DETAIL PROJECT REPORT

VISHWAKARMA YOJNA: VIII
AN APPROACH TOWARDS RURBANISATION

MandirVillage
Navsari District

PREPARED BY

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Nodal officers
Prof. Chintan B. Naik
Prof. Komal A. Pal

YEAR:2020-21

GUJARAT TECHNOLOGICAL UNIVERSITY
Chandkheda, Ahmedabad– 382424 Gujarat

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CERTIFICATE

This is to certify that the following students of degree Engineering successfully submitted

Detail Project Report for,

VILLAGE: Mandir

DISTRICT: Navsari

Under

Vishwakarma Yojana: Phase-VIII

In partial fulfillment of the project offered by

GUJARATTECHNOLOGICALUNIVERSITY,CHANDKHEDA

During the academic year 2020-21.

This project work has been carried out by the murderous supervision and guidance.

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College Stamp:	

ABSTRACT

Vishwakarma Yojana is one such initiative towards Rurbanization of villages by Government of Gujarat that hinders such migrations. This Yojana aims at developing the village by providing all the urban facilities that a city may have yet maintaining the Rural soul. This can be achieved by considering various aspects such as Physical, Social, and Renewable infrastructural facilities. The concept of Rurbanization at regeneration and revitalization of both the physical as well as social environment in villages through a judicious and economic consumption of resources is the thought for betterment or the villages. It is designed to reduce and remove the rural-urban divide and to lead to process of rural transformation that is not exploitative. It is an approach towards Rurbanization, it has been proposed to provide the benefit of real-world experience to engineering students and apply their technical knowledge in the planning, development and management of rural infrastructure facilities.

In this village on one hand some essential infrastructural facilities like Water Supply, Road Network and electricity, primary school, secondary and higher secondary school etc. have been good and enough on the other hand lacking infrastructural facilities like drainage, public toilet, and public garden. Under this scheme the villages of Rurban areas will be adopted by various engineering colleges under the Gujarat technological University. The engineering colleges would study the identified villages and make recommendations to achieve integrated and comprehensive development through technology application and project preparation and management. It is the project that helps us to know about real inside the field work. It also helps us to know about the difference between the book knowledge and real work on side.

Mandir village is a village that develops near the edge of two beautiful lakes. This village has its own historically important. Many old temples are existing in this village. Gujarat state highway number six is passing through this village.

In this project our main aim is to identify the problems and find their solution as per current and future need of population. Selection of infrastructure facility has been made based on the most recent need of people as well as for modernization of village by keep in touch with environment.

India is one of the fastest developing countries in the world. In India about 70% people live in rural areas. So, it is very important to redevelop urban areas with proper planning and good aesthetics to meet the future requirement of population of country. So, there is a huge scope in the field of urban development.

Key Words: Vishwakarma Yojana phase VIII, Modern village, Urban development, Village in Navsari

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We are highly indented to **Gujarat Technological University**, Ahmedabad for providing us such opportunity to work under Vishwakarma Yojana to get real work experience and applying our technical knowledge in the development of Villages.

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ABBREVIATION

SHORT NAME / SYMBOL	FULL NAME
Govt.	Government
C.H.C	Community Health Centers
P.H.C	Primary Health Center
RCC	Reinforced cement concrete
IoT	Internet of Things
SC	Scheduled Castes
ST	Scheduled Tribes
USD	United States Dollar
NGO	Non-governmental organization
IST	Indian Standard Time

Chapter 1:- Ideal village visit from our district of Gujarat State.

1.1 Background& Study Area Location

BABEN village BARDOLI is situated inSuratdistrict. People of this village are livingin very peaceful manner. This village have very proud history. Agriculture is the main profession of this village. Still this village is waiting for industrial development. Education, drinking water, Road and Electricity are the main concern of this village. Young generation is more attracted towards mobile, laptop and computer technology these days. If banks and finance institutions proved loan and other financial support to the villagers, this village will see the real development. Medical and health services mustbe improved.

Study Area and location

TALUKA NAME	BARDOLI
DISTRICT	SURAT
STATE	GUJARAT
LANGUAGE	GUJARATI,HINDI,ENGLISH
ELEVATION/ALTITUDE	34mtr ABOVE SEA LEVEL
STD CODE	02622
ASSEMBLY CONSISTENCY	BARDOLI ASSEMBLY CONSISTENCY
LATITUDE	21.1379796 N
LONGITUDE	73.0966019 E

Figure 1. Map of BABEN (Ideal Village)

1.2 Concept: Ideal Village

Baben as an Ideal Village.BABEN village, which is located some 35 km from Surat city, typifiesdevelopment. The villagers enjoy all the facilities that one living in the city does. The 2-km road from Bardoli to Baben gives a commuter the feeling of passing through a highway. This is because thevillage road is 12-meter-wide and is well lit with streetlights. The road has not been laid withgovernment money, but the fund for it was raised through various ingenious schemes by the villagers.

Figure 2:Lack view of BABEN VILLAGE

The Idea of an Ideal Village:

About 70% of our population lives in rural areas (Census 2011). Though number is expected to fall in the coming years, it is still estimated that more than half of our population would be rural even in 2050. Despite there being several past initiatives by governments at all levels – Central, State and Local – in the past, the level of improvement has not kept pace with the rising aspirations among Indians.

The idea of a"smart village" or model village has been explored earlier as well, most notably through the ***PradhanmantriAdarsh Gram Yojana***, launched by the Central Government in 2009-10. The target villages under the scheme were those with more than 50% of the population belonging to Scheduled Castes (SCs). Additionally, State governments have also taken steps in this direction.

1.2.1 Objectives

A model village project has the following important objectives:

- ✓ Prevent distress migrationfrom rural to urban areas, which is a common phenomenon India's village due to lack of opportunities and facilities that guarantee a **decent standard of living.**
- ✓ Make the model village a **"hub"** that could attract resources for the development of other villages in its vicinity.
- ✓ Provide **easier, faster and cheaper access** to urban markets for agricultural produce or other marketable commodities produced in such villages.

1.2.2 Example / Live Case studies of ideal village of India/Gujarat

- Baben village, which is located some 35 km from Surat city, typifies development. There villagers enjoy all the facilities that one living in the city does.
- The 2-km road from Bardoli to Baben gives a commuter the feeling of passing through a highway. This is because the village road is 12-meter-wide and is well lit with streetlights.
- The road has not been laid with government money, but the fund for it was raised through various ingenious schemes by the villagers.
- The village panchayat collected Rs 3 crore in the last five years from the real estate developers and used that money on roads, street lights and water system for the 15000 people of Baben.
- The village also has a degree and diploma engineering college, a school and a restaurant.

Figure 3:-Aesthetics of Baben Village

1.2.3 The Idea of a model Village

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Sector	Parameter	Urban	Rural
Expenditure Poverty	**% People Below Poverty Line (2011-12) (Tendulkar Estimates)**	14%	26%
	% People Below Poverty Line (2011-12) (Rangarajan Estimates)	27.2%	31.3%
Education	**Literacy Rate - 2011#**	85%	68.9%
	Average Years of School Education of Working Population*	8.42%	4.72%
Health	**Infant Mortality Rate (Imr) - 2011##**	28%	46%
	Life Expectancy at Birth - 2002-06 **	68.8%	62.1%

Table 2:- GAP between Rural and Urban

- One reason for the failure of rural development schemes has been the lack of a holistic focus on the village as a unit. Separate flagship schemes targeting different sectors such as health (NRHM), education (SSA) and livelihood (NREGA, NRLM) have been launched in the past, but met with limited success. The "model village" concept could address these challenges comprehensively. It can address resource deficits in each of these sectors, with adequate focus on the special needs of every village.
- The idea of an "Adarsh gram" or model village has been explored earlier as well, most notably through the PradhanmantriAdarsh gram yojana, launched by the central government in 2009-10. The scheme was implemented in pilot mode in 1000 villages of Assam, Bihar, Himachal Pradesh, Rajasthan and Tamilnadu, with an allocation of Rs 10 lakh per village. This limit was later raised to Rs 20 lakh per village. The target villages under the scheme were those with more than 50% of the population belonging to scheduled castes (SCs).

1.3 Detail study(Socio economic, physical, demographic and infrastructure details) of Ideal village.

❖ Physical& Demographical Growth: -

- The village is home to 2766 people, among them 1415 (51%) are male and 1351 (49%) are female. 85% of the whole population are from general caste, 10% are from schedule caste and 6% are schedule tribes. Child (aged under 6 years) population of Baben village is 15%, among them53% are boys and 47% are girls. There are 416 households in the village and an average 7 persons live in every family.

	TOTAL	GENERAL	SC	ST	CHILDREN
TOTAL	15610	11458	1892	2260	2121
MALE	8642	6484	937	1221	1164
FEMALE	6968	4974	955	1039	957

Table 3:- Cast wise Male Female Population 2011

❖ Economical Profile:-

- Most people have their own business and other have own farm. A minor person depends on job. Baben has 37% (1013) population engaged in either main or marginal works. 47% male and 26% female population are working population. 40% of total male population is main (full time) workers and 6% are marginal (part time) workers. For women 19% of total female population is main and 8% are marginal workers.

❖ Infrastructural Facilities:-

- Infrastructural facilities like water supply, sanitation facility, solid waste collection, storm water collection, road as well as light facility available in village.

❖ Physical Infrastructure Facilities:-

- All approach road is either bituminous or cement concrete and have well drainage facility of rainwater. All internal roads are made up of cement concrete and main approach road are bituminous road. Also, there is footpath on either side of the main road. In village there is also 9 over head water tank of capacity about 50000 lit. With perfect condition.


Figure 4:- Road of BabenvillageFigure 5:- Overhead Water Tank

- In village there is also 8 units of public latrine blocks which are in good condition. Panchayat higher person for cleaning and maintenance of latrine. For solid waste collection door to door collection system is provided gram panchayat.

Figure 6:- Door-to-Door Collection of Solid Waste System

❖ Social Infrastructure Facilities:-

- In educational facility village have up to college level in which include 6 governments Aanganwadi, 1 primary school, 1 secondary and higher secondary school and have 7 collages. In health facilities village have 2 sub center and about 8 private clinics available.

Figure 7:-Aanganwadi inBaben village

Figure 8:- Primary school in Baben village

Figure 9 :-PHC& sub PHC in Baben village

1.4 SWOT analysis of Ideal village:-

- The SWOT analysis of ideal village includes:
- Strength:
  - Water tank facility
  - Drainage facility
  - Road network
  - Transport Facility
  - Sanitation facility
  - Irrigation facility
  - Housing condition

- Weakness:

Absence of use of renewable energy source, such as

  - Solar panel based LED street lights
  - Biogas plant
  - Hydropower electricity
  - Electricity generation from wind

- Geothermal power plants - Low wage payment - Low saving habit

➢ Opportunities:
- Demand for agriculture
- NGO intervention
- Government Schemes
- High standard urbanization
- Expansion of public transport system
- Residential development with high added value

➢ Threats:
- Job insecurity
- Low repayment habit
- Urbanization without proper landscaping plan or standards
- Non-application of quality and environmental standards

1.5 Prospects of Development of the Ideal village

✓ To update school as a smart school and also achieve 100% literacy. Till now only partly village is covered with CCTV and wi-fi facility so next step is provide this facility in whole village as soon as possible.

1.6 Benefits of the visits of Ideal village

✓ The techno economic survey of Baben village will help us in the planning process of physical and social infrastructure in allotted villages. We got a clear idea as to which amenities and infrastructures are required for better life in rural area.
✓ We were also made aware about different schemes by govt. for rural development. This visit helps us to know Modern and accurate working of local panchayat body.

1.7 Electrical / Civil aspects required in Ideal village / Smart Village

Civil aspects:

➢ A ‘Smart Village/Ward’ encompasses sustainable and inclusive development of all sections of its Community, so. The 100 per cent achievement of the following basic amenities, they enjoy a high standard of living. Homes for all -with access to toilet, safe-drinking water, and regular power. Skills and Village Enterprise development with bank and market linkages gave more flexible access to youth. Has functional solid/liquid waste management system.

Electrical aspects:

➢ There are certain ideas in smart cities that can be directly implemented in villages. For example, the use of cameras and sensors in streets for surveillance, sensors for healthcare etc.
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Chapter 2 Literature Review

2.1 Urban & Rural village concept

Rural :-

Rural areas are also known as the 'countryside' or a 'village' in India. It has a very low population density. In rural areas, agriculture is the chief source of livelihood along with fishing, cottage industries, pottery etc.

Urban :-

All places with a municipality, corporation, can torments board or notified town area committee, etc. All other places which satisfied the following criteria: A minimum population of 5,000 At least 75 per cent of the male main working population engaged in nonagricultural pursuits; A density of population of at least 400 persons per sq. km.

2.2 Importance of the Rural development

- Rural development has a wider view of rural society and its change. There are various aspects dealing with rural areas and its societies, which have been changing since long by many factors.
- The main characteristic features of society are based on the changes in economic, social, cultural, religion, believes, attitudinal, organizational and even political changes, besides the technological alterations.

2.3 Ancient Villages / Different Definition of: Rural Urban Villages

- Rural areas have low population density and large amount of undeveloped land. Agricultural activities are more in rural areas. Rural areas are large and isolated areas of and open country with low population density.
- **United states census(2000 census)** defines rural areas as comprising open country and settlements with fewer than 2500 residents areas designated as rural can have population densities as high as 999 per square mile as 1 person per square mile.
- **National geographic society** defines A rural area is an open swath of land that has few homes or other buildings and not very many people.

2.4 Scenario: Rural / Urban village of India population Growth

	1991-2001	2001-2011	Difference
INDIA	21.5	17.6	-3.9
RURAL	18.1	12.2	-5.9
URBAN	31.5	31.8	+0.3

Table 4:- Growth Rate of Population

2.5 Scenario: Rural / Urban India & Gujarat as per Census 2011 and latest population Growth

Gujarat Urban/Rural Population – Census 2011

- ✓ As per the Census 2011 out of total population of Gujarat, 42.6% people lived in urban regions while 57.4% in rural areas.
- ✓ The total figure of population of urban population was25,745,083 out of which 13,692,101 were males while remaining 12,052,982 were females. In rural areas of Gujarat, male population was 17,799,159 while female population was 16,895,450.
- ✓ The average sex ratio in urban regions of Gujarat was 880 females per 1000 males. Also the Child (0-6 age) sex ration of urban areas in Gujarat was 852 girls per 1000 boys.
- ✓ Thus the total children (0-6 age) living in urban areas of Gujarat were 2,952,359 which is 11.47% of total urban population. Similarly the average sex ratio in rural areas of Gujarat was 949 female per1000 male.
- ✓ The Child sex ratio of rural areas in Gujarat was 914 girls per 1000 boys.

2.6 Rural Development Issues - Concerns – Measures

- ➢ Issue of rural area: This is particularly shown in the disparity of economic and cultural development between urban and rural areas. It is mainly done because of the dual segmentation based on the household registration system.
- ➢ Issue of farmer: It include increasing income level of farmer, reducing burden of farmer, protect rights of farmer without confused migration of rural workers to cities.
- ➢ The financial, manpower and executive resources devoted to the implementation of rural growth programmers are utterly inadequate.
- ➢ Good implementation of rural development programmers can be ensured only if those responsible for actual implementation are paid reasonably well, appropriately trained, and suitably motivated. But this has not been done as yet.

Measures:

- ➢ Increasingly tourism, niche manufacturers, and recreation, have replaced resource extraction and agriculture as dominant economic drivers.
- ➢ The major occupation of villagers is agriculture, thus Growth of village is also depend upon development of agriculture system.
- ➢ By Various measures for the improvement of regional structures (land consolidation, rural road construction, village development) were merged and expanded strategic elements.

2.7 Various infrastructure guidelines with the Norms for Villages for the provisions of different infrastructure facilities

Facilities	**Planning Commission/UDPFI Norms**		**Village Name:**	**Mandir**
			Population:	**3500**
		Existing	**Required as per Norms**	**Gap**
Social Infrastructure Facilities				
Education				
Anganwadi	Each or Per 2500 population	1	2	1
Primary School	Each Per 2500 population	1	1	0
Higher Secondary School	Per 15,000 Population	0	0	0
College	Per 125,000 Population	0	0	0
Medical Facility				
Govt/Panchyat Dispensary or Sub PHC or Health Centre	Each Village	1	1	0
Physical Infrastructure Facilities				
Transportation	Adequate		Inadequate	
Pucca Village Approach Road	Each village		√	
Bus/Auto Stand provision	All Villages connected by PT (ST Bus or Auto)		√	
Drinking Water (Minimum 70 lpcd)	Adequate		Inadequate	
Over Head Tank	1/3 of Total Demand		√	
U/G Sump	2/3 of Total Demand		√	
Socio- Cultural Infrastructure Facilities				
Community Hall	Per 10000 Population	1	1	0

2.8 Other Projects / Schemes of Gujarat / Indian Government

- Atmanirbhar Bharat Abhiyan
- PM-KISAN (Pradhan Mantri Kisan Samman Nidhi) Scheme
- Pradhan Mantri Kisan Maan Dhan Yojana
- PM Garib Kalyan Yojana (PMGKY)
- Pradhan Mantri Shram Yogi Maan-Dhan
- New Jal Shakti Ministry
- Jan Dhan Yojana
- Skill India Mission

- Make in India
- Swachh Bharat Mission
- Sansad Adarsh Gram Yojana
- Sukanya Samriddhi Scheme – Beti Bachao Beti Padhao
- HRIDAY Scheme
- PM Mudra Yojna
- Ujjwala Yojna
- Atal Pension Yojana
- Prime Minister Jeevan Jyoti Bima Yojana
- Pradhan Mantri Suraksha Bima Yojana
- AMRUT Plan
- Digital India Mission
- Gold Monetization Scheme
- UDAY
- Start-up India
- Setu Bhartam Yojana
- Stand Up India
- Prime Minister Ujjwala Plan

Chapter 3 :-Smart Concept Idea and its Visit

3. 1 Introduction: Concepts, Definitions and Practices

- The first question is what is meant by a ‘smart city’. The answer is, there is no universally accepted definition of a smart city. It means different things to different people.
- The conceptualization of Smart City, therefore, varies from city to city and country to country, depending on the level of development, willingness to change and reform, resources and aspirations of the city residents.
- A smart city would have a different connotation in India than, say, Europe. Even in India, there is no one way of defining a smart city.
- Some definitional boundaries are required to guide cities in the Mission. In the imagination of any city dweller in India, the picture of a smart city contains a wish list of infrastructure and services that describes his or her level of aspiration.

3.2 Vision-Goals, Standards and Performance Measurement Indicators

- Smart Cities Mission of the Government is a bold, new initiative. It is meant to set examples that can be replicated both within and outside the Smart City, catalyzing the creation of similar Smart Cities in various regions and parts of the country.
- The core infrastructure elements in a smart city would include:
    1. Adequate water supply
    2. Sanitation
    3. Assured electricity supply
    4. Public transport
    5. Affordable housing
    6. Good governance
    7. Sustainable environment
    8. Safety and Security of citizens
    9. Health and Education

3.3 Technological Options

- Smart Energy :-
  Smart energy systems will monitor and control energy usage to more efficiently manage and conserve energy. Cisco estimates that cities that run on information can improve their energy efficiency by 30 percent within 20 years. By using renewable energy sources, manage water supply and have a waste management system, cities can reduce pollution and use less energy.
- Smart Mobility :-
  Smart mobility strives to find more sustainable transport options. Deloitte reported that an average American is stuck about 34 hours in traffic every year. With rapidly growing cities, new transportation solutions need to be developed to keep mobility dynamic. This could save the US government for about 124 billion dollars every year. Finding new and improved solutions will reduce costs and have a positive environmental impact.

- Smart public Services :-
  By connecting city residents and authorities using innovative communication technology, cities can become safer, cleaner and the general city standard will improve.If residents have the possibility to report trash or infrastructural problems, authorities can act faster to solve problems they otherwise would not be aware of.
- Smart Infrastructure :-
  Smart infrastructure creates the fundament for all smart solutions. By using new technology to convert raw data into information, urban and regional development can be planned, adjusted.
- Smart Care :-
  To adapt to changes in population demographics, the development of smarter healthcare services will provide quality services also in the future. Smarter care will reduce costs and connect users within the healthcare industry to provide necessary patient information.

3.4 Road Map and Safeguards

- The purpose of building smart cities is to make the lives of the residents easier and safer.
- Technology can be used as an instrument to protect lives and improve services and businesses processes; furthermore, it can be used to protect Personally Identifiable Information (PII) and cities critical infrastructures, such as transportation, hospitals, power plants, and water treatment systems.
- In order to build a smart and secure city, technology can certainly play a critical role, but technology alone is not enough-the city‘s employees and the community have an equally important role to play.
- The city officials need to empower the public by engaging them in the decision-making process.
- Cities need to value their citizens feedback by encouraging them toparticipate and contribute to solving problems; moreover, local citizens must be fully aware of the community challenges and must be engaged in shaping the budget allocations, local taxes, etc.

3.5 Issues & Challenges

- Issues concerned with developing Smart City Projects:
- ✓ Under the flagship ―Safe City project, the Union Ministry proposes USD 333 million to make seven big cities (Delhi, Mumbai, Kolkata, Chennai, Ahmedabad, Bangalore and Hyderabad) to center on technological progress rather than manpower. Ministry of Urban Development plans to invest more than USD 20 billion in the metro rail projects in coming years.
- ✓ The proposed 534 km, Mumbai- Ahmedabad high speed rail project will have an investment of around USD 10.5 billion.
- ✓ The Government of India has approved a USD 4.13 billion plan to spur electric and hybrid vehicle production by laying out an ambitious target of 6 million vehicles by 2020.
- ✓ Developing a new or green field Smart City with target population of 5 to 10 lakhs is likely to require financial investment ranging between INR 75,000 and 150,000 crores and may require 8 – 10 years for implementation.

3.6 Smart Infrastructure - Intelligent Traffic Management

- Transport infrastructure should be planned on priority for pedestrians, cyclists, electric vehicles and other private vehicles. For electric cars, charging points should be provided at several locations.

3.7 Cyber Security

- Smart cities move from being a buzzword to reality as the market has evolved into its next stage. As more governments begin to adopt smart concepts, most find it challenging to keep pace with rapid changes in the digital world and the continued evolution of their service delivery models.
- The interface between urban growth, technology, infrastructure and capital requirement presents a unique set of opportunities and challenges to the implementation of Smart cities.
- The challenges cities face generates demand for investment in the physical, economic, institutional and social infrastructure. The report tries to highlight the various parameters of a smart city, existing security challenges and possible solutions.

3.8 Retrofitting- Redevelopment- Greenfield Development District Cooling

Air conditioners and hammed services: In the Southeast, air conditioners are almost crucial pieces of equipment for home comfort. However, it can be difficult to find the right air conditioner for your home, one that will provide enough cool air in the summer to cool your home without driving your energy costs through the roof. We can help! At Hammond Services, we can help you choose the perfect air conditioner for your home, install it professionally, and even maintain/repair it in the years ahead.

Energy Efficient and Affordable Air Conditioners: When it comes down to selecting a new air conditioner for your home, there are a few things you should consider. First of all is efficiency. By choosing an energy efficient model, you can be sure your money is being well spent and isn't being thrown away with inefficiencies. Get the most bang for your buck with an air conditioner that won't cost a fortune to run.

Rreliability you can count on as a carrier factory authorized dealer, our commitment to quality products you can count on is clear. We're confident when we say that with the proper maintenance, you can count on our air conditioners to operate efficiently for years to come. If you're having trouble choosing an air conditioner for your home, contact us today – we can help you weigh your options!

District cooling is the cooling equivalent of district heating. Working on broadly similar principles to district heating, district cooling delivers chilled water to buildings like offices and factories needing cooling. In winter, the source for the cooling can often be sea water, so it is a cheaper resource than using electricity to run compressors for cooling. Alternatively, District Cooling can be provided by a Heat Sharing Network which enables each building on the circuit to use a heat pump to reject heat to an ambient ground temperature circuit.

3.9 Strategic Options for Fast Development

A city with free Wi-Fi in all public spaces. A city where children learn how to program apps in elementary school. Where you can shop online and have your shopping delivered to your home within hours. Where street lighting is provided on demand. A city that uses smart sensors to tell you where to park your vehicle downtown. That knows when your garbage needs to be collected. That has open data access. That uses smart algorithms to coordinate hospital and vaccination capacities.

A smart city takes action in all of these areas based on a strategic and integrated planning approach and a comprehensive and high-quality IT infrastructure. Sounds too good to be true? Different cities already do each of these things today. But no single city exists that ticks all the boxes. For the world's urban centers, a complete set of smart services is not something they currently offer. In many cases it is not even something they are planning to offer in the future.

We know this from our ground-breaking investigation of 87 global cities. This is the first systematic study of cities' smart strategies on such a scale. We took a close look at cities from Europe to Africa, from regional centers of less than half a million to megacities of more than 20 million. We examined their official "smart city strategies" and other strategic policies to discover what they were up to. And we also looked at where they are headed in the coming years and decades. The results took us by surprise. The "smart city" has been an agenda item for many years now and there is widespread acknowledgment that smart city strategies are of vital importance to the development of urban areas. But the situation on the ground is very patchy.

Most cities are simply not taking a broad enough approach: They lack a holistic perspective that covers all parts of society and all relevant facets of urban life. In this study, we look at how cities around the world are embracing the smart revolution – and the multibillion-dollar market it has created. We point out where we believe there is room for improvement and how cities can go about achieving it. Urban centers need to develop an interconnected, integrated approach, one that brings together areas traditionally viewed as separate: energy and mobility, government and health, education and environment, and so on. Their aim must be to forge a holistic smart city strategy that encompasses every area of citizens' lives.

3.10 India's Urban Water and Sanitation Challenges and Role of Indigenous Technologies

- Water and its management are a critical issue in India and there is an urgent need for investment in water and sanitation infrastructure across the country.
- Since 1992, countries around the world have marked World Water Day every March 22 to promote awareness and understanding about issues related to water. This year it is timely to highlight effective ways to attract the resources and expertise necessary to support such investment.

- India faces herculean challenges in providing and maintaining the two basic services of safe drinking water and improved sanitation. With more people than any other country in the world living without access to improved sanitation, nearly half of the population in India currently practices open defecation. But more than 100 million additional toilets must be built within the next four years in order to achieve the achievable vision of an open-defecation-free India.

3.11 Initiatives in village development by local self-government

- At present, there are about 3 million elected representatives at all levels of the panchayat, one-half of which are women.
- These members represent more than 2.4 lakh (240,000) Gram Panchayats, about 6,000 intermediate level tiers and more than 500 district panchayats. Spread over the length and breadth of the country, the new panchayats cover about 96% of India's more than 5.8 lakh (580,000) villages and nearly 99.6% of the rural population. This is the largest experiment in decentralization of governance in the history of humanity.

3.12 Smart Initiatives by District Municipal Corporation

- Managing solid waste is a daunting task for every urban local body (ULB) in India. The irony is such that out of 400 municipal corporations and councils in India, only a handful of ULBs are managing their solid waste management, while reinventing some of the age-old garbage disposal methods with a touch of new technologies. The Council has listed some of the proven examples that can be considered for tackling such a sensitive issue.
- Take Pune's example. The city has managed to tackle the waste of over 1,700 tones that it generates daily, while ensuring minimization of land fill, freeing up urban land for more productive purposes. At present, the Pune Municipal Corporation (PMC) has combined an integrated approach with decentralized waste management by installing 25 bio-methane plants that produce 600 kW of electricity and compost as a by-product

3.13 Any Projects contributed working by Government / NGO / Other Digital Country concept

- No NGO is working in this village and village run under the self governance of people.
- Government project also contribute for its development but still now no government project is running for this village.

3.14 How to implement other Countries smart villages projects in Indian village context

- In line with the described global initiatives and tendencies towards smarter and more sustainable communities, the European Union has also taken a holistic and integrative approach towards those objectives.
- The Declaration acknowledges "that the rural digital economy, if developed in an innovative, integrated and inclusive way, has the potential to improve the life-quality of rural citizens and, thereby, contribute to tackling the current depopulation of- and the migration from—rural areas

Chapter 4: About Mandir Village

4.1 Introduction: Urban & Rural

Urban:-

An urban area is the region surrounding a city. Most inhabitants of urban areas have nonagricultural jobs. Urban areas are very developed, meaning there is a density of human structures such as houses, commercial buildings, roads, bridges, and railways. "Urban area" can refer to towns, cities, and sub-urban.The conception of early predecessors of Urban areas during the Urban revolution led to the creation of Human Civilization with modern urban planning, which along with other human activities such as exploitation of natural resources leads to human impact on the environment.

Rural:-

Rural areas have a low population density and small settlements agricultural areas are commonly rural though so are others such as Forests. The main source of income of people is depends on the agriculture.According to the planning commission, a town with a maximum population of 15,000 is considered rural in nature. In these areas the panchayat makes all the decisions. It is also defined as undeveloped area of any country where living standard of people is not so high and they faces lake of many basic facilities such as electricity supply, drainage line, drinking water supply, sanitary arrangementetc.

4.1.1 Introduction about Mandir village

- Mandir is a village which is located at Jalalporetaluka of Navsari district Gujarat.
- People who live in this village are too humble and always ready for help other.
- It is a small village which is well connected with State Highway of Gujarat.
- Population in this village is not so high.
- People in this village are mainly depends on the Agriculture.
- There is no industrial development in this village.

4.1.2Need of Study

- In India about 70% population live in rural area so it is very important to develop our rural area for overall development of the country.
- Under Vishwakarmaproject, the basic need of rural development program through creation of social and physical infrastructure.
- Under this project, the common problem of village is solved by engineering students.

4.1.3 Study Area:-

Taluka name	Jalalpore
District	Navsari
State	Gujarat
Language	Gujarati, Hindi, Marathi
Elevation / Altitude	14 meters above MSL
Telephone Code / STD code	396472
Assembly Consistency	Jalalpore Assembly constituency
Elevation / Altitude	14 meters. Above Sea level
Time zone	IST (UTC5:30)
Latitude	20.8896° N
Longitude	72.9187° E

Table 5:- Details of Mandir Village

- Study area mainly includes Mandir Village which is situated in JalalporeTaluka in Navsari district of Gujarat state, India. It is located 8 KM towards south from district head quartersNavsari. Navsari, Valsad, Surat, Pardi are the nearby Cities to Mandir.

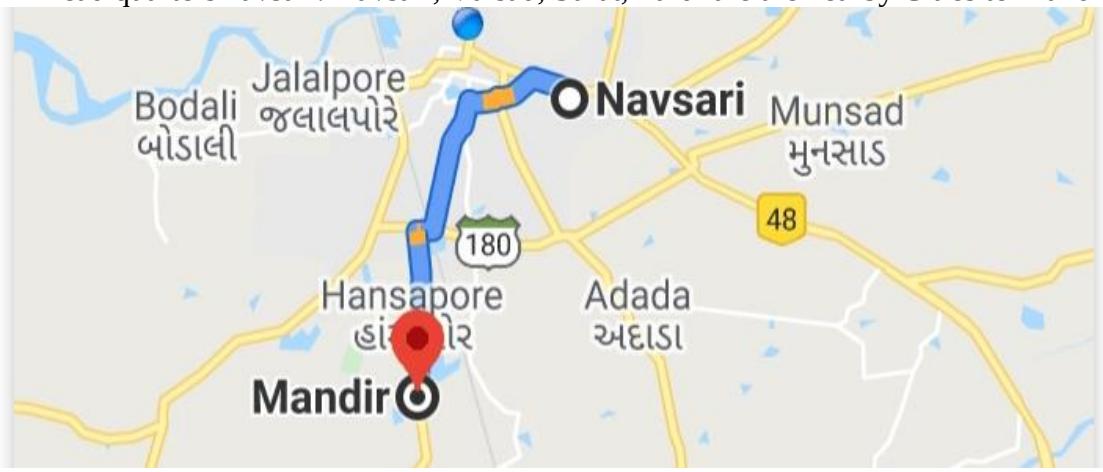


Figure10:-Route of Mandir village from Navsari city

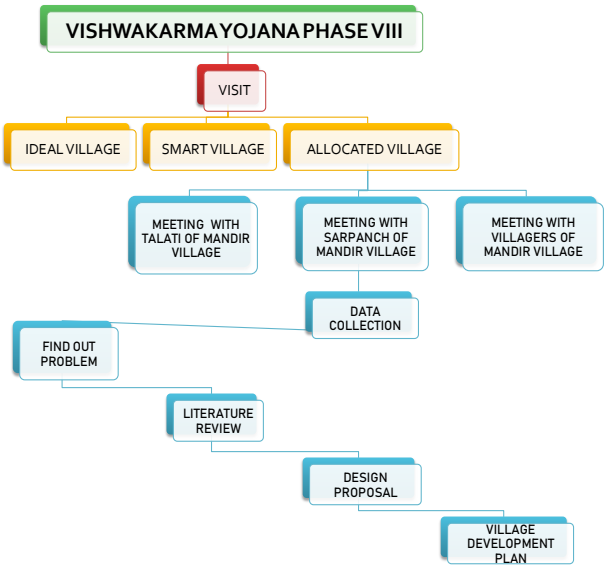
4.1.4 Objectives of the study:

- Bridging the rural-urban divide economic, technological facilities and services.
- Repair and properplanning have its own advantages and it can offer many benefits.
- Maintenance of existing like gram panchayat building, canal and other.
- Water supply for drinking and irrigation,sanitary arrangement should be the priority focus can be provided.
- To increase agricultural growth by adopting suitable method of irrigation.
- To Identification Sanitation Facilities That Are Needed to Be Improve Like Sewerage and Drainage Line, Dumping Facilities, Electricity Connections etc.

4.1.5 Scope of the study:

- There is huge scope of village development in future,these include agricultural growth, putting up of economic and social infrastructure, fair wages as also housing and house sites for the landless, village planning, public health, education and functional literacy, communication etc.
- **Rural development** has assumed greater importance in India today than in the earlier period in the process of the development of the country. It is a strategy package seeking to achieve enhanced rural production and productivity,greater socio-economic equity, and aspiration, balance in social and economic development.
-

4.1.6 Methodology:



4.1.7 Available methodology for development of related to civil/Electric

- There are many methodologies for development of village related to civil but commonly used method is survey and panning keep in view to people review.
- These include many steps like :
  1. Student team and faculty advisor meet at start of semester
  2. Visit the Smart/Idea village and collect data of that village
  3. Identify the problem facing by the villager of allocated village
  4. Study GAP Analysis
  5. Design proposal
  6. Project management structure
  7. Budget
  8. Grant from various sources
  9. Resume of team members

4.2 Mandir Village Study Area Profile

Figure 11: Study Area of Mandir village

4.2.1 Study Area Location with brief History Land use detail

- **Brief History**
  Mandir village has Shiv Mandir open at Avda Falia, Matvad. It also have some another temples like hanuman mandir, Ramji-Mandir, Shri Bhutbapa Mandir etc. It's off Dandi Road. We had Pran Pratistha on 21st January till 23rd January. There is a Priest all day and need to visit.

- **Land Use**
  The Main use of land in this village is for Agricultural activities and residence purpose.

❖ Official language of Mandir:

- The native language of Mandir is Gujarati and most of village people speak Gujarati. Mandir people use Gujarati language for communication.

❖ Mandir's nearest town /city/important place is:-

Nearest city/town to Mandir:

- Navsari 8 km
- Surat 40 km
- Bilimora 20.1 km
- Gandevi 12 km
- Valsad 33 km

Nearest railway station:-

- Vedchha railway station 2.8 km
- Gandhi smriti railway station 4 km
- Ancheli railway station 6.7 km
- Amalsad railway station 10 km
- Navsari railway station 7.5 km

4.2.2 Base Location Land Map, Gram Tal Map map,

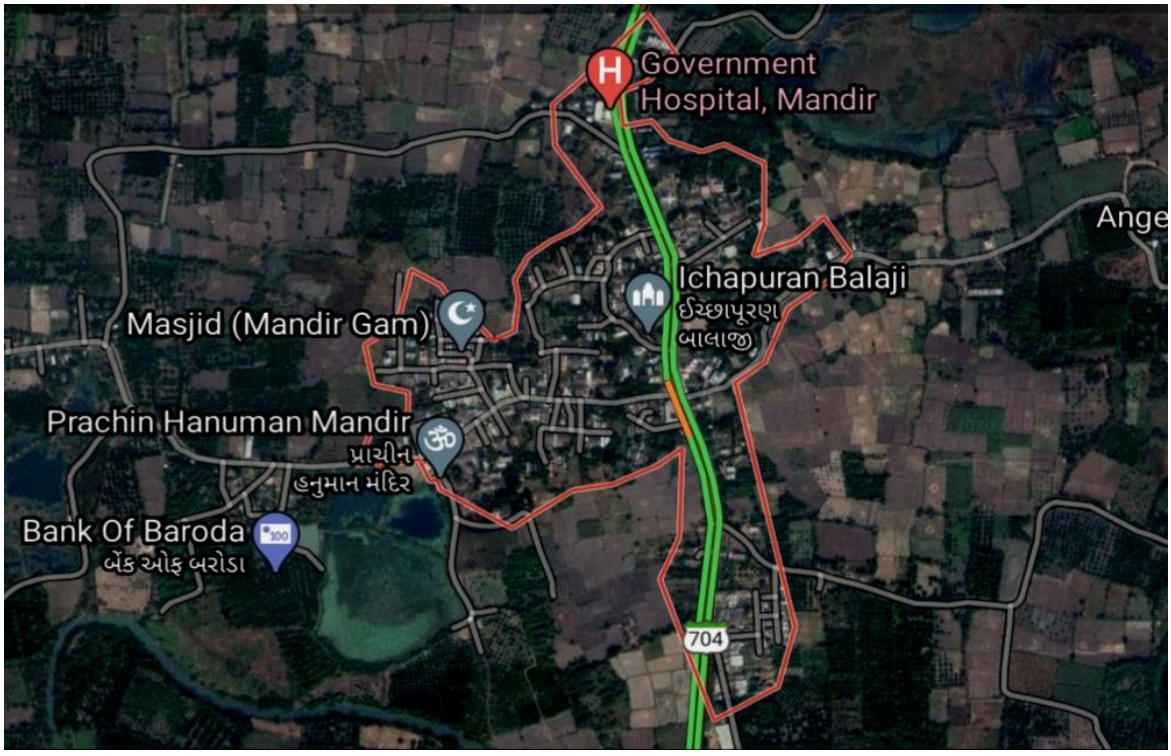


Figure 12 :-Map of Mandir village

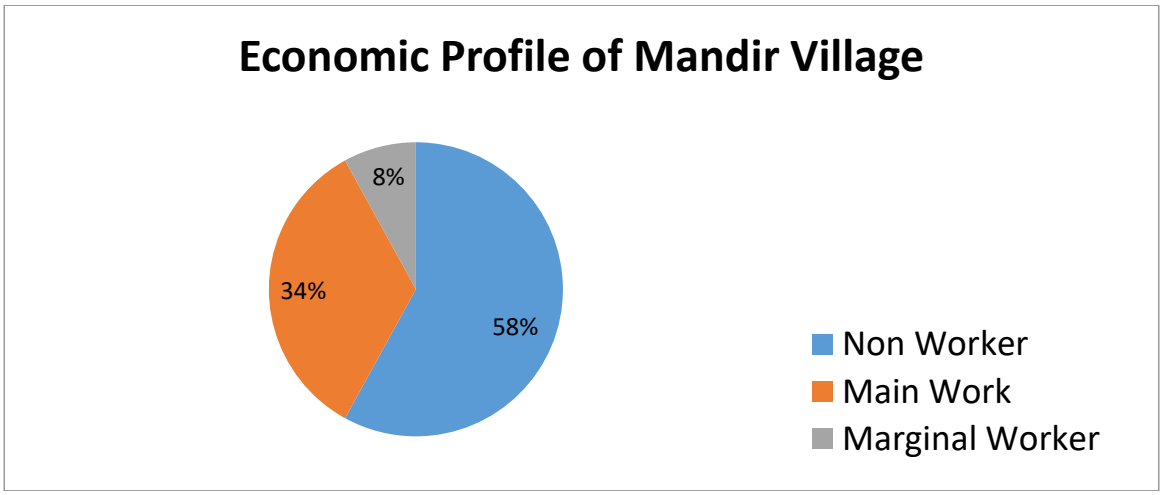
4.2.3Physical& Demographical Growth:-

PARTICULARS	TOTAL	MALE	FEMALE
Total number of houses	**1050**	**-**	**-**
Population	**3556**	**1776**	**1780**
Child(0-6)	**344**	**195**	**149**
Schedule caste	**45**	**21**	**24**
Schedule tribe	**118**	**592**	**593**
Literacy	**88.39%**	**91.10%**	**84.98%**
Total Worker	**1486**	**1091**	**395**

Table 6:-Physical & Demographical Growth

4.2.4 ECONOMICGENERATION PROFILE:-

- Most of the people depend on agriculture.
- Minor people depend on job.
- 60% male and 23% female population are working population
- 43% total male populations are full time workers and 17% are marginal workers.
- 17% total female populations are full time workers and 6% are marginal workers.



4.2.5 Actual Problem faced by Villagers and Smart solution

Generally, in village main source of drinking water is ground water which laid out by bore well and by open well which is in bad condition.

There is only 1 overhead water tank, which is in used condition of 25,000 lit. Of capacity. Required some maintenance works to increase usage life of the tank and required new overhead water tank of large capacity.
About 90% of village is facilitated with drainage of daily drain of waste water as well as also for rainy water solution. But the fact is that this drainage facility is not in use because of it is not maintain properly and water logging problem in drainage. If some repair and maintenance work carried out it will be in working condition.

4.2.6 Social Scenario: -

PARTICULARS	TOTAL	MALE	FEMALE
Total number of houses	1050	-	-
Population	3556	1776	1780
Child(0-6)	344	195	149
Literacy	88.39%	91.10%	84.98%
Total Worker	1486	1091	395
Main Worker	1219	-	-
Marginal Worker	267	115	152

Table 7:- Social scenario of Mandir village

- The Mandir village has population of 3556 of which 1776 are males while 1780 are females as per Population Census 2011.
- Mandir village has higher literacy rate compared to Gujarat. In 2011, literacy rate of Mandir village was 88.39 % compared to 78.03 % of Gujarat. In Vedchha Male literacy stands at 91.10% while female literacy rate was 84.98 %.

4.2.7 Migration Reasons / Trends

- Major reason for migration is employment but it is not only reason for migration people also migrate from village due to higher education and marriage in outside of the village.

4.3 Datacollection:-

4.3.1 General (Method of data collection)

For Data Collection, We Are Conducting Local Surveys of Mandir Village, Which Are as Following:
1. Participatory Survey
2. Base Line Survey
3. Hand-Out Survey
4. Mail Survey
5. Face to Face Survey
6. Electronic Survey

7. Questionnaire Survey

Base line survey is a benchmark for any intervention during and post implementation of any development programme. A detailed baseline survey was undertaken which involved household census survey, bio-physical survey and village level data collection from sarpanch. This gave in the details of the demographic profile of the village, the literacy percentage, sc/st population, number of bpl household, cattle population and net consumption rate in the village, average milk production of the cattle and various schemes running and their benefits bio-physical survey was undertaken to identify various natural resources available in the village. It included the soil typology, well in the area, crop taken in the field, cropping pattern, fertilizer used and various sources of irrigation in the field.

4.3.2 Primary details of survey

Primary survey is done in order to collect the basic information about various facilities available in the village.In this survey data is collected by various means like house to house means door to door survey, by interviewing people, school teachers, shop keepers, and other public.

Accuracy of this data is not enoughmeaning that data based on primary survey is not reliable or very accurate. Variances in the data happened due to different views of people.We Survey the infrastructure facilities available in village like grampanchayatbuilding, school building, water supply system, solid waste management, Water tank,Drainageline,Aanganwadi etc.

4.3.3 Average size of House-Geo-Tagging of House

In mandir village there are mainly two group of people one group of people who live in pucca type houses while other group of people live in kutcha type houses so there is a large variation in the size of house.The average size of house in this village is about 27 square meters.

4.3.4 No. of Human being in One House

The average number of human beings in one house in Mandir village is 4.

4.3.5 Material available locally in the village and Materiaoutsourced by the villagers

Material which are locally available in Mandir village are clay, mud, bamboo, wood etc.

4.3.6 Geographical Details

Sr.No	Description	Information
1	Area of village(Approx.) in Hector	847
2	Forest area	-
3	Agricultural Land area in Hector	677
4	Residential area in Hector	170
5	Distance to the nearest railway station in kilometers	4

Table 8:- Geographical Details

4.3.7 Demographical Detail - Cast Wise Population Details / Which ID proof using by the villagers

Particular	Total	Male	Female
Population	**3556**	**1776**	**1780**
ST	**1185**	**592**	**593**
SC	**45**	**21**	**24**

Table 9:- Cast Wise Population

4.3.8 Occupational Detail - Occupation wise Details / Majority business

- There are many occupational groups in village, but the major three occupation are Agriculture, Rikshaw driving and Labours.

4.3.9 Agricultural Details / Organic Farming / Fishery

- The farmer usually used traditional method for agricultural activities but among them very small numbers of farmer used organic fertilizer.
- There is no used of Fishery for agriculture.

4.3.10 Physical Infrastructure Facilities - Manufacturing HUB / Warehouses

- The village has seven lake and four overheadtanks.
- There is not any manufacturing HUB in this village.
- The village is well connected with State-Highway.
- The village has four Aaganwadi, two primary school and one Secondary & Higher secondary school.

4.3.11 Tourism development available in the village for attracting the tourist

- For tourism purpose we can decorate the Pond and surrounding its area.
- In this village there are many prachin temples so by this we can also attract the tourist.

4.4 Infrastructure Facilities:-

- All internal roads are made of bitumen road and well connected to each other.
- The village is well connected with State-Highway.

- The village has four Aanganwadi, two primary school and one Secondary & Higher secondary school.
- The villages have four overhead water tanks.
- The villages have seven ponds and many private borewells.
- Hand pumps are also available in village.
- The village also have irrigation channel.
- The village have bus stop
- The villages have LED streetlight at suitable interval.
- Most of the houses in the village are pucca
- In many faliyasof the village have blocks pavement.

Figure13:-Aanganwadi in Mandir village

Figure 14:- Secondary & Higher Secondary School

4.4.1Drinkingwater/Water management facility

- In this village people are mainly used their own water purify machine for drinking purpose.
- The village have four overhead water tank which are utilized for daily consumption of people.
- Many people used their own bore wall.
- The village also has hand pump and pond.
- From the over hand water tank is well connected through the pipeline to provide water at every house.

Figure 15:- Water tank

Figure 16:- Hand pump

Figure17:- Pond

4.4.2 Drainage network / Sanitation facilities

- There is a little portion of village consist the drainage facilities and which are open drainage.
- In this village there is no any arrangement for collection / drain off of rain water through drainage line.

❖ Sanitation facilities:-

Sanitation Facilities	Details	Remarks
Public latrine Blocks	Not Available	Required
Solid and Liquid Waste Disposal system	Not Available	Required
Dump of garbage	Available	On land
Solid waste collection System	Not Available	Required
Drainage line	Available	Open type

Table 10:- Sanitation Facility in Mandir

4.4.3 Transportation and road network: -

- All internal roads are made up of bitumen road which is approximately 3.5m wide and condition is good.
- The village relates to State-Highway which is made of bitumen and in good condition.
- Foot path is not available for pedestrian.
- During monsoon season internal streets are waterlogged.

Figure 18:- State-Highway

Figure 19:- Internal Road

4.4.4 Housing Condition: -

- In this village there are 200 kutcha type houses while 850 houses are pucca type.
- There are 225 houses under the Awasyojana.

4.4.5 Social Infrastructure Facilities, Health, Education, Community Hall, Library

❖ Health facility:

Description	Detail	Remark
ICDS (Aanganwadi)	**4**	**Adequate**
Sub-Center	**1**	**Adequate**
PHC	**1**	**Adequate**
CHC/RH	**1**	**Adequate**
Govt.Hospital	**1**	**Adequate**
Govt. Dispensary	**Not available**	**Required**
AYUSH Health facility	**Not available**	**Required**
Sonography/Ultrasound facility	**Not available**	**Required**

Table 11:- Health facility in Mandir

Figure 20:- R.H. & CHC Mandir

Figure 21:-Govt.Hospital

❖ Education Facility :-

Description	Detail	Remark
Aanganwadi/Play group	**4**	**Adequate**
Primary School	**2**	**Adequate**
Secondary School	**1**	**Adequate**
Higher Sec. School	**1**	**Adequate**
ITI collage/vocational training center	**Not available**	**Not Required**

Table 12:- Education facility

Figure 22:-Sarvajanik High school Mandir **Figure 23:- Primary & Secondary school Mandir**

4.4.6 Existing condition of public building & maintenance of existing infrastructures:

- The existing condition of public building is good because many of them are built recently.
- Some building like panchayat office, temples, water tanks and aaganwadi required little maintenance.

4.4.7 Technology Mobile / WIFI / Internet Uses Details

- People useInternet through their smart phones.
- In this village the youngster and many other people uses smart mobile phone and at some houses people also use their own WIFI but there is no public WIFI for villagers.

4.4.8 Sports Activity as Gram Panchayat: -

- During summer vacation Gram Panchayat organized cricket match.

4.4.9 Socio-Cultural Facilities, Public Garden /Park/Playground /Pond/ Other Recreation Facilities

Description	Detail	Remark
Community hall	Not available	Required
Public library	Not available	Required
Public garden	Available	Poor condition
Village pond	Available	Poor condition
Recreational center	Not available	Required
Assembly Polling Station	Available	Good condition
Cinema/ Video Hall	Not available	Not Required
Birth and death Registration Office	Available	Maintenance Required

Table 13:- Social-cultural facility

Figure 24:- Birth and death Registration Office (Gram Panchayat)

Figure 25:- Public garden

Figure 26:- Pond of Mandir Village

4.4.10 Other facilities

❖ Electricity

- There is more than 6 hours electricity available in residential area of Mandir village.
- In village some people also use solar panel for electricity.
- The electricity is supplied by D.G.V.C.L
- Generally, the power cut is occur on Monday.


Figure 27:- Transformer of MandirvillageFigure 28:- Electricity from D.G.V.C.L

4.4.11 Any other facilities :-

- Temporary post collection booth is there in village.
- There is no general market for villagers, so they sell their vegetable to APMC market or at EruCharasta market
- Panchayat Building is available but requires maintenance.
- The Village also has Milk Co-operative society through this village people can sell their milk directly and get instant money.
- The village has banking facility and ATM facility.
- There is lake of some facilities like Pharmacy/medical shop, Agriculture Co-operative Society, etc. in this village.

Figure 29:- Bank in Mandir Village

4.5 Electrical concept :-

4.5.1 RENEWABLE ENERGY SOURCE PLANNING PARTICULARLY FOR VILLAGES:

After visits we are learnt many of the things regarding which problems are affect to villagers and which of the general facilities are available and which of the facilities general requirement isn't fulfil to villagers, how to save environment, how to uses more and more amount to renewable energy source. Their CCTV camera and street light working on electricity, they no use any type of renewable energy source, Wifi system is available only on gram panchayat.

Street light: In the Mandir village suitable amount of street lights are provided that to in a healthy condition. They are all spaced at proper distance from one another. In some of the street lights LED's are provided while some works on the solar panel. **Cable Tv center:** In this village cable TV center is available. All the village house has connection of cable TV. So all the villager see all the channels easily and get knowledge from this.

Figure 30 :- Solar panel

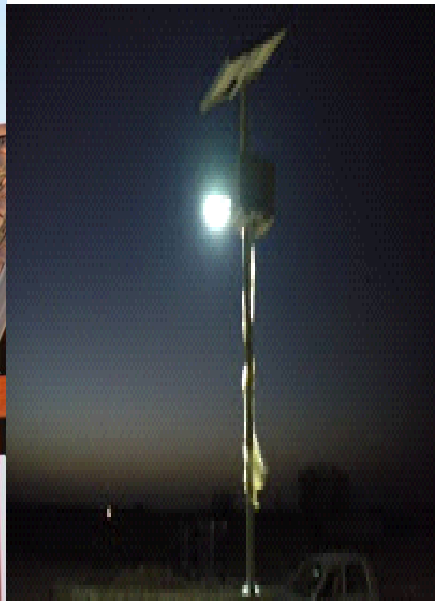


Figure 31:- Solar street

4.5.2 Irrigation facility:

For irrigation purpose it is necessary to provide electricity because to run motor and light purpose.

In village near farm separate electrical connection is provided for that purpose specifically that help to farmer to fed water to the plants.

Figure 32:- Agriculture in Mandir village

Figure 33:- Borewell

4.5.3 Electricity facilities with Area:-

In the village of mandir the electricity is Provided by the DGVCL. In this Village Electric Supply provided by the Eru subdivision of DGVCL.
In some areas the electricity is not provided properly. So, we can provide a renewable energy in these areas.

4.6 Existing Institution like - Village Administration – Detail Profile :-

4.6.1 Bachat Mandali

- This yojana is not exist in this village.

4.6.2 Dudh Mandali

- There is a milk co-operative Society in this village which collect the milk from people and pay them.

4.6.3 Mahila forum

- In this village there are various type of yojanas running for women such as JananiSurakshaYojana, Kishory Shakti Yojana and BalikaSamriddhiyojana.

4.6.4 Plantation for an Air Pollution

- The air quality of village is good there is no need for special treatment for improving the air quality in this village.
- Some farmer have Ambawadi with help to reduce the harmful content from the air and also help to improve the air quality index.

4.6.5 Rainwater Harvesting- Waste Water Recycling

- There is no arrangement for collection and use of rainwater as well as waste water.

4.6.6 Agricultural development

- Some Farmers are used the modern method of agricultural practice while other farmers used traditional method for agricultural activities.
- Navsari Agricultural University play major role for agricultural development in Mandir village.

4.6.7 Any other

- In this village various types of govt. scheme are running but the most highlighted scheme is Pradhan mantra Awas and Sardar Awas yojana.
- Many villagers get the benefit of awas yojna and built their house under this scheme.

Chapter 5: Technical Options with Case Studies

5.1 Civil Concept

5.1.1 Advance Sustainable construction techniques / Practices and Quantity Surveying

India, the seventh largest country in the world, is a leading economy and home to over one billion people living in various climatic zones. In 2011, there were slightly over 500 construction equipment manufacturing companies in all of India.The sector is labor-intensive and, including indirect jobs, provides employment to more than **49.5 million** people. India is one of the fastest developing countries in Asia. There are lots of techniques and equipment used for construction activity. The sectors consume a lot of energy throughout the life cycle of buildings thus becoming a major contributor to greenhouse gas emissions.

Sustainable construction techniques include use of solar power, biodegradable materials, smart application, low energy house and zero-energy house building design etc. The Indian economy has witnessed considerable progress in the past few decades. Most of the infrastructure development sectors moved forward, but not to the required extent of increasing growth rate up to the tune of 8 to 10 per cent. The Union Government has underlined the requirements of the construction industry.The Planning Commission has estimated that investment requirement in infrastructure to the tune of about ₹ 14,500 billion or US$320 billion during the 11th Five Year Plan period.

Figure 34:- Sustainable Development

5.1.2 Soil Liquefaction

- **Soil liquefaction** occurs when a saturated or partially saturated soil substantially loses strength and stiffness in response to an applied stress such as shaking during an

earthquake or other sudden change in stress condition, in which material that is ordinarily a solid behaves like a liquid.

- The most common way of **preventing** the occurrence of liquefaction are foundation soil improvement methods. One type of improvement is to replace the susceptible soil with the appropriate amount of gravel. A more favorable form of the granule metric soil curve in a narrower location is obtained in this way.

Type of Liquefaction

1. Flow liquefaction
2. Cyclic mobility

- **Flow liquefaction** is a phenomenon in which the static equilibrium is destroyed by static or dynamic loads in a soil deposit with low residual strength. Residual strength is the strength of a liquefied soil.
- **Cyclic mobility** is a liquefaction phenomenon, triggered by **cyclic** loading, occuring in soil deposits with static shear stresses lower than the soil strength. Deformations due to cyclic mobility develop incrementally because of static and dynamic stresses that exist during an earthquake.

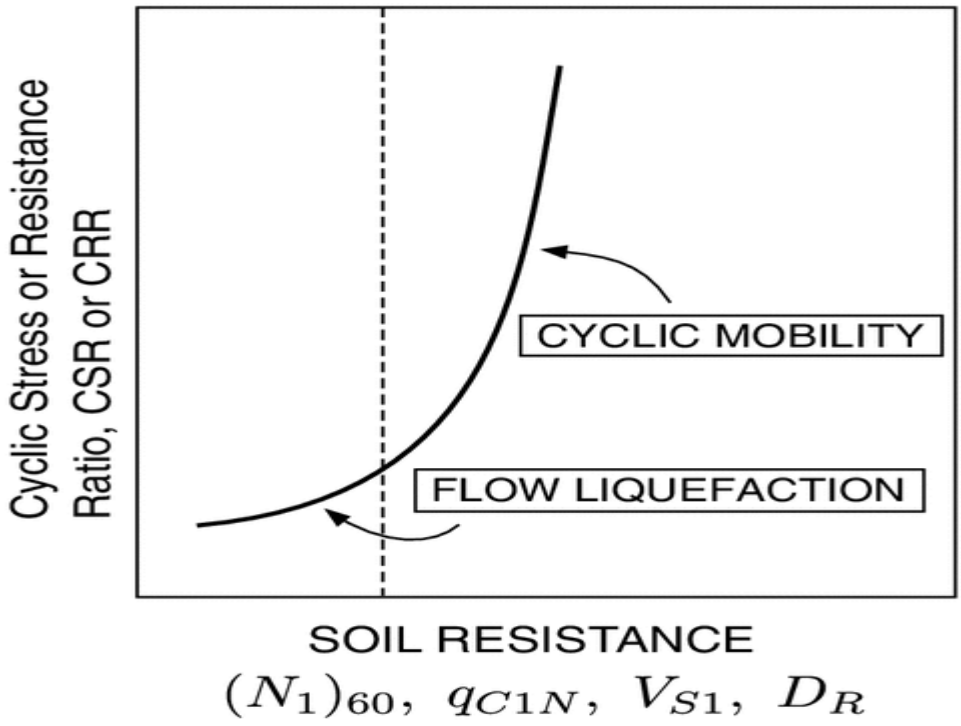


Figure 35 :-Graph of Change in type of liquefaction

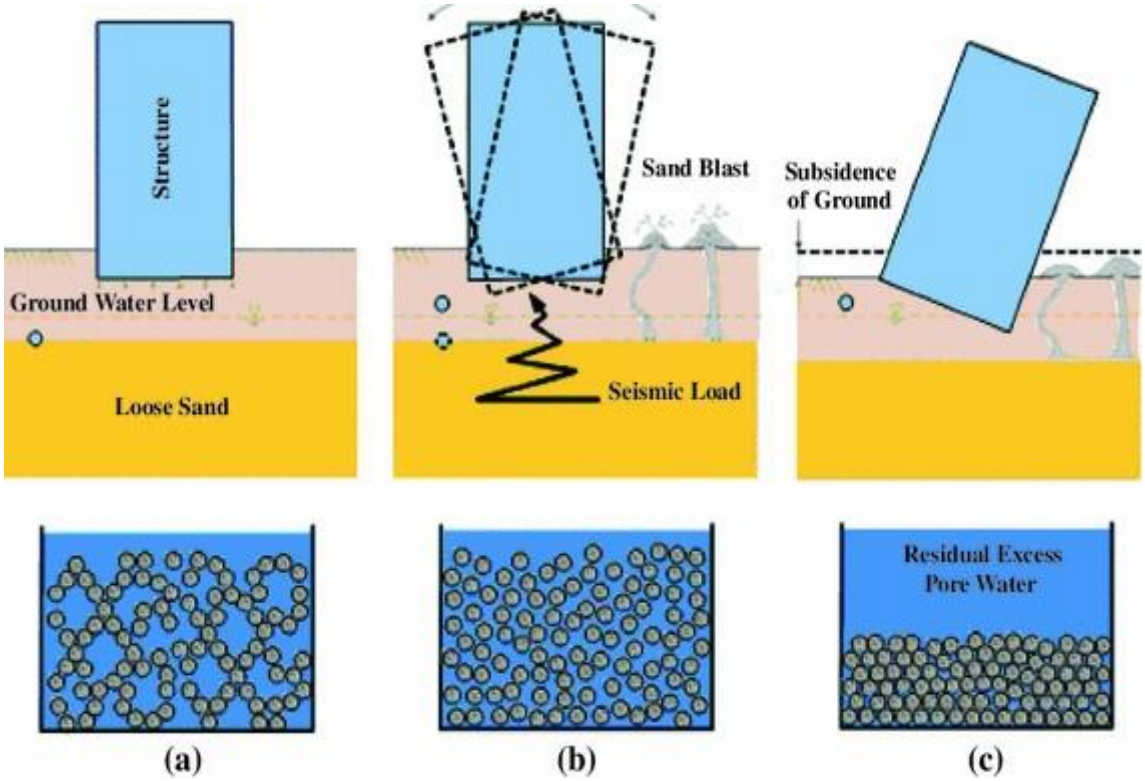


Figure 36:- Soil liquefaction

Figure 37 :- Damage in structure due to soil liquefaction

5.1.3 Sustainable Sanitation

- **Sustainable sanitation** is a sanitation system designed to meet certain criteria and to work well over the long-term. Sustainable sanitation systems consider the entire "sanitation value chain", from the experience of the user, excreta and wastewater user, excreta and waste, treatment, and reuse or disposal.

- Sanitation refers to public health conditions related to clean drinking water and adequate treatment and disposal of human excreta and sewage. Preventing human contact with feces is part of sanitation, as is hand washing with soap.
- Creating awareness among the people work as the pier for sustainable sanitation.
- It also includes the degree of recycling and reuse of excreta practiced and the effects of these, for example reusing the wastewater, returning nutrients and organic material to agriculture etc.

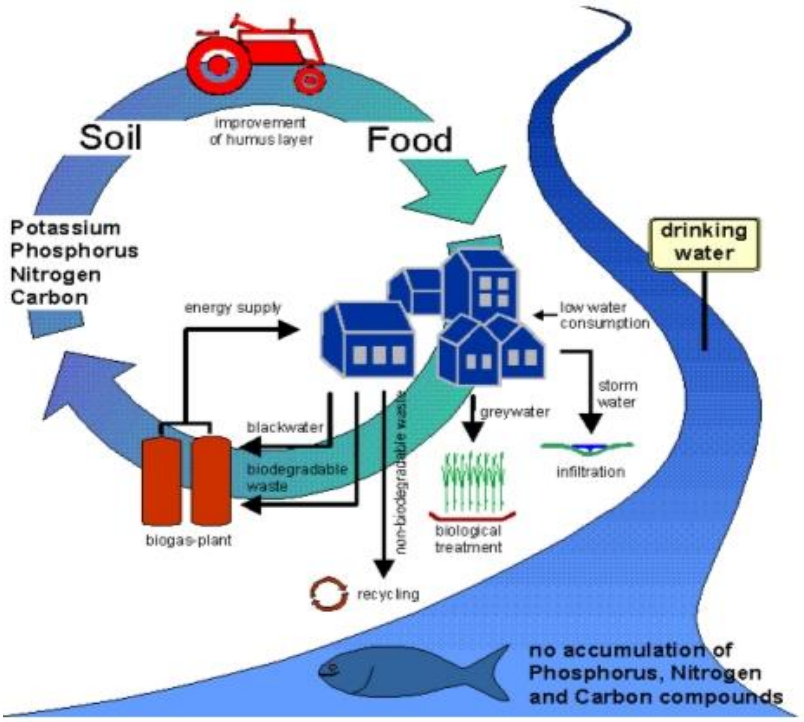


Figure38:- Sustainable sanitation

5.1.4 Transport Infrastructure / system

- Transportation is the lifeline of the village because many facilities are not available in the village so villagers have to go outside the village or nearest town/ city.
- Transportation facility is such that it is well connected with all the town/city and alsoreduces the cost of journey.

- Following are the main four modes transportation system :-
  1 Railway
  2 Roadway
  3 Airway
  4 Waterway

Figure 39:-Different Mode of Transportation

- Among the different **means of transportation**, **Railway system** is the cheapest and safest mode both for passengers and goods. It is the most affordable mode of transportation used for travelling for long as well as for short routes. Different countries have their own railway networks connecting different towns and states.

5.1.5 Vertical Farming

- The global population is anticipated to grow up to 9 billion by 2050, this growth in population is expected to cause immense pressure on available natural resources and demand more food which makes it imperative to intensify agricultural production,Vertical farming is very useful in the area where land is not available for farming or very few lands areaavailable for farming, By this method person can grow more crop at the same time as compare to normal farming but their cost of Labours and cost of electricity is high.
- The aim of vertical farming is to optimize plant growth, and soilless farming techniques such as hydroponics, aquaponics, and aeroponics.

Figure 40:- Vertical farming

- **Hydroponics:** Hydroponics is the predominant growing system, plants are grown in nutrient solution, free of soil. The plant roots are grown in the nutrient solution contained in a grow tray such that the roots are submerged in the solution. The grow tray is filled with a nutrient solution few time a dayby using reservoir below the tray, a water pump, and a timer.

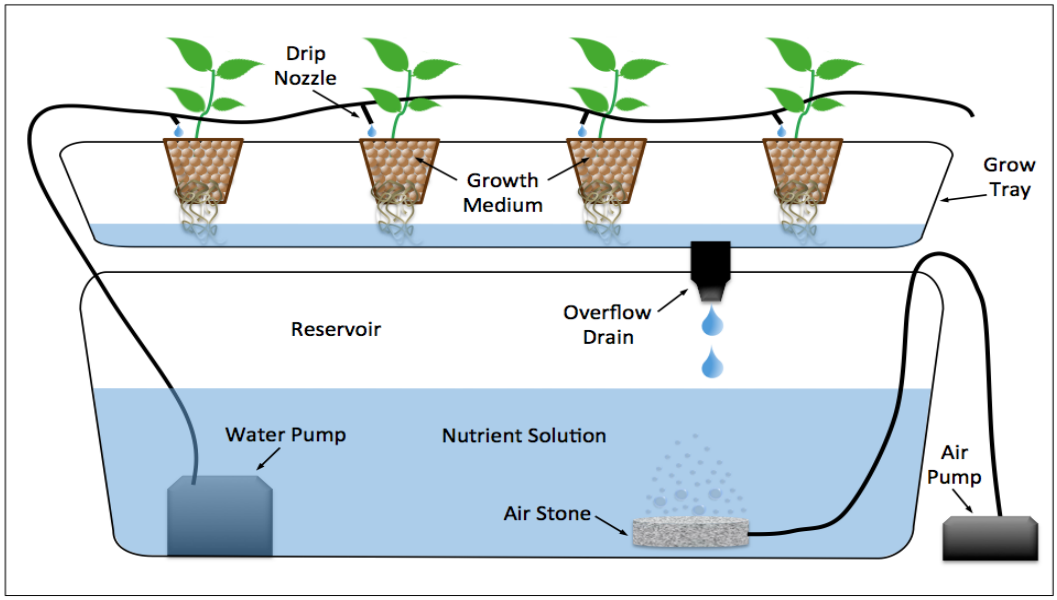


Figure 41:- Diagram of Hydroponics system

- **Aquaponics:**-Its combine aquaculture and hydroponics in the same ecosystem. Fish grown in the fish tank, produce waste that are high in nutrient content, which can be used as nutrient content, which can be used as nutrient suppliant to grow the plants ina grow tray. The plants on the other hand naturally filter the water in which the fish live.

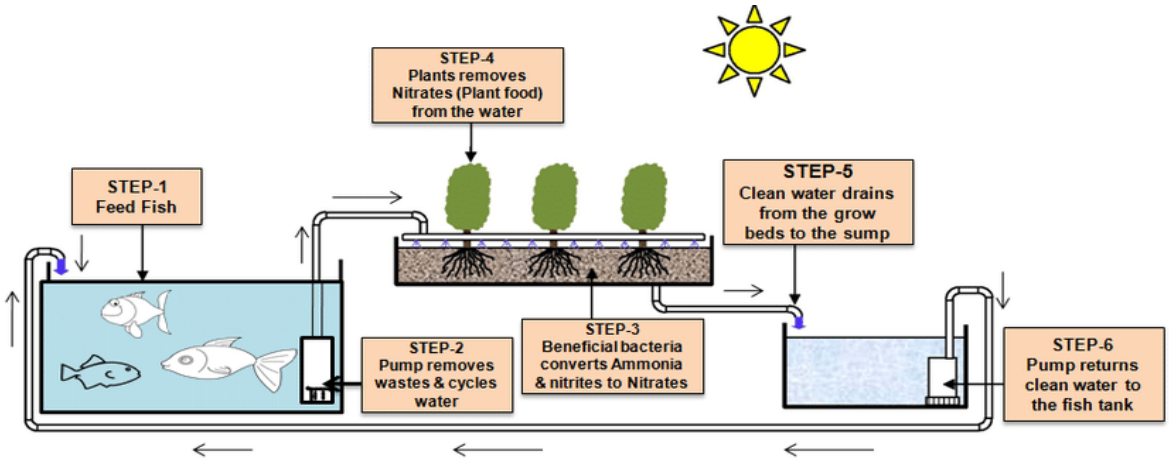


Figure 42:- Aquaponics vertical farming diagram

- **Aeroponics :**-In an Aeroponic system, plants are grown in an environment where air with very little water or mist and without soil are used. In this system, the roots are

nourished by misting the root zones with a nutrient solution on a continual basis by using a fine sprayer to ensure that the roots get sufficient oxygen.

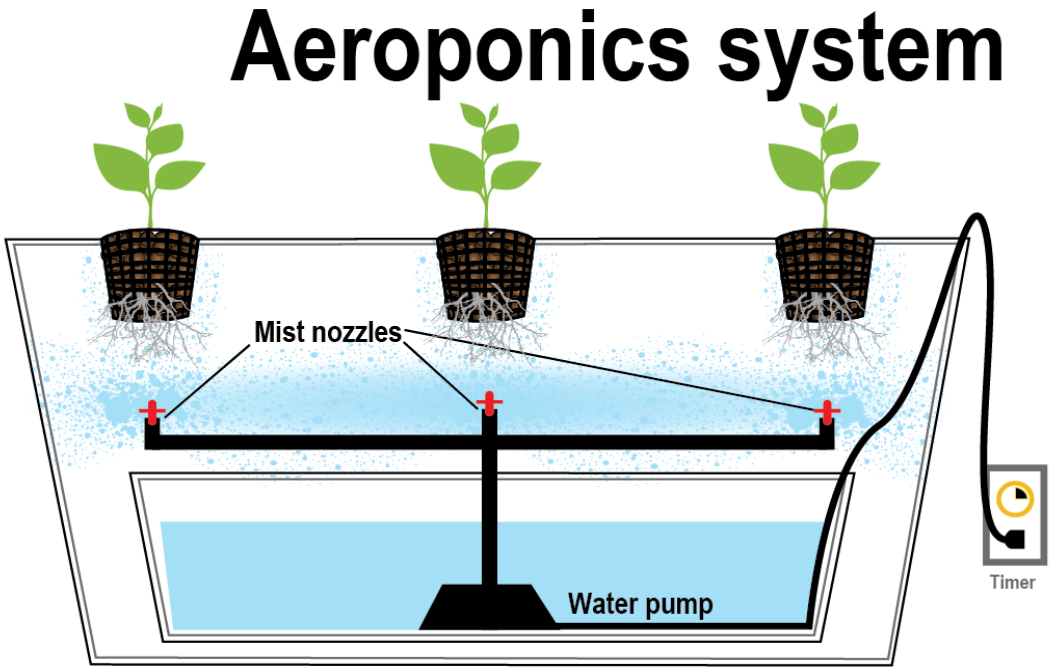


Figure 43:- Aeroponics vertical farming diagram

Figure 44 :- Layer of Aeroponics farming

5.1.6 Corrosion Mechanism, Prevention & Repair Measures of RCC Structure

Mechanism :-In RCC structure in the presence of moisture, an oxidation reaction takes place on the energized area of metal surface to elute metal as an iron (anode). A reduction takes place on the low energy area (cathode).

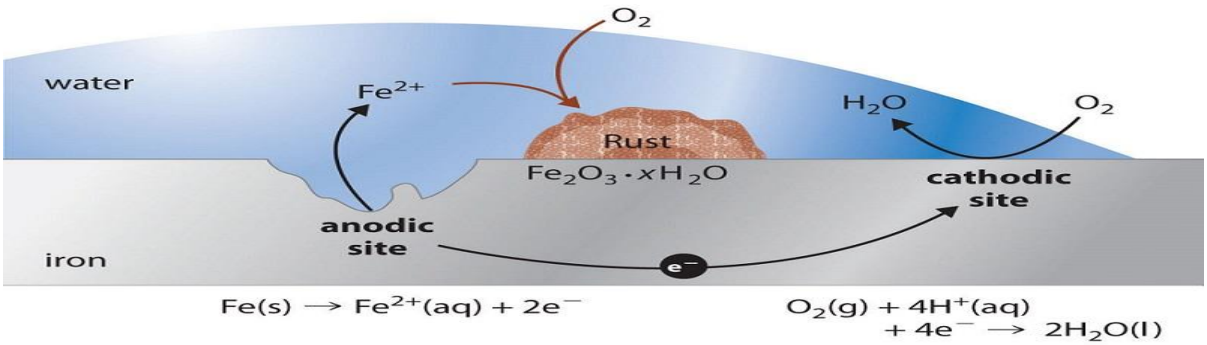


Figure 45:- Process of corrosion in reinforcement

On the metal surface, oxidation on anode and reduction on cathode proceed in equal rates and metal corrosion takes place. Normally, corrosion of metal occurs on anode.

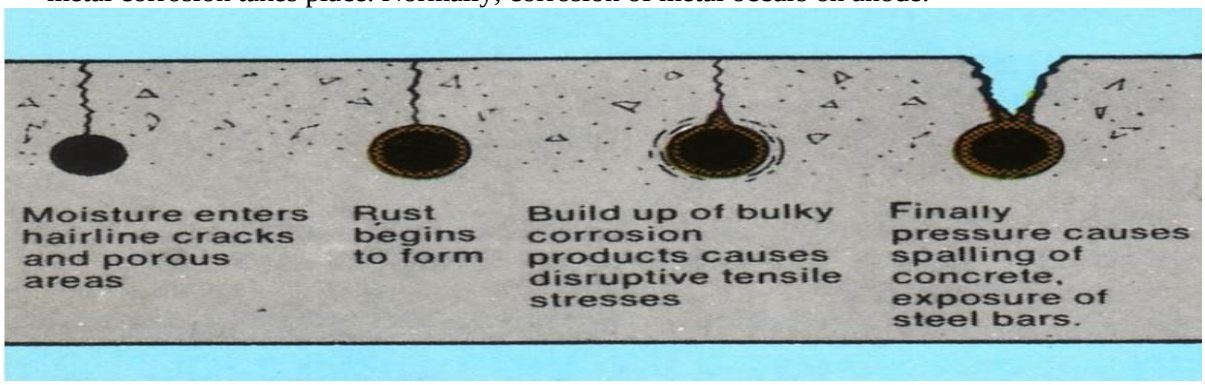


Figure 46:- Different stages of corrosion

Prevention :

1. Use corrosion inhibitor admixture
2. Use of protective coating on reinforced bar
3. Use of electrochemical technique
4. Control of concrete mix

Repair and measures of RCC Structure :

1. In the case of Reinforced concrete structure, the ingress of moisture or air may lead to corrosion of steel, cracking and spelling of concrete cover there by reducing durability of concrete structure.
2. Repair has been suggested as the protective solution for damaged structure due to corrosion.
3. The most commonly adopted solution is that to fill the crack by suitable chemical compound.

5.1.7 Sewage treatment plant

Sewage treatment plant is a place where sewage is cleaned so that it is not harmful or dangerous to the environment this place is known as sewage treatment plant.Sewage treatment is the process of removing contaminants from wastewater, primarily from household sewage. It includes physical, chemical, and biological processes to remove these contaminants and produce environmentally safe treated wastewater.

- **Primary treatment :-**Primary treatment consists of temporarily holding the sewage in a quiescent basin where heavy solids can settle to the bottom while oil, grease and lighter solids float to the surface. The settled and floating materials are removed and the remainingliquid may be discharged or subjected to secondary treatment.

- **Secondary treatment:-**Secondary treatment removes dissolved and suspended biological matter. Secondary treatment is typically performed by indigenous, water-borne micro-organisms in a managed habitat. Secondary treatment may require a separation process to remove the micro-organisms from the treated water prior to discharge or tertiary treatment.

- **Tertiary treatment :-**Tertiary treatment is sometimes defined as anything more than primary and secondary treatment in order to allow ejection into a highly sensitive or fragile ecosystem (estuaries, low-flow rivers, coral reefs...). Treated water is sometimes disinfected chemically or physically (for example, by lagoons and microfiltration) prior to discharge into a stream, river, bay, lagoon or wetland, or it can be used for the irrigation of a golf course, greenwayorpark
-

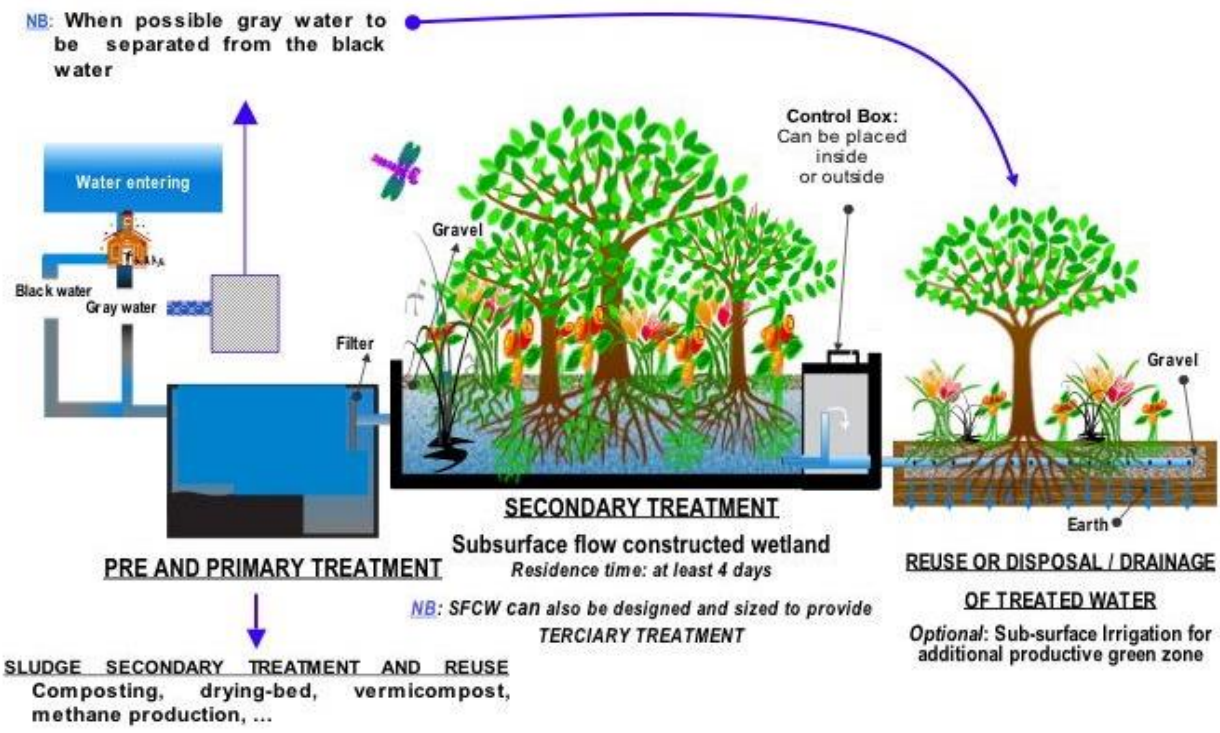


Figure 47:- Steps for sewage treatment plant

Figure48:- Sewage treatment plant

5.1.8 Technical case study of "ATAL TUNNEL(ROHTANG)"

We have selected an already completed project named"ATAL TUNNEL(ROHTANG)".It is a roadway tunnel constructed at an altitude of 3060 m above mean sea level, making it the highest highway tunnel in the world. At 9.02 km length, it is also the longest bi-directional single-tube roadway tunnel of India. The tunnel was formerly known as the Rohtang tunnel and was renamed after India's former prime minister AtalBihari Vajpayee. It is located under thePirPanjal mountain range of the Himalayas, near Rohtang pass in Himachal Pradesh, India.

Figure49:-ATAL TUNNEL(ROHTANG)

- The project is considered a key development for the Indian defense forces as it connects the Manali and Lahaul valley. The tunnel will also reduce the distance between Manali and Leh by 46 km. Earlier, the road connectivity was limited to only one season of the year as the Rohtang pass remains closed in the winters due to heavy snowfall.
- It is a horse-shoe shaped tunnel with raised footpaths on both sides of the lanes. It is equipped with a semi-transverse ventilation system and a service tunnel for maintenance and emergency exit.

❖ Geology of Rohtang Tunnel

The Himalayas are full of geological uncertainties because of faults, folds, and shear zones due to ongoing tectonic activities. Therefore, it is essential to study the geology of the Himalayas before constructing any major structure in the region.

- The site has a complicated geology marked with intermixed rocks along the alignment of the tunnel. The types of rocks consist of quartzite schist, phyllite, and magmatic gneiss.
- The average dip direction and plunge of these rocks were 220° and 250°, respectively. It shows that the rocks are uniformly dipping throughout the alignment of the tunnel.
- Two main shear zones were encountered during the construction of the tunnel. Tunneling in the shear zones is difficult due to the probability of rock burst.

❖ Properties of Rohtang Tunnel Rocks

The presence of good quality rocks is desirable for tunneling process, and the index properties of rocks can help assess the quality of rock. The index properties of rocks present along the alignment of the Rohtang tunnel are tabled below:

Rock Type/Properties	Phyllite	Quartzite schist	Magmatic gneiss
Density (gm/cc)	2.69	2.73	2.68
Porosity	0.48	0.49	0.61
Specific gravity	2.77	2.73	2.73
Sonic wave velocity (km/sec)	3.66	4.0	2.53
Slake durability index (%)	98.94	98.78	98.70
Water content	0.19	0.19	0.22

Table 14: Index Properties of Rohtang Tunnel Rocks

- A feasibility study of the project Rohtang Tunnel was carried out in May 1990 following which the geological report was submitted in June 2004.**Approval** by Cabinet Committee on Security in 2005.**Design and specification report** which was prepared and finalized in December 2006.Tenders were floated in 2007 and the foundation stone was laid in **July 2010.**The project was **scheduled to be completed by February 2015** but it got delayed due to unexpected problems. **It was originally designed to be 8.8 km long but GPS** readings taken on completion show it to be **9 km long.**

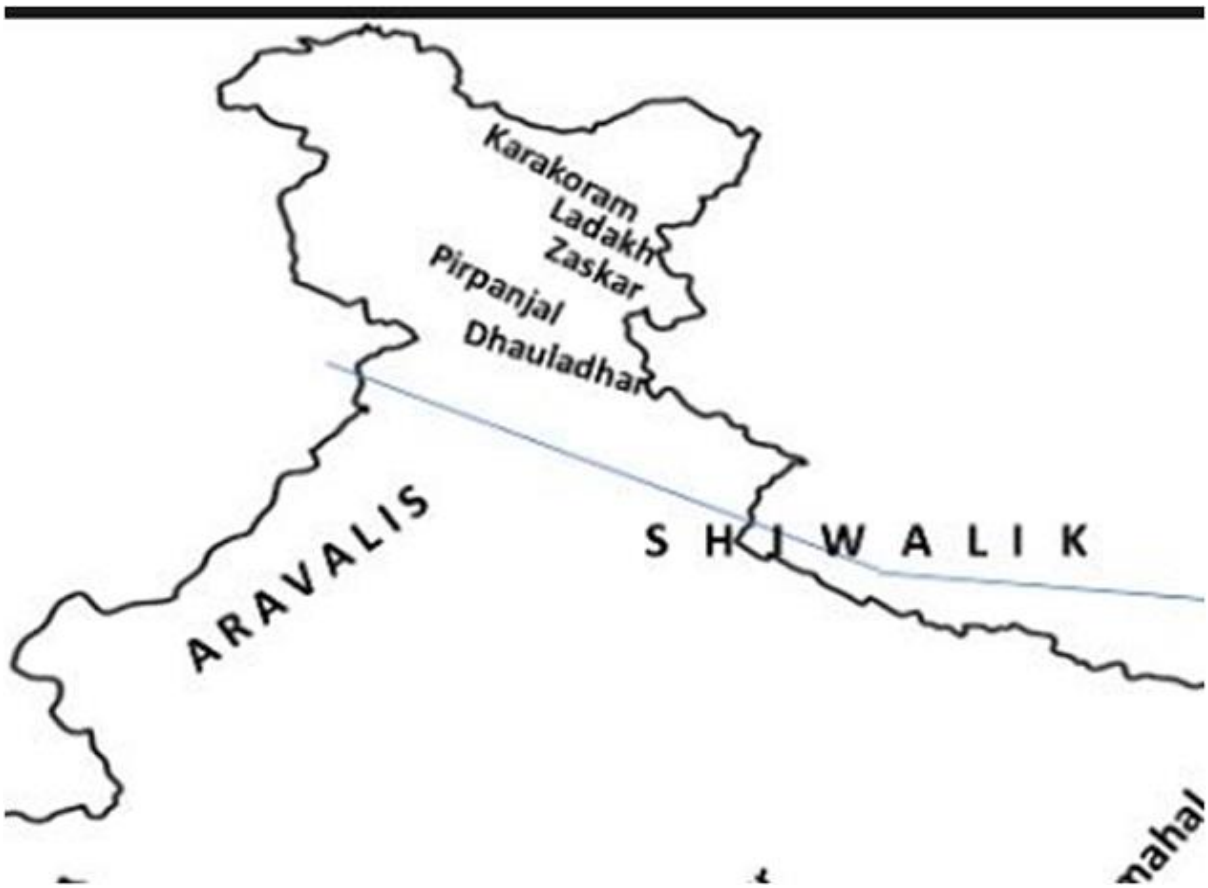


Figure 50:-9-km-long tunnel under the PirPanjal range

❖ Problems faced during the construction of Rohtang Tunnel:-

- The construction teams faced fast flowing water from Seri Nullah, which flowed on top of the tunnel routeand impeded construction efforts.
- The sheer volume of water prevented construction for several months while project engineers grappled with a way to tackle the problem.
- The rock structures faced by the engineers too caused impediments.

❖ Strategic advantages:-

- The tunnel will reduce the distance between Manali and Leh by 46 km.
- The Rohtang Pass, to which the tunnel provides an alternate, is located at a height of 13,050 feet.
- Journey from Manali Valley to Lahaul and Spiti Valley, which normally takes around five hours to negotiate, would now be completed in little over ten minutes.

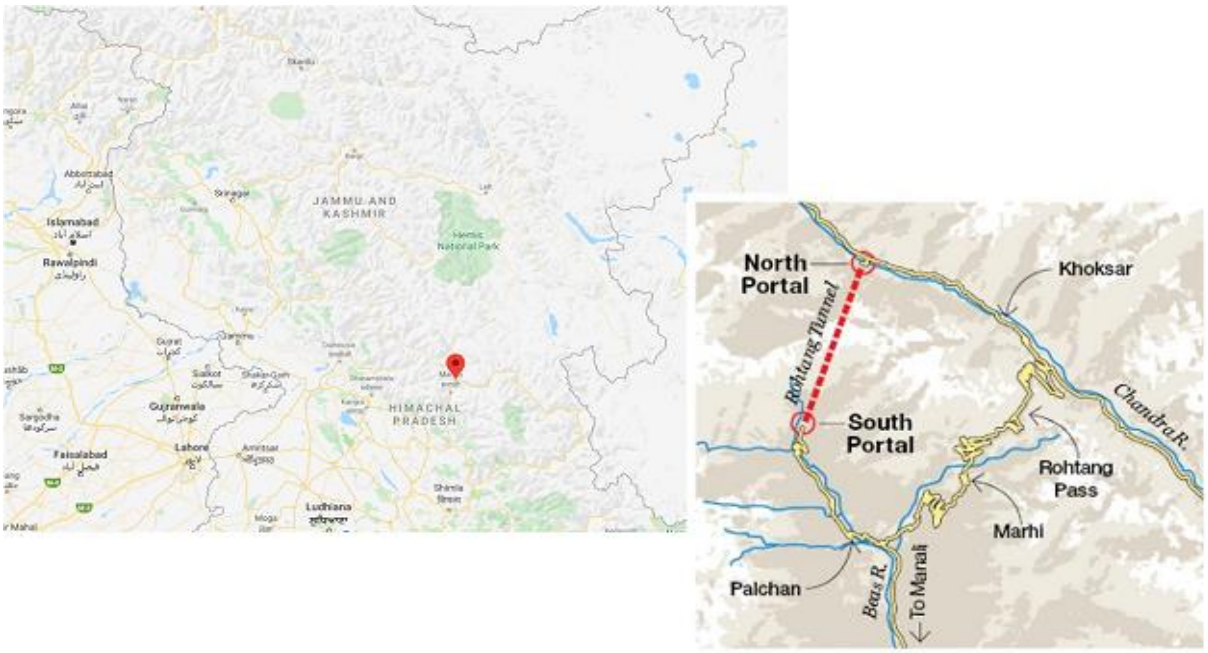


Figure51:- Satellite view of Rohtang Tunnel

- The tunnel will be a boon to the residents of the Lahaul and Spiti Valley who remain cut off from the rest of the country in winters for nearly six months due to heavy snowfall.
- The tunnel will provide almost all-weather connectivity to the troops stationed in Ladakh.
- A 2 km long tunnel will have to be built to negotiate the 16,040 feet high Baralacha pass.
- Another 78 km long tunnel will be required at the Lachung La pass at 16,800 feet.
- A third 32 km long tunnel will be required at Tanglang La pass at 17,480 feet.

❖ Features of Rohtang Tunnel:-

- Bridges in rivers on the approach to the tunnel from both the portals have also been completed and are now being painted.
- Snow galleries have also been built at the approach road to the tunnel from Manali side, and this will ensure all-weather connectivity.
- An emergency escape tunnel under themain tunnel.
- This would provide an emergency exit in case of any untoward incident which may render the main tunnel unusable.
- The tunnel also provides a telephone every 150 meters,
- Fire hydrant every 60 meters,
- Emergency exit every 500 meters,
- Air quality monitoring every one km,
- Broadcasting system and automatic incident detection system with CCTV cameras every 250 meters**.**
- Vehicles will travel at a maximum speed of 80 km per hour**.**

- Up to 1,500 trucks and 3,000 cars are expected to use it per day.

Figure52:- Ongoing Work of Tunnel

Figure53:- Drilling Work

Figure 54 :- Construction site of Atal Tunnel

Figure55:- Specification of Atal Tunnel

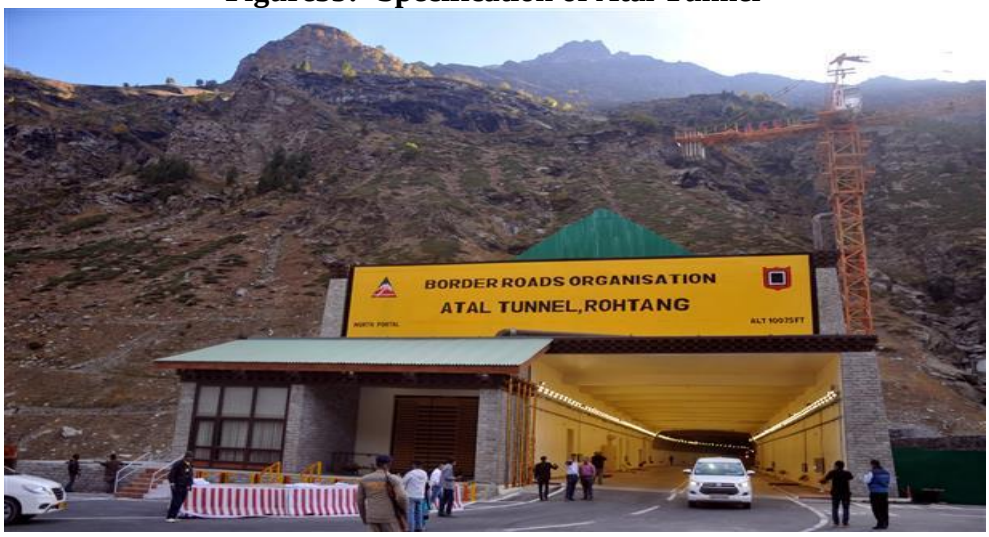


Figure56:- Entrance view of the Tunnel

Figure57:- Inside view of the Tunnel

Figure58:- Picture of Atal Tunnel

5.2 Concept (Electrical)

5.2.1 Programmable Load Shedding

- The project is designed to operate an electrical load multiple number of times as per theprogram. It overcomes the difficulties of switching the load ON/OFF manually. This proposed has an inbuilt real time clock (RTC) to keep tracking the time and thus to switch ON/OFF the load accordingly. Load shedding is what electric utilities do when there is a huge demand forelectricity that exceeds the supply.thus, in a distribution system it needs to be precisely controlled for specific period of time.

Figure59:- Block Diagram of Programmable Load Shedding

Power supply Block

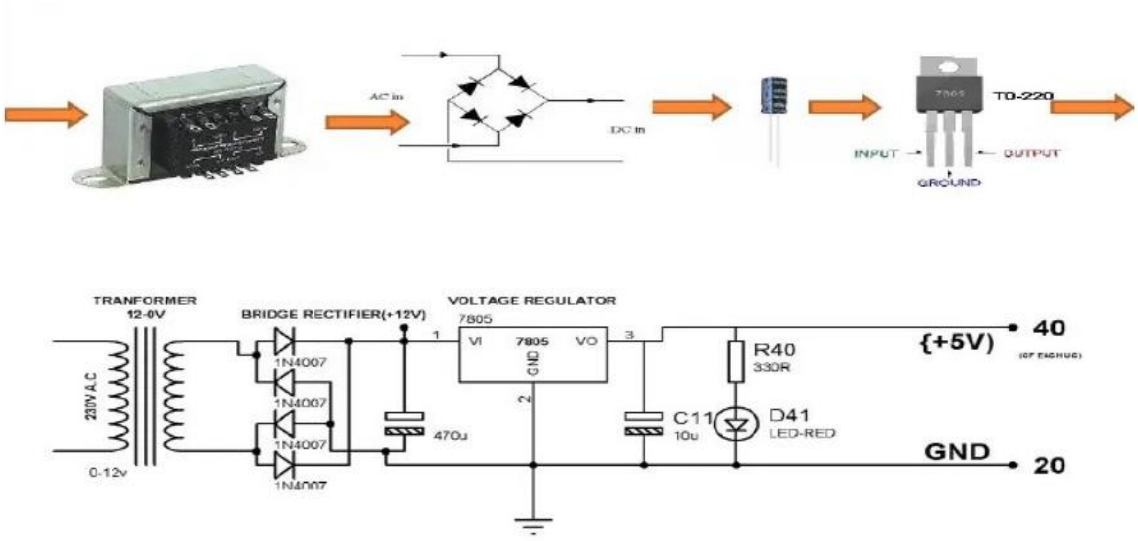
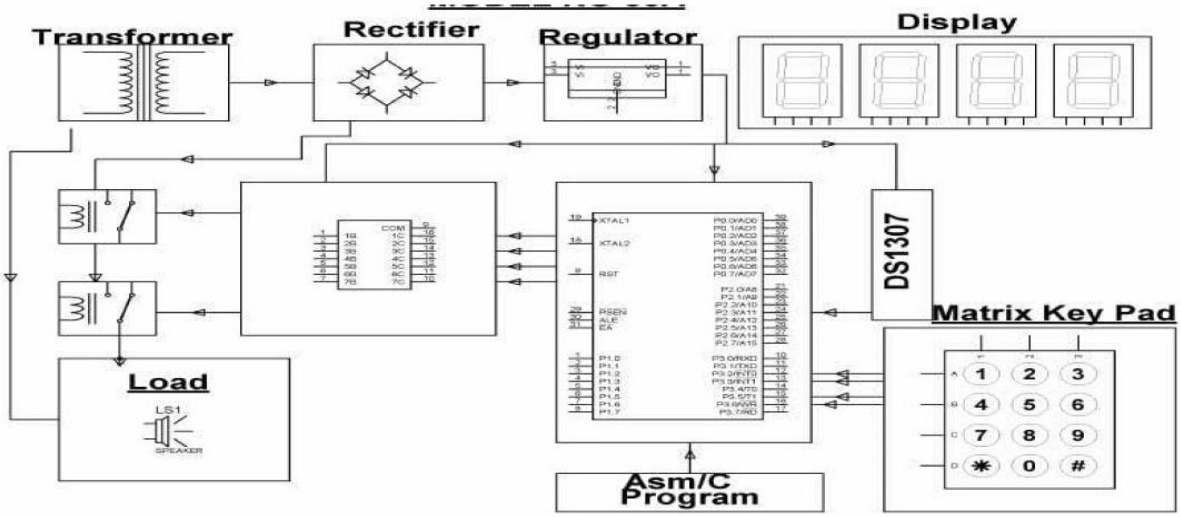


Figure60:-Power Supply Block

5.2.2 Railway Security System using IoT

High speed railway has achieved remarkable development in China and safety monitoring of highspeed railway is becoming an important research.Man has been developing various methods to protect himself from natural calamities since ages. The only scientific solution to natural calamities is development of systems to predict, detect and take preventive measures using recent advancement in technology. Along the highly landslide prone near railway line, many people have lost their lives due to landslides. It is now high time to replace the present obsolete manual detection systems deployed along this line. Development of high-speed railroad transport in Russia imposes strict requirements to the railway flaw detection systems. Most of all those requirements apply to the measurement of dynamic interaction between the rail car and the railway. Raspberry Pi is used to control all the operations.

The system is based on the principle of IOT. Location is tracked by using GPS Module. Currently railway track inspection and monitoring is done manually which is time



taking and not accurate, due to the high chance of human error occurrence. Moreover,

practically it is impossible to inspect and monitor the railway track manually as they run thousands of miles. To avoid this, we propose a prototype system, designed for continuous monitoring of railway tracks using a combination of sensors. These sensors collect data and through computational analysis faults in the railway tracks are identified. The collected data can help in finding cracks in the tracks and catastrophic accidents can be avoided.

Block diagram of Railway Security System using IoT

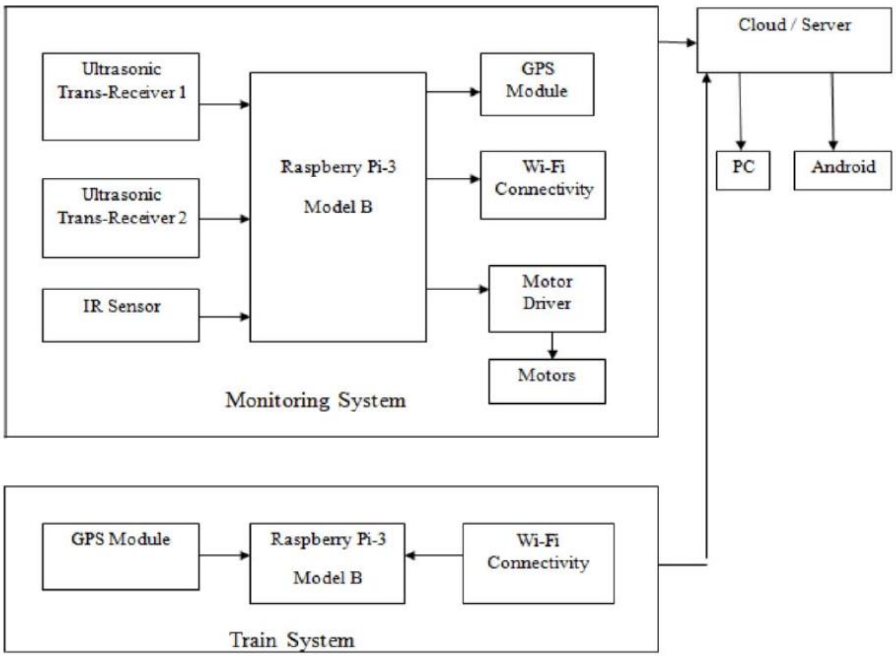
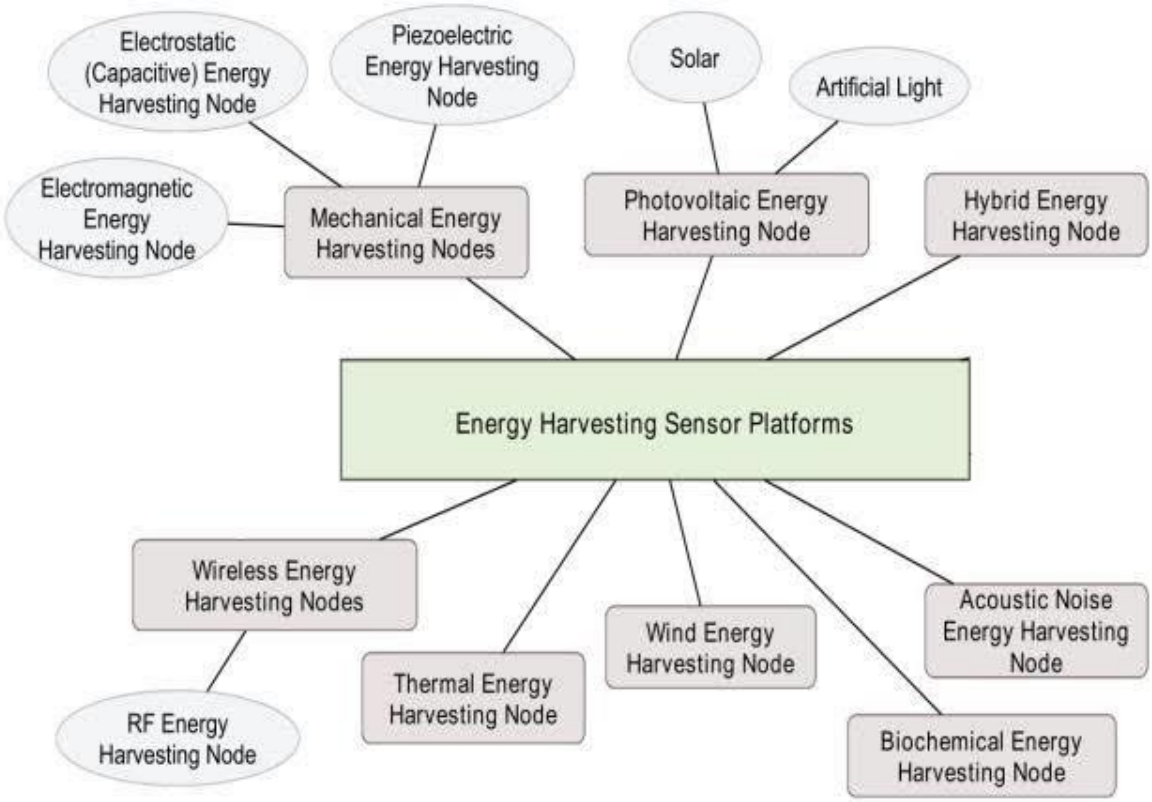


Figure61:- Block diagram of Railway Security System using IoT

5.2.3Management through Energy Harvesting Concept

Energy harvesting is the process by which ambient energy is captured and converted into electricity for small autonomous devices, such as satellites, laptops and nodes in sensor networks without the need for battery power. ... It can also eliminate the need for wires to carry power or to transmit data.



5.2.4Moisture Monitoring System

The efficient irrigation management practices based on the monitoring of the moisture in the soil provide a great benefit for the appropriate amount of water applied in the fields. This ispresentingdesign and development of a soil moisture sensor and a response monitoring system. The probes used in this sensor are made of nickel which is an anti-corrosive and robust material for use in agricultural related applications. The response monitoring system measure the moisture of the soil, compare it with the desired values given by the user and generate alert if soil moisture goes below desired value. It helps in problems related to growing of crops in which irrigation is required at irregular interval. It is also helpful in monitoring of soil moisture in golf fields.

- **Soil moisture sensor**

A soil moisture sensor as the name indicates is used to determine the moisture present in the soil. The moisture of the soil depends upon various factors such as type of soil whether its sandy, clay, loam, sandy loam and salts present in soil such as iron, manganese, calcium, phosphorus, nitrogen, Sulphur etc. it also depends upon temperature. Based on the reading of moisture sensor, irrigation is done.

- **Soil Water Tension-based soil moisture sensors:**

These sensors measure energy of water in the soil. Water tension is measured in energy/mass of the soil. Units are Joules/kg (J/kg) or kilopascal (kPa). It tells how much difficult or easy it will be for the plant to extract water from the soil.

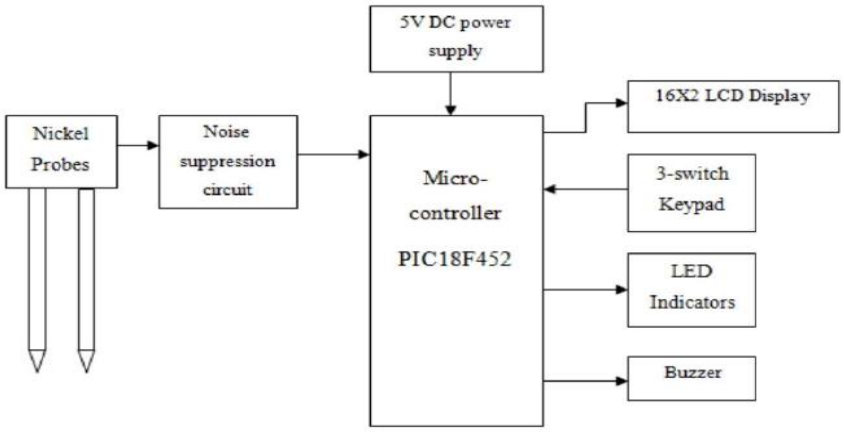


Figure 62:- Block diagram of Soil Moisture Sensor Based Response Monitoring System

5.2.5 Home Automation using IoT

With advancement of Automation technology, life is getting simpler and easier in all aspects. In today's world Automatic systems are being preferred over manual system. With the rapid increase in the number of users of internet over the past decade has made Internet a part and parcel of life, and IoT is the latest and emerging internet technology. Internet of things is a growing network of everyday object-from industrial machine to consumer goods that can share information and complete tasks while you are busy with other activities. WirelessHome Automation system(WHAS) using IoT is a system that uses computers or mobile devices to control basic home functions and features automatically through internet from anywhere around the world, an automated home is sometimes called a smart home. It is meant to save the electric power and human energy. The home automation system differs from other system by allowing the user to operate the system from anywhere around the world through internet connection.

Figure63:- Home Automation

Observation:-

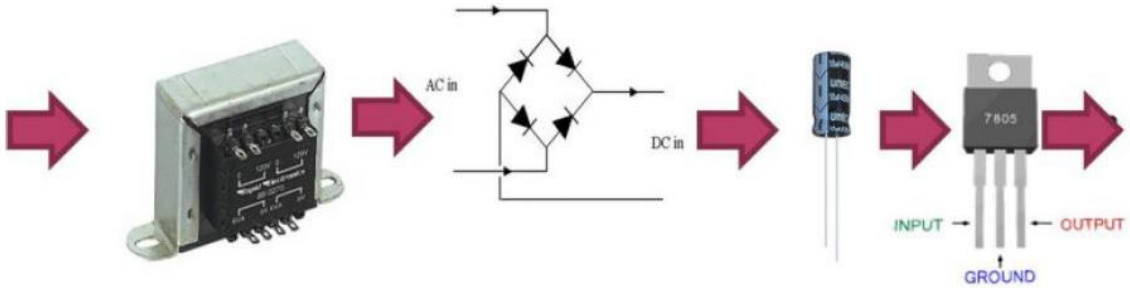
The end individual can utilize their mobile phone or PC to sign into the machine. A fundamental test is accomplished for whether the equipment instrument is ON or not. Handiest on the off chance that the equipment is approved and ON, at that point the individual is verified. When the confirmation is done accurately, individual is then equipped for send the control alarms to the equipment machine. At the equipment device the SL intention power program will always follow for the change inside the distinction and will thusly transport the markers to the Circuit. While a client chooses an exchange inside the notoriety for any of the instrument [I. E. ON or off], the records from the hand-held is sent to the web Server in a string design, wherein the web – site is the host. At the server the status isspared in the database of their non-open device field. At the equipment end, the circuit power program a web website page is utilized to rescue the notoriety of the contraptions in a reasonable example [for each 10sec]. Those changes come quite close to treats [which are transitory web files] from the web server and are spared at the PC inside the name of the net site on the web. Thusly every 10 sec on the grounds that the site page is revived and the new treat esteems are modernized.

5.2.6PC Based Electrical Load Control

Automation system is mostly depending upon the power systems in industrial, residential or commercial, which needs remote controlling and monitoring. By employing wireless technologies, it is more competent to execute a suitable technology depending upon the requirements of the proposed system like speed, cost, and distance. For distant controlling and monitoring of different loads and by means of efficient power usage through real time power spending with the help of a PC based graphical user interface application. The progress of technology equipment's is becoming simpler and easier for us. Automated systems have more benefits over manual system. PC based electrical load-controlled systems are highly reliable, precise and time conserving systems. They give number of features like rapid data storage, transfer data and data securities.

Block diagram of PC Based Electrical Load Control

- The PC based electrical load control system can be built with 8051 series Microcontroller, Level Shifter IC, DB Connector, Relays, Relay Driver, Transformer, Diodes, Capacitors, Resistors, LED, Crystal, Lamps, Keil compiler and Language: Embedded C or Assembly.



- **Figure 65:- Power supply diagram**

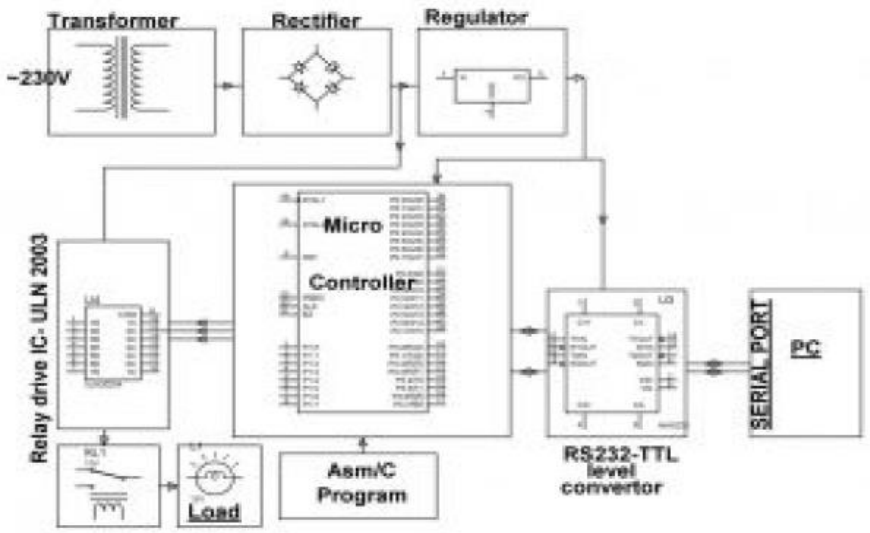


Figure64:- Block diagram of PC Based Electrical Load Control

Power Supply

Working

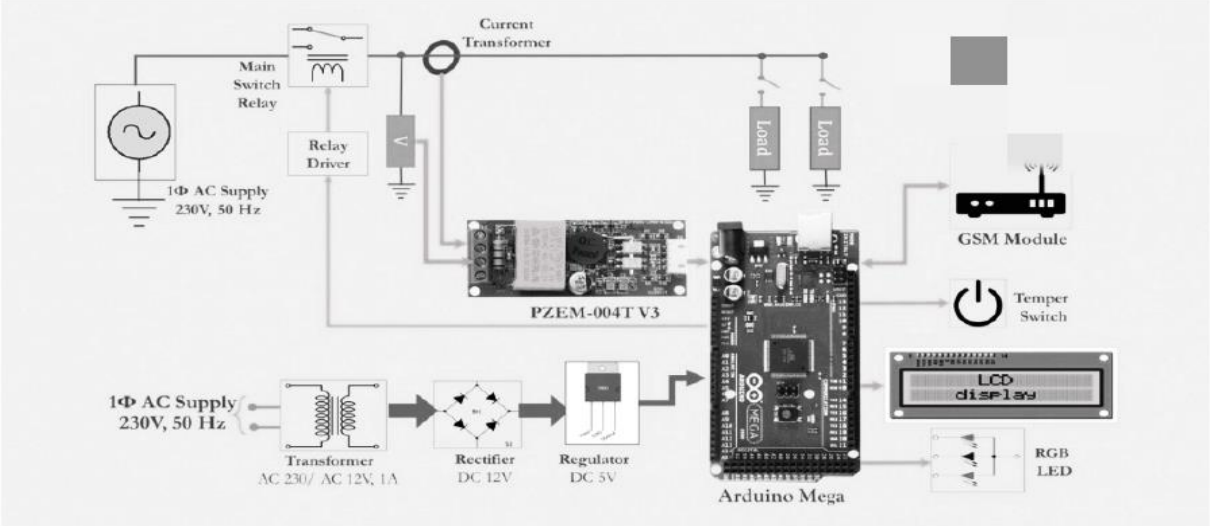
At present, they are physically controlled which makes it complex to organize the lighting with the scene. By employing this system, one can manage the electrical load ON/OFF by just being seated at one place using a PC. This system is incorporated with the electrical loads and associated to the PC where centralized control takes place. It uses an MAX 232 protocol from the microcontroller to communicate with the PC.To switch the appliances, we employ Hyper Terminal on personal computer. Once the connection is established with the PC, then the system begins working. The 8051family microcontroller is used in this project. Further, this project can be improved by implementing a GUI based control board on the PC with suitable embedded system software. The power control can also be integrated using power electronics devices.

5.2.6Electrical Parameters Measurements

Electricity is one of the basic needs of humans,it's commonly used for domestic, industrial and agricultural purposes in day today's life. Most of us know the role of energy meter in electricity grid. Its fundamental component of distribution grid. Energy meter helps the utility (Electricity distribution company) to account theuses of electricity by consumer on kw per hour basis.

Block Diagram of IoT Based Energy Meter

Figure 66:- Block Diagram of IoT Based Energy Meter


Current
Transformer
Main
Switch
Relay
Relay
Driver
1Φ AC Supply
230V, 50 Hz
Load
Load
GSM Module
PZEM-004T V3
Temper
Switch
LCD
display
1Φ AC Supply
230V, 50 Hz
Transformer
AC 230/ AC 12V, 1A
Rectifier
DC 12V
Regulator
DC 5V
Arduino Mega
RGB
LED

Chapter 6:- Swatchh Bharat Abhiyan(Clean India)

It is a country-wide campaign initiated by the Government of India in 2014 to eliminate open defecation and improve solid waste management (SWM). Phase 1 of the mission lasted till October 2019. Phase 2 will be implemented between 2020-21 and 2024-25. Initiated by the Government of India, the mission aimed to achieve an "open-defecation free" (ODF) India by 2 October 2019, the 150th anniversary of the birth of Mahatma Gandhi. The objectives of the first phase of the mission also included eradication of manual scavenging, generating awareness and bringing about a behavior change regarding sanitation practices, and augmentation of capacity at the local level. The second phase of the mission aims to sustain the open defecation free status and improve the management of solid and liquid waste. The mission is aimed at progressing towards target 6.2 of the Sustainable Development Goals Number 6 established by the United Nations in 2015.

The campaign's official name is in Hindi. In English, it translates to "Clean India Mission". The campaign was officially launched on 2 October 2014 at Rajghat, New Delhi by Prime Minister NarendraModi. It is India's largest cleanliness drive to date with three million government employees and students from all parts of India participating in 4,043 cities, towns, and rural communities. At a rally in Champaran, the Prime minister called the campaign Satyagrah se Swachhagrah in reference to Gandhi's Champaran Satyagraha launched on 10 April 1916. The mission was split into two: rural and urban. In rural areas "SBM - Gramin" was financed and monitored through the Ministry of Drinking Water and Sanitation; whereas "SBM - urban" was overseen by the Ministry of Housing and Urban Affairs.

As part of the campaign, volunteers, known as Swachhagrahis, or "Ambassadors of cleanliness", promoted indoor plumbing and community approaches to sanitation (CAS) at the village level. Other activities included national real-time monitoring and updates from non-governmental organizations (NGOs) such as The Ugly Indian, Waste Warriors, and SWaCH Pune (Solid Waste Collection and Handling).

The government provided subsidy for construction of nearly 110 million toilets between 2014 and 2019, although many Indians especially in rural areas choose to not use them. The campaign was criticized for using coercive approaches to force people to use toilets. Many households were threatened with a loss of benefits such as access to electricity or food entitlements through the public distribution system.

6.1 Swatchhta needed in allocated village -Existing Situation with photograph

- In Mandir village there is no solid waste management system people through garbage anywhere, which cause disease like cholera and typhoid.
- People can get sick when they swallow food or water contaminated with cholera bacteria.
- Swatchh Bharat Abhiyan can help the people to prevent many diseases.

Figure 67:-Swatchh Bharat Abhiyan

6.2 Guidelines - Implementation in allocated village with Photograph

- Household toilets, including conversion of insanitary latrines into pour-flush latrines.
- IEC & Public Awareness.

Figure68:- Household Toilet

6.3 Activities Done by Students for allocated village withPhotograph

- We create awareness among the people and motivate them to use dustbin and toilet. Conducted a local Jansabha to Aware them about cleanliness and Hygiene facilities.

Figure69:- Cleanliness done by Villagers

Chapter 7:-Village condition due to Covid-19

With respect to COVID 19 pandemic, Ministry of Panchayati Raj, Government of India in close collaboration with State Governments has taken various initiatives. Close consultation and guidance of the State as well as District authorities is being maintained to ensure that lock down conditions are not violated and norms of social distancing are scrupulously followed to contain the spread of the disease. India has overtaken Brazil and become the second-worst affected country in the world by the coronavirus pandemic, with more than 4 million cases. COVID-19 had mostly remained in India's cities, but the disease is now spreading to rural India – an area with over 850 million people and far worse healthcare. The reason for this shift appears to be migrant workers who have been returning to their villages since lockdown was eased at the end of June. The medical response to stop the spread and treat those infected has been inadequate, according to media reports. With one trained doctor for every 1,497 people, against the World Health Organization recommended one per 1,000, and public health expenditure for 2018 at just 1.3% of GDP, India faces an uphill struggle in dealing with the pandemic. While two-thirds of India's population lives in rural areas, there are almost four times as many health workers per person in cities. Most rural communities rely on untrained health workers. Over two-thirds of these rural health providers have no formal medical training, but remain the only option of medical support for most of the rural population.

7.1 Taken steps in allocated village related to existing situation with photograph

The sarpanch of Mandir gram panchayat create awareness among all villagers to keep distance from each other and wash hands frequently, andasked them to stay home and stay safe.They follow the lockdown and guidelines given by State and Central government.

They sanitized entire village at that time.Orientation is being provided to villagers and migrants on social distancing and what precautions they must take in 'Navsari' district for those who returned to villages.

Figure 70:- Temperature Measurement of villagers

Figure 71:- Sanitization process of whole village

7.2 Activities Done by Students for allocated village with Photograph

- We go there and met talati of the village and gathered information of village from her.
- We motivate the people to take precaution against Covid-19 to protect themself and family from this virus.

Figure 72 :- Photo with Talati of Mandir village

7.3 Any other steps taken by the students / villagers

- In all gram panchayats in the state, the use of Social Media whatsapp group has been used to create awareness among the masses in the villages. Information at the grassroots level is being given to the people by putting posters everywhere.
- Face masks are being distributed to the citizens by Gram Panchayat members and social organizations and citizens are also being told not to touch their eyes, nose, and mouth, wash hands with soap frequently and maintain personal distance.

Figure73:- Barricade at entrance of village

Chapter 8 :- Sustainable Design Planning Proposal

8.1 Design Proposal

After visiting the village and survey work, we try to identify the problem facing by the people and their solution we mark some problem and try to give their best possible solution in our Design Proposal.

8.1.1 Sustainable design (Civil) Bus Stop

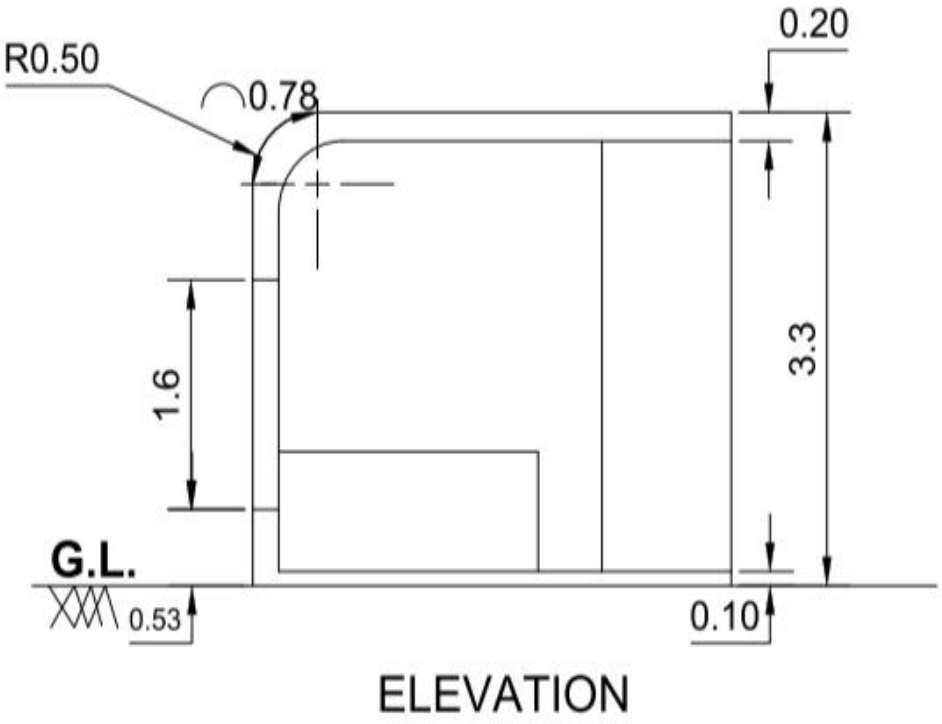
Sustainable design seeks to reduce negative impacts on the environment, and the health and comfort of building occupants, thereby improving building performance. The basic objectives of sustainability are to reduce consumption of non-renewable resources, minimize waste, and create healthy, productive environments.

In this section we give a design of bus stop that make more comfortable journey of villager to provide them shade and waiting arrangement for their bus. While designing this bus stop we also keep view of its electricity city and maintenance cost in our mind for that purpose we provide solar penal on the roof of the bus stand that make it free from any energy cost.

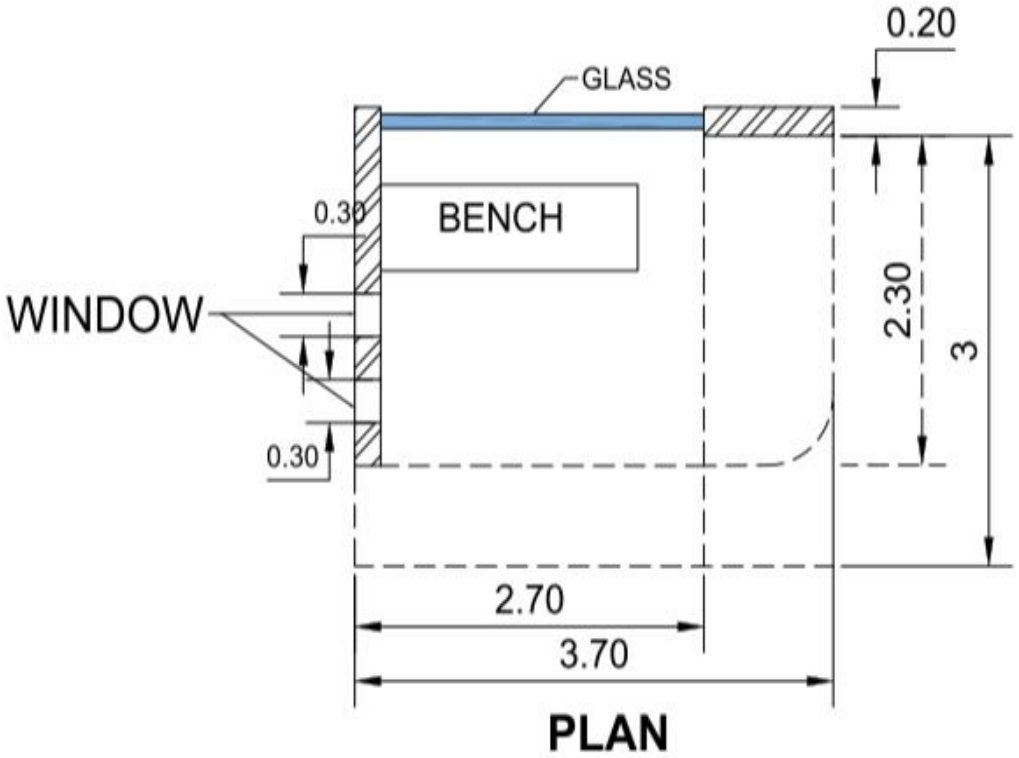
Design Utilized by :-
Visitors, students, people who do job in nearer city/town, local villagers etc.

Design Brief:-
A good bus shelter is an essential part of any successful urban mass-transit system. We provide solar penal on the roof of the bus stop which generate electricity this electricity utilize for running fan and light for the passenger.

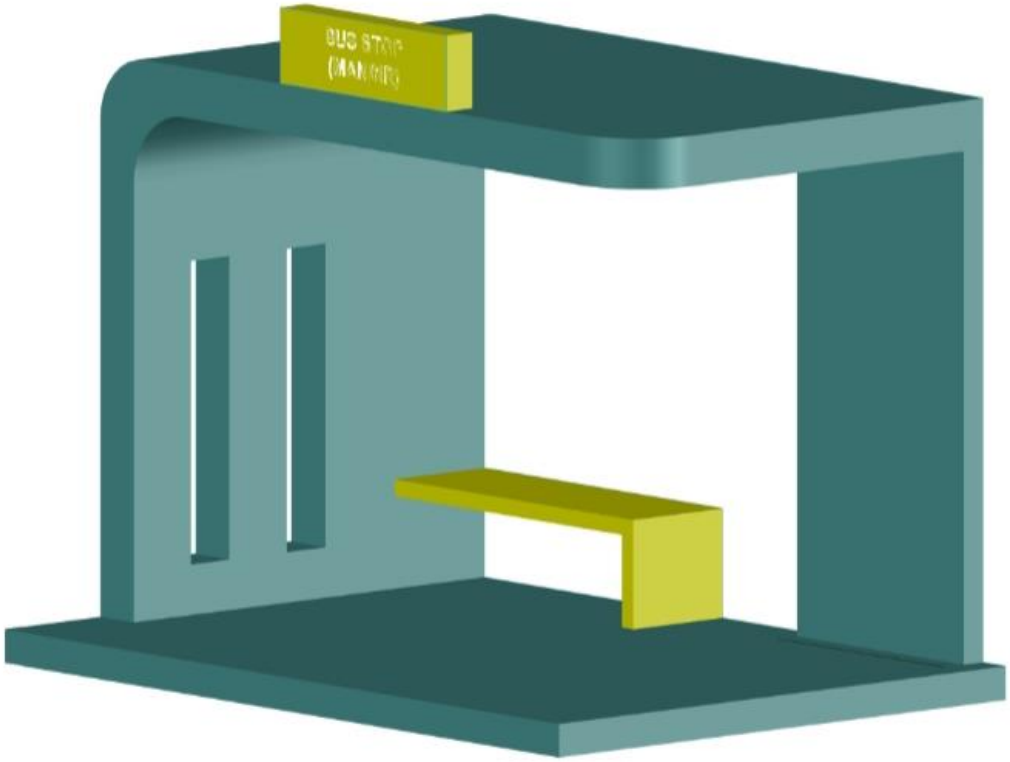
Bus stop Design :-
Length : 3.70m
Width : 2.30m
Height : 3.30m
Build up area :8.51 m^2



ELEVATION



PLAN



3D VIEW OF BUS STOP

Measurement Sheet (Bus stop)

Sr.No	Description	Nos.	Length (m)	Width (m)	Height (m)	Total Quantity (m^3)
1.	Excavation	1	6	1.2	1.5	10.8
2.	Wall	1	1	0.2	3.1	0.62
3.	Wall	1	2.5	0.2	3.1	1.55
4.	Window	2	0.3	0.2	1.6	-0.19
5.	Plinth	1	3.70	3	0.1	1.11
6.	Slab	1	3.70	2.30	0.2	1.70

Abstract Sheet

Sr.No	Description	Quantity (m^3)	Rate	Per	Amount
1.	Excavation	10.8	85	m^3	918
2.	Wall	1.98	5050	m^3	9999
3.	Plinth	1.11	3500	m^3	3885
4.	Slab	1.70	3700	m^3	6290
				Total	21092

The rates of their respective works Provided in the Abstract Along with the quantities are inclusive of water charges, contractors profit, utilize and labour charges.

8.1.2 Physical Design (Civil) : Medical store

In Mandir village there is no medical store so people travel around 4 to 5 kM in search of medicine so according to feed back given by the villager we design this medical store for their convenient.

Design Utilized by :-

All people who living in the Mandir village and also people surrounding this village can utilize this medical shop for their medicine.

Needs :-

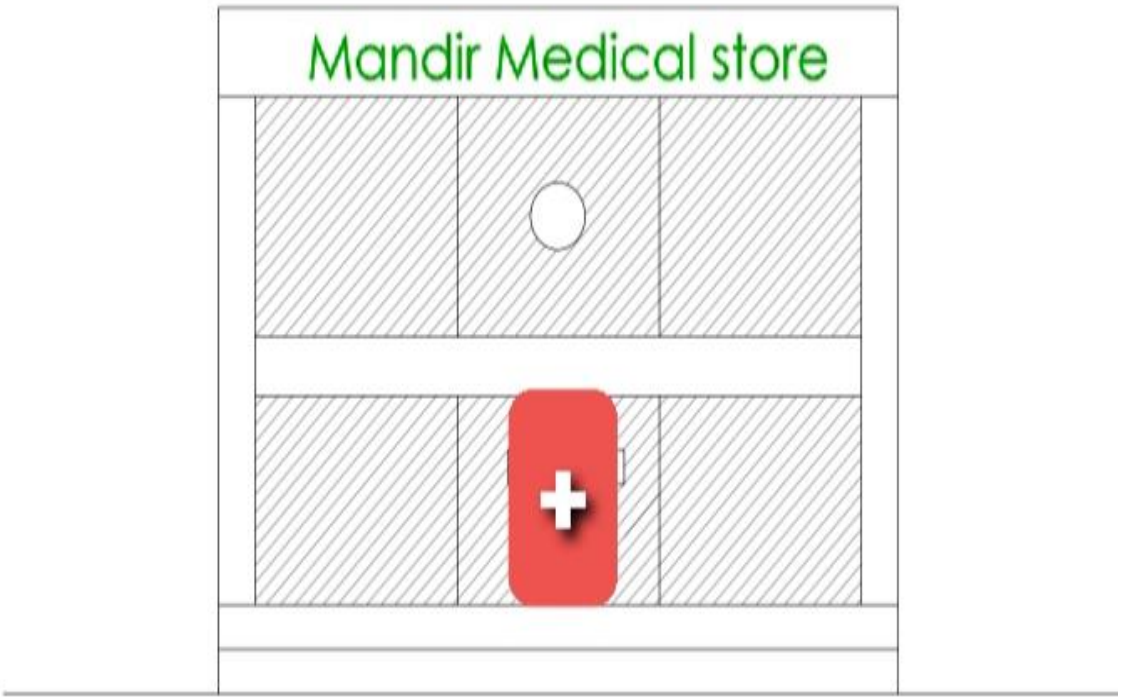
When emergency need of medicine is access, this reduce the cost of medicine due to easily availability

Design brief :

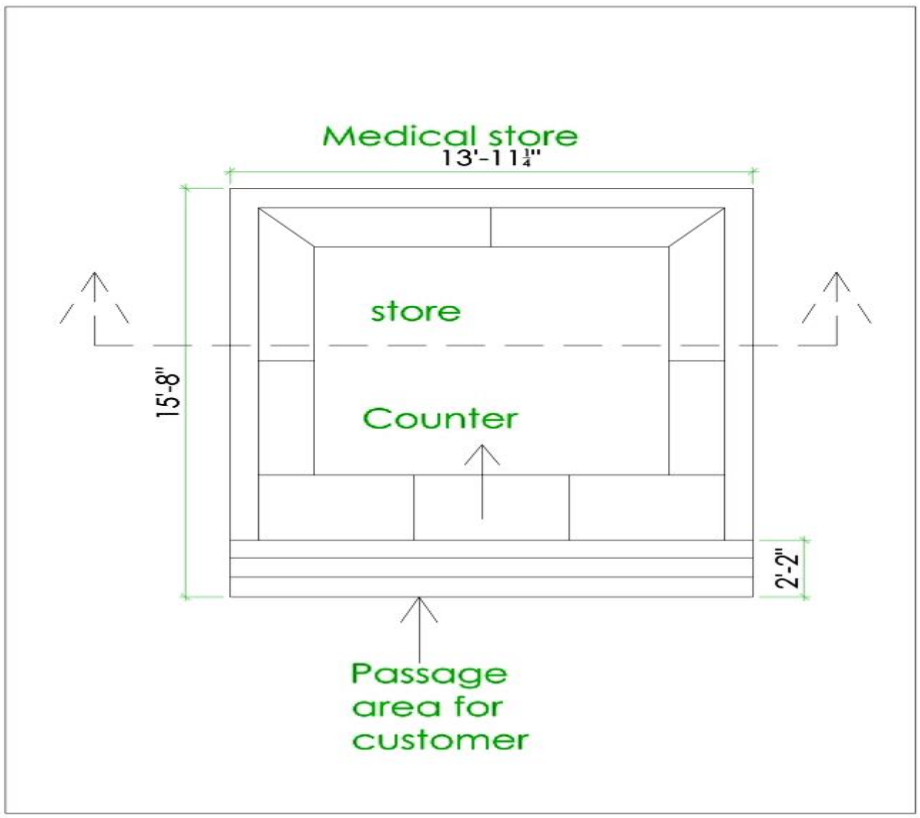
Medical store is a place where medicines are compounded or dispensed. It is a retail shop which provide the pharmaceutical drug and other medical product such as first aid kit, hand gloves, mask etc.

Medical store design :-

Length :- 4.25 meter
Width :-4.77 meter
height :- 3.2 meter
Build up area:- 20.27 m^2



ELEVATION



PLAN

Measurement Sheet (Medical Store)

Sr.No	Description	Nos.	Length (m)	Width (m)	Height (m)	Total Quantity (m^3)
1.	Excavation	1	12.47	1.2	1.5	10.8
2.	Wall	1	12.47	0.3	3	0.62
3.	Plinth	1	12.47	0.3	0.5	1.55
4.	Slab					
	First	1	4.24	0.9	0.15	0.57
	Second	1	4.24	0.6	0.15	0.38
	Third	1	4.24	0.3	0.15	0.19
5.	Slab	1	4.24	4.11	0.15	2.61

Absract Sheet

Sr.No	Description	Quantity (m^3)	Rate	Per	Amount
1.	Excavation	22.45	85	m^3	1909
2.	Wall	11.22	5050	m^3	56661
3.	Plinth	2.86	3500	m^3	10010
4.	Slab	2.61	3700	m^3	9657
				Total	78237

The rates of their respective works provided in the Abstract along with the quantities are inclusive of water charges, contractors profit, utilize and labour charges.

8.1.3 Social Design (Civil): Public toilet

In India many people have not their personal toilet, in Mandir village there is also lack of public toilet facilities.so, we focus on the hygiene in this village and suggest this design for people this help to maintain the good sanitation facility and good health of the people.

Design utilized by :-

People of the village, travellers, general public, customers, employees of a business, school pupils

Needs :-

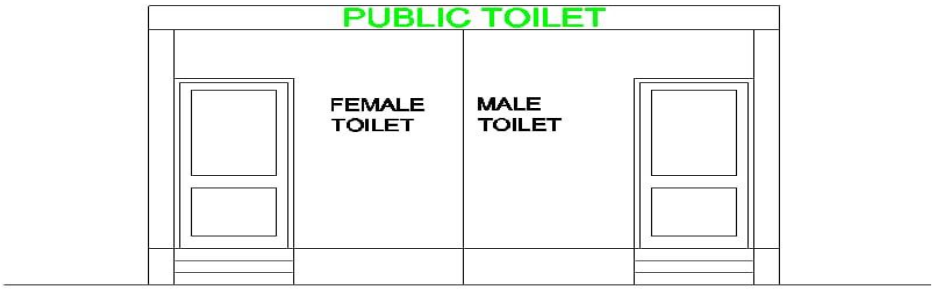
It is very urgent need of the village this help to improve health structure in village and maintain hygiene in surrounding area.

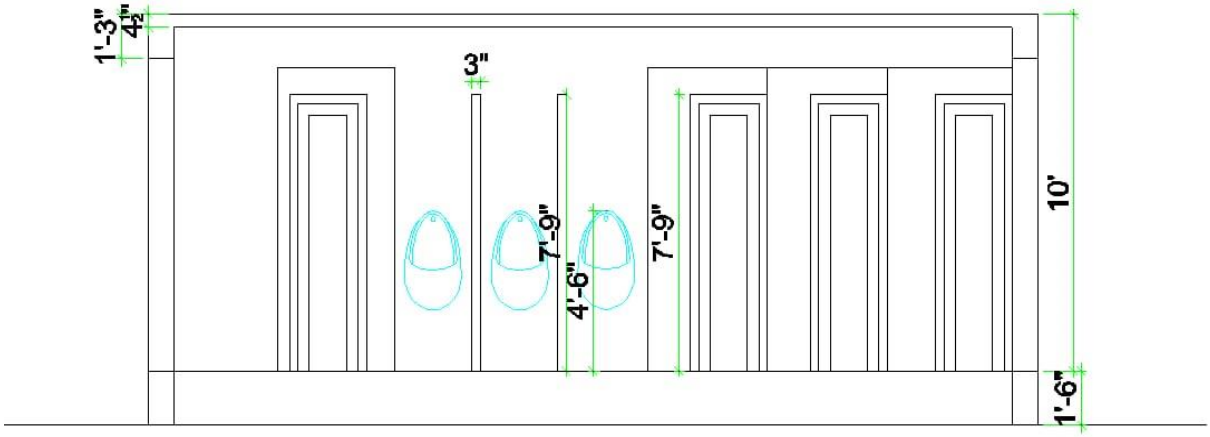
Design Brief :-

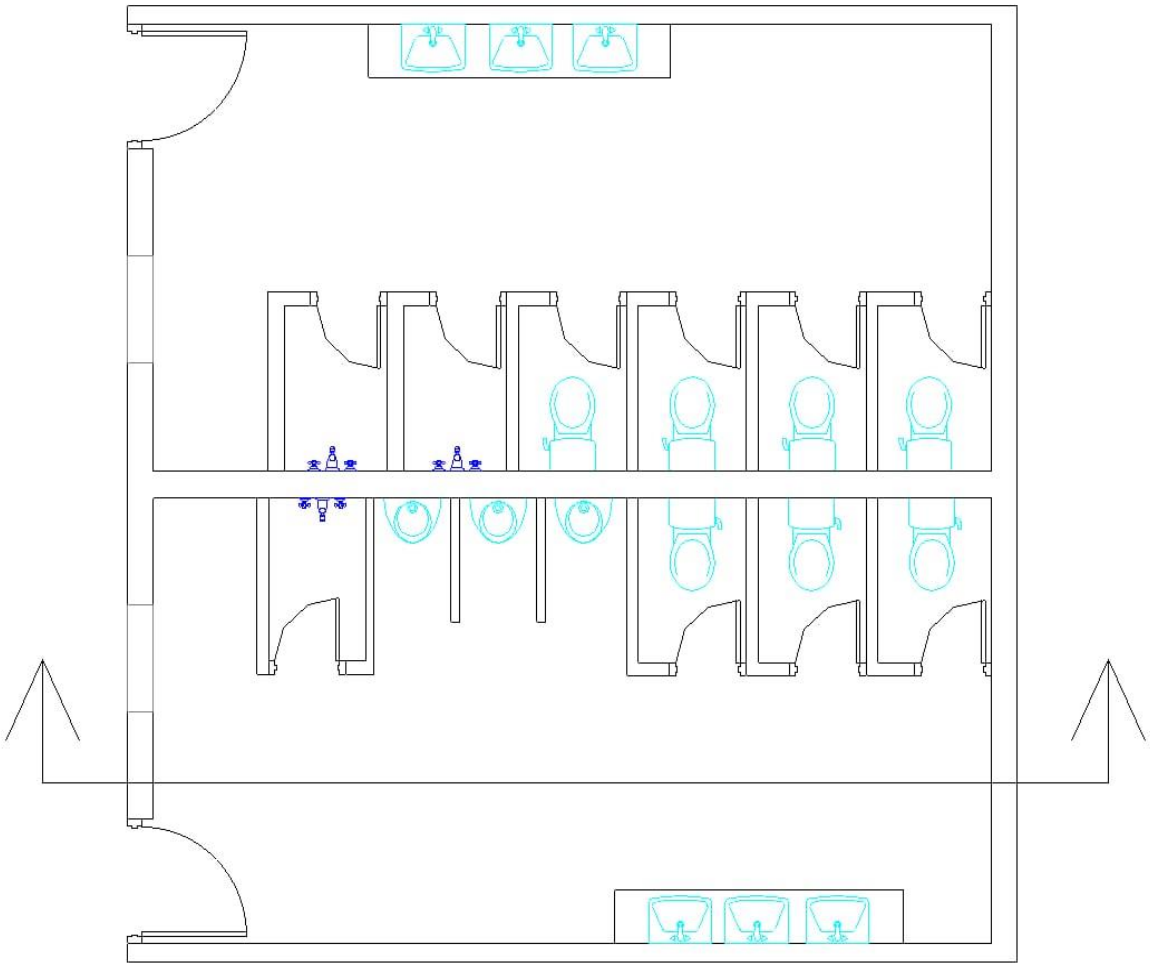
A public toilet is a room or small building with toilets (or urinals) and sinks that does not belong to a particular household. Public toilets are typically found in many different places like inner-city locations, offices, factories, schools, universities and other places of work and study. Similarly, museums, cinemas, bars, restaurants, entertainment venues usually provide public toilets.

Public toilet Design:

Length :- 5.64 m
Width :- 7.92 m
Height:- 3.2m
Build up area :- 44.67 m^2




1'-3"
4½"
3"
7'-9"
4'-6"
7'-9"
10'
1'-6"



Measurement Sheet (Public Toilet)

Sr.No	Description	Nos.	Length (m)	Width (m)	Height (m)	Total Quantity (m^3)
1.	Excavation	1	32.69	1.2	1.5	58.84
2.	Wall (0.23mthk)	1	33.66	0.23	3.048	23.6
3.	Wall(0.12m thk)	1	22.77	0.12	3.048	8.33
4.	Door	2	1.1	0.23	2.13	-1.08
5.	Plinth	1	5.64	7.92	0.46	20.55
6.	Slab	1	5.64	7.92	0.1	4.47

Abstract Sheet

Sr.No	Description	Quantity (m^3)	Rate	Per	Amount
1.	Excavation	58.84	85	m^3	5002
2.	Wall	23.85	5050	m^3	120443
3.	Plinth	20.55	3500	m^3	16539
4.	Slab	4.47	3700	m^3	71925
				Total	213909

The rates of their respective works provided in the Abstract along with the quantities are inclusive of water charges, contractors profit, utilize and labour charges.

8.1.4 Socio- Cultural Design (Civil) :- GARDEN

Garden is place where all categories of people are come for refreshment and get relax.In gardens, ornamental plants are often grown for their flowers, foliage, or overall appearance.

Design utilized by :

All category of people from children to elder.

Needs :-

It's good for your health. The health benefits of gardening have been well-documented. Being outside increases your exposure to Vitamin D and the weight-bearing exercise of gardening is good for bones and the heart. One study even found that gardening decreases your risk of dementia.

Design brief :-

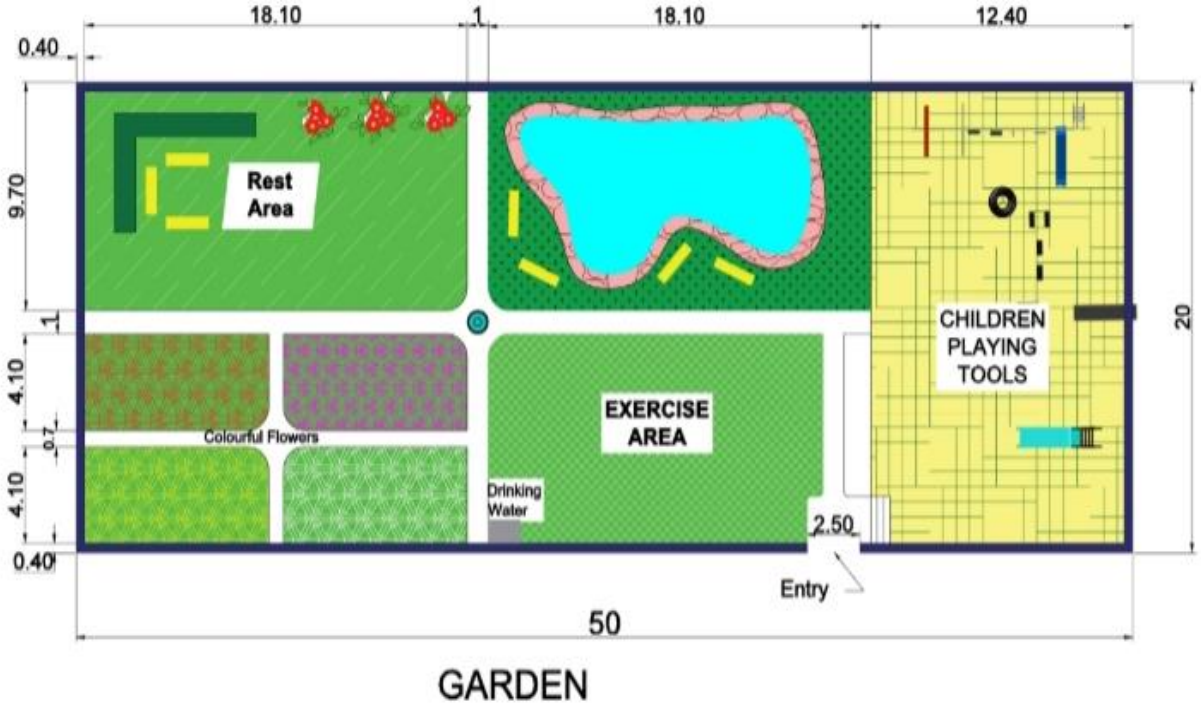
A garden is a planned space, usually outdoors, set aside for the display, cultivation, or enjoyment of plants and other forms of nature, as an ideal setting for social or solitary human life.

Garden Design :-

Length :- 50m

Width :-20m

Total area of garden :-1000 m^2



Measurement Sheet (Public Toilet)

Sr.No	Description	Nos.	Length (m)	Width (m)	Height (m)	Total Quantity (m^3)
1.	Excavation	1	136.7	0.7	1	95.69
2.	Wall	1	136.7	0.2	1.6	43.74

Absract sheet

Sr.No	Description	Quantity (m^3)	Rate	Per	Amount
1.	Excavation	95.69	85	m^3	8134
2.	Wall	43.74	5050	m^3	220887
				Total	229021

The rates of their respective works provided in the Abstract along with the quantities are inclusive of water charges, contractors profit, utilize and labour charges.

8.1.5 Smart village design (Civil) :- Public Library

Whereas village libraries have a responsibility to provide information services to all communities in the village area. The village libraries aim is to make villagers more empowered by increasing information literacy.The library has a major role on helping on raising the culture of information literacy amongst the society

Design utilized by :-

Students, Common People, employees, interested person, people surrounding the village

Needs :-

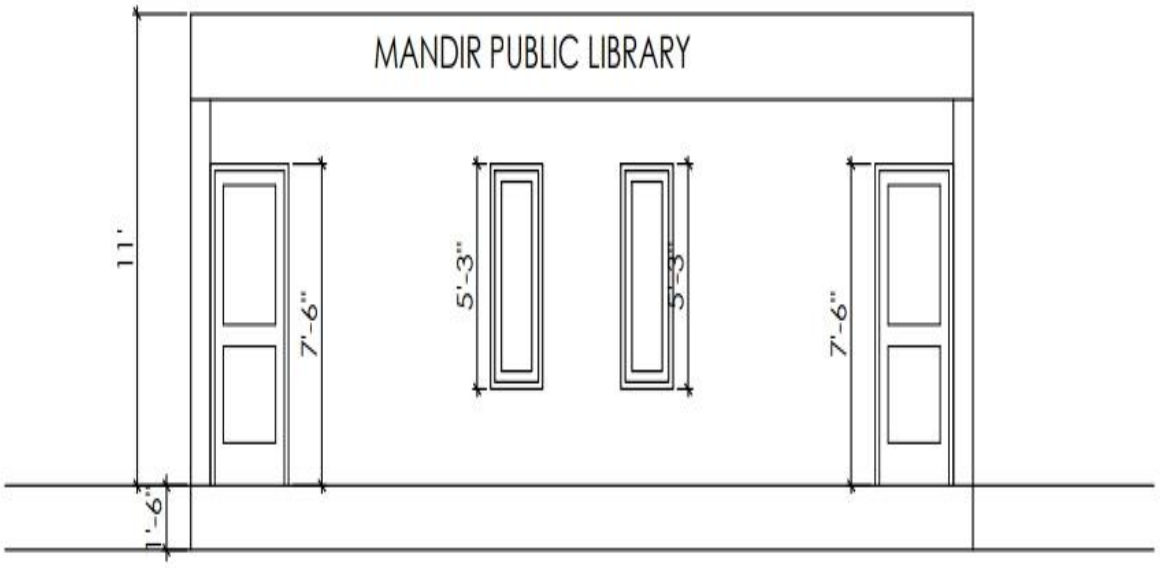
In Mandir village there is no public library so, people need to travel around 7km to 8km in search of book this consume lots of time and also increase the cost of travel to reduce this trouble we introduce this design for the benefit of people.

Design brief :-

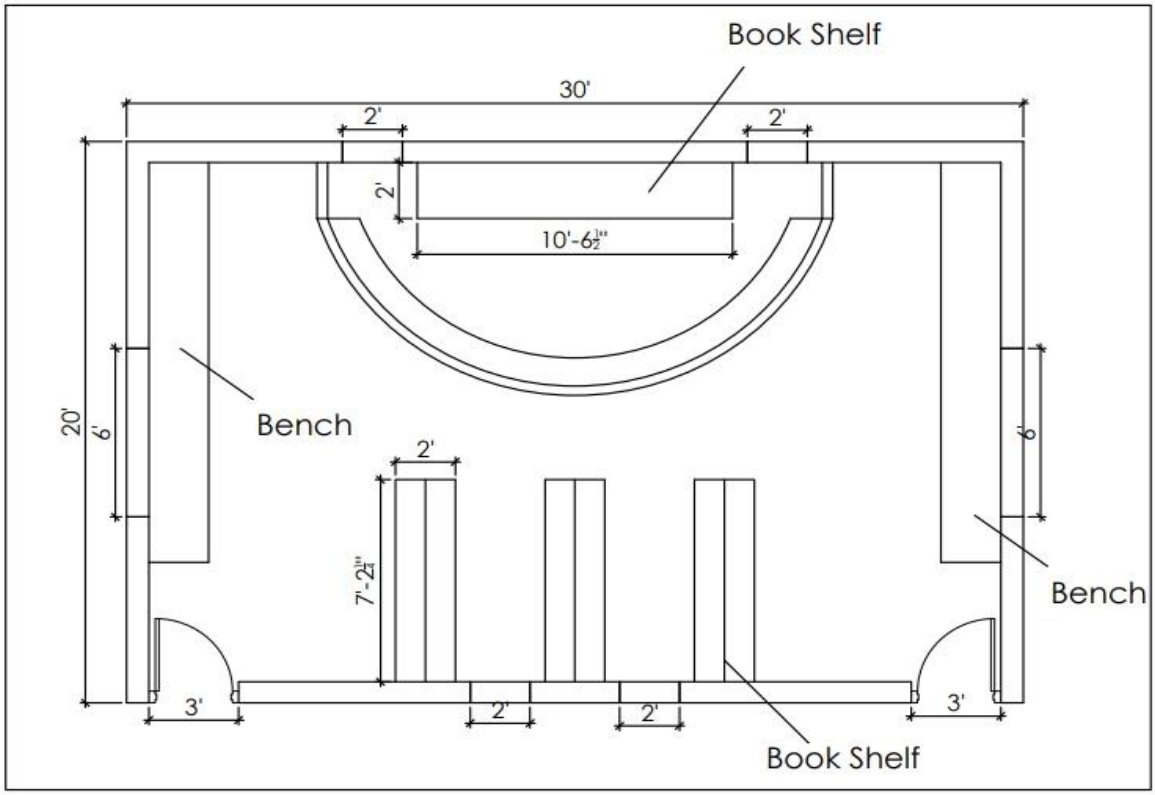
Library is an essential part of any smart village this help to increase knowledge and create awareness among the people. Here we design this library keeping in view of student need.

Public Library design :-

Length ;- 9.14 m
Width :- 6.1 m
Build up area :- 55.75 m^2



ELEVATION



PLAN

Measurement Sheet (Library)

Sr.No	Description	Nos.	Length (m)	Width (m)	Height (m)	Total Quantity (m^3)
1.	**Excavation**	**1**	**29.28**	**1.2**	**1.5**	**52.70**
2.	**Wall**	**1**	**29.28**	**0.3**	**3.048**	**26.77**
3.	**Window**	**4**	**0.61**	**0.3**	**1.52**	**-1.11**
4.	**Window**	**2**	**1.83**	**0.3**	**1.52**	**-1.67**
5.	**Door**	**1**	**1.5**	**0.3**	**2.13**	**-0.96**
6.	**Plinth**	**1**	**9.14**	**6.1**	**0.46**	**25.65**
7.	**Slab**	**1**	**9.14**	**6.1**	**0.1**	**5.58**

Abstract Sheet

Sr.No	Description	Quantity (m^3)	Rate	Per	Amount
1.	**Excavation**	**52.70**	**85**	**m^3**	**4480**
2.	**Wall**	**23.03**	**5050**	**m^3**	**116302**
3.	**Plinth**	**25.65**	**3500**	**m^3**	**93275**
4.	**Slab**	**5.58**	**3700**	**m^3**	**20646**
				Total	**234703**

The rates of their respective works provided in the Abstract along with the quantities are inclusive of water charges, contractors profit, utilize and labour charges.

8.1.6:- Heritage village Design (civil) :- Entrance Gate

Entrance gate is structure constructed at the entrance of the village. This gate is used for many purposes like for security reason, for appearance, for giving information to road users etc.

Design utilized by :-

This design can be used by the travelers and visitors for getting information about Village it is also used by villager as entrance gate.

Needs :-

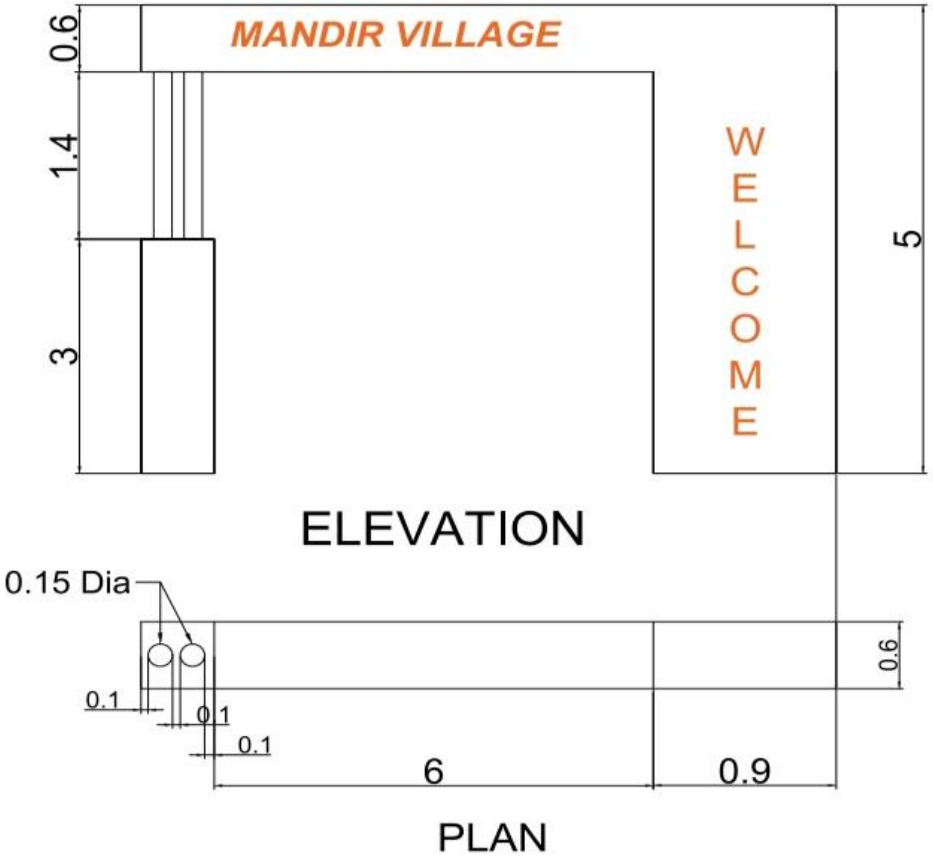
It is constructed for good appearance and to give information about village.

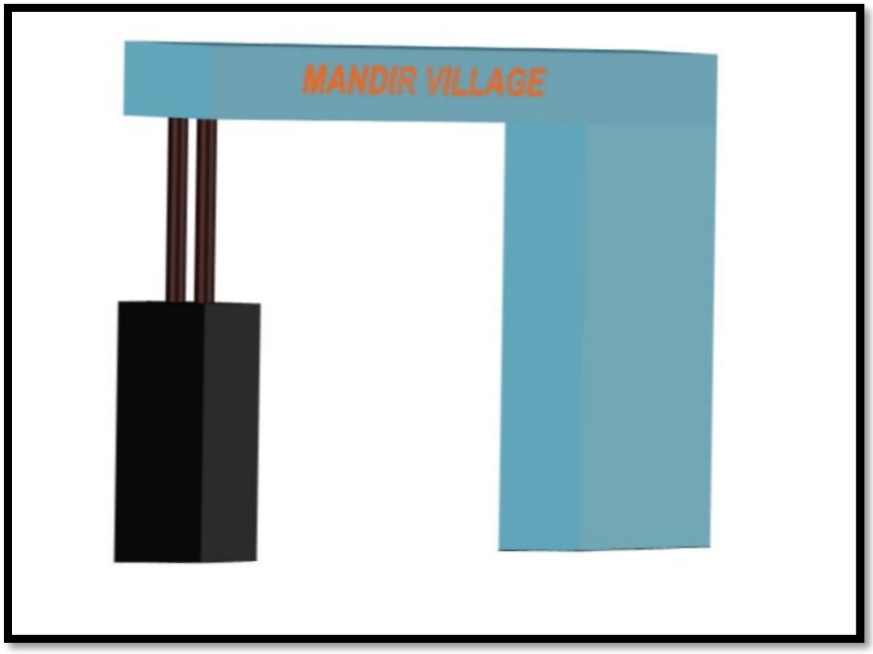
Design brief :-

The ease of use of an entry gate is important for security purposes and it also give good esthetic to village approach road.

Entrance gate design : -

Length :- 7.5 m
Width :- 0.6 m
Height :- 5 m





3D view of entrance gate

Measurement Sheet (Entrance Gate)

Sr.No	Description	Nos.	Length (m)	Width (m)	Height (m)	Total Quantity (m^3)
1.	**Excavation**	**1**	**3.5**	**1.5**	**1.5**	**52.70**
2.	**Column(0.6x0.6)**	**1**	**0.6**	**0.6**	**3**	**1.08**
3.	**Column(0.9x0.6)**	**1**	**0.9**	**0.6**	**4.4**	**2.38**
4.	**Cylindrical support**	**2**	**Diameter=0.15m** **Volume= $\pi r^2 h$ =0.0248**		**1.4**	**0.05**
5.	**Top Hor. Support**	**1**	**7.5**	**0.6**	**0.6**	**2.7**

Abstract Sheet

Sr.No	Description	Quantity (m^3)	Rate	Per	Amount
1.	**Excavation**	**7.88**	**85**	**m^3**	**4480**
2.	**Column**	**3.46**	**5050**	**m^3**	**116302**
3.	**Cylindrical Support**	**0.05**	**5050**	**m^3**	**93275**
4.	**Top Hor. Support**	**2.7**	**5050**	**m^3**	**20646**
				Total	**234703**

The rates of their respective works provided in the Abstract along with the quantities are inclusive of water charges, contractors profit, utilize and labour charges.

8.1.7Solar roof top plant (Electrical Design)

Introduction

Knowing the fact that fossil fuels are not going to last forever, solar power generation seems to be leading the path in clean and renewable energy generation among all other renewable sources of energy production. China which once seems world's largest polluter has now developed the largest solar power plant. Furthermore by 2020 India is aiming to produce 100,000 MW of electricity from solar power plant only.

Working Principle

The working principle is that we use the energy of photons to get the drift current flowing in the circuit using reversed bias p-n junction diode (p-type and n-type silicon combination).

How does Solar Panel Converts Sunlight into Electricity?

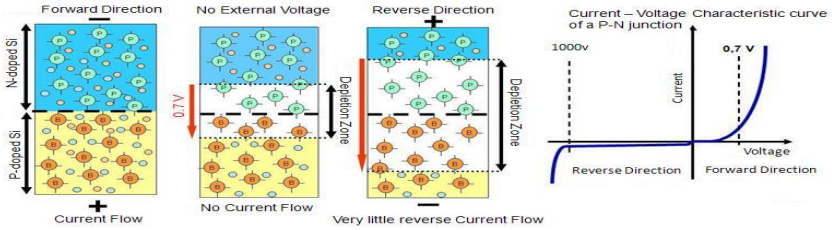


Figure 74:- Conversion of Sun light into Electricity

Silicon is a much known semiconductor having properties of both metals and non-metals. To make a solar panel, this silicon is doped by a pentavalent impurity converting silicon into positive type silicon also known as p-type silicon. And similarly other part is converted into negative or n-type silicon. As name suggest p-type have excess of holes (positive charge) in it and n- type has excessive electrons. Then these two are combined together one over other up to the atomic level. Due to their contact and having opposite charge electrons flow from n-type to p-type and holes travel from p-type to n-type thus creating a thin potential barrier between them. The current so generated from this movement of charges is named as diffusion current. But we need to understand yet another thing that is due to this potential barrier, giving rise to electric field which flows from the positive charge near n-type and negative charge near p-type junction (the area where potential is generated or meeting area of p and n type). Due to this electric field electrons from p-type starts flowing towards n-type and holes from n-type towards p-type giving rise to a current called drift current. Initially the diffusion current is more than the drift current but as potential difference increases due to diffusion it simultaneously increases the drift current. Current stops flowing when drift current becomes equal to diffusion current.

Sunlight travels to earth in the form of small energy particles called photons. This photon strikes the p- type region and transfer its energy to hole and electron pair thus exciting theelectron and it gets away from hole. The electric field we have due to potential difference at p-n junction makes its electron to travel to n-type region thus causing the current to flow.

Working of Solar Power Plant

As sunlight falls over solar cells, a large number of photons strike the p-type region of silicon. Electron and holes pair will get separated after absorbing the energy of photon. The electron travels from p-type region to n-type region due to the action of electric field at p-n junction. Further the diode is reversed biased to increase this electric field. So this current starts flowing in the circuit for individual solar cell. We combine the current of all the solar cells of a solar panel, to get a significant output.

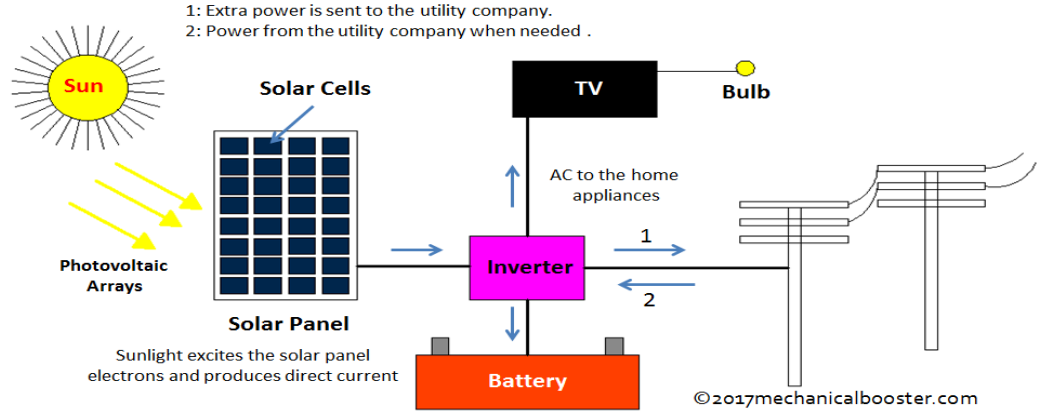


Figure 75:- Working of solar power plant

- Solar panels produce direct current which is required to be converted into alternating current to be supplied to homes or power grid.

Components of a rooftop solar PV plant

From the above, we can see that a rooftop solar PV plant primarily requires, and in some cases , components

PV modules (panels)

Inverters

Mounting structures

If battery backup is required then; battery

PV modules (panels):

There are two kinds of modules: Thin-film, and Crystalline. Rooftop solar plants predominantly use crystalline panels because they are more efficient and therefore better suited to installations like rooftops where space is a constraint. There are two important parameters about solar panels:

Panel efficiency:

It should be noted that the efficiency of a solar panel is calculated with reference to the area it occupies. Two 250 Wp panels of different efficiency rating will generate the same amount of power, but occupy different amounts of space on your rooftop. Capacity rating The capacity of a solar panel is denoted in terms of watts as Wp (watt peak). E.g., 250 Wp. This is the power output of the plant at 25°C. The capacity of the plant reduces at temperatures above 25°C and increases at temperatures below 25°C.

Inverters:

Inverters are a very important component of your rooftop solar PV plant because they determine the quality of AC power you get, and also the kind of loads that can bepoweredwithsolar– different inverters support different levels of starting current requirements which affects the kind of machinery that can run on solar power. Inverters

are also the only major component of your solar plant that are replaced during the lifetime of the plant.

Will I get power during a power failure?

Not all rooftop solar PV plants generate power during power failures. Aspreviously mentioned, the solar inverter uses another source of power as a reference voltage. If the inverter is designed to use only grid power as a reference voltage, then the inverter will not be able to function in the absence of grid power and the solar plant will not generate power.

Therefore, if you are interested in rooftop solar to provide power during grid failures it is critical to choose an inverter that can use other sources of power as a reference voltage and continue to function even when the grid is down.

Types of inverters: Based on the explanation above, we can classify inverters into 4 types

Grid-tied

These inverters are primarily designed to supply the generated power to the grid and also power the load while grid power is available. This inverter will NOT generate power during a power failure, not only because it needs grid power as a reference voltage, but also because the inverter shuts down the system to stop sending power into the grid and avoids the risk of electrocuting utility personnel who are working to repair the grid (known as Anti Islanding)

Hybrid:

Inverters (also known as Bidirectional or magical inverters) are a one system solution for a complete solar PV system. They can automatically manage between 2 or more different sources of power (grid, diesel, solar). They have inbuilt charge controllers, MPPT controller, Anti Islanding solutions, DC and AC disconnects and other features like automatic turning on/off of the diesel generator, automatic data logging, and various kinds of protection for the different components of the system, making them ideally suited for applications that require management of power from different sources.

Solar Panel Mounting Structures:

Solar panels are mounted on iron fixtures so that they can withstand wind and weight of panels. The panels are mounted to face south in the Northern Hemisphere and north in the Southern Hemisphere for maximum power tracking. The tilt of the panels is at an angle equal to the latitude of that location.

The proper design of mounting structures is important to power plant performance as the power output from the PV plant will not be maximised if the mountings buckle and the panels are not optimally oriented towards the sun. In addition, improperly mounted panels present a ragged appearance that is not pleasing to the eye. Allowing sufficient air circulation to cool the PV panels is also an important factor that mounting structures should be designed for because, as mentioned above, rooftop PV plant output falls as temperatures rise above 25°C.

Batteries: A battery pack can add about 25-30% to the initial system cost of a rooftop PV solar system for one day autonomy (storing an entire day's output).Charge controllers that are integrated into the inverter are preferred as the inverter directs either grid power or solar power, based on availability and demand, to charge the batteries. This extends the

battery life compared with using stand-alone charge controllers that allow parallel charging between grid and solar power at different power levels, damaging the battery

Reasons to use batteries:

- **Make power available when the sun isn't shining** – This can be particular useful for applications where electrical consumption is greater during the night than in the day, such as BPOs that work on night shifts, or even residential apartments where most people are away during the day and at home during the night
- **Smoothen power delivery during the day –** Clouds moving across the sun can suddenly reduce the output from your rooftop plant. A battery backup can ensure that the load gets sufficient power during such dips in plant output
- **Immediately cut-in during power failures –** If space isn't available for a large rooftop plant, solar panels with batteries can be used to support the load until a diesel generator can be turned on
- **Optimize time-of-use billing –** If the utility charges different tariffs based on time of day, power from the batteries can be used to reduce consumption at those times when utility power is very expensive

Drawbacks to using batteries

- **Charge/discharge efficiency** – Batteries and their charging equipment are not 100% efficient. There is a loss of energy both while charging and discharging the battery. Different models of batteries can have different charge/discharge efficiencies. If we lose 15% of the energy while charging and another 15% while discharging, we get back only about 72% of the power that was sent to the battery

- **Maintenance –** Battery packs require careful maintenance. Maintenance isn't limited to the physical condition of the battery (amount of electrolyte, cleaning of terminals) but also extends to the way we charge and discharge the battery. Repeatedly deep discharging the batteries, discharging before the battery has reached full charge, etc., are ways in which the life of the battery can be significantly reduced. Batteries can last as long as 10 years or give trouble within a few days, depending on how they are used.Due to the above drawbacks, we do not recommend coupling solar PV plants with battery backup unless absolutely necessary. If batteries are required, we urge you to perform a lifetime cost-benefit analysis to understand the effect on cost of solar power from your rooftop.

❖ **Maintenance of rooftop solar PV systems**

The basic rooftop solar PV system has no moving parts and therefore requires very little maintenance. Additional components, such as trackers and batteries, can significantly increase the maintenance effort and expenditure.

- **Solar panels –** These typically require little to no maintenance beyond having the dust cleaned off them. Solar panels can be expected to last for 25 years
- **Inverter –** This can be affected by grid power quality or other issues common to power equipment such as humidity or short-circuits caused by insects, and may require some maintenance such as replacement of capacitors. The lifespan of an inverter is 5-10 years

- **Mounting structures –** These typically last the lifetime of the plant and do not require maintenance, unless tracking systems are used

Benefits of solar roof top

- Most clean and renewable source of energy.
- It is available in abundance and endless.
- It provides electricity at low cost, as fuel is free.
- Keeping in mind the pollution and cost of fossil fuel, it's becoming the most reliable source of clean energy.

Disadvantages of roof top

- It requires a lot of land to be captured forever.
- Initial cost of installation is too high.
- The energy storage options are not efficient and moreover costly if efficient.
- Power production is quite low as compared to nuclear or other resources to produce power.
- There is a problem if it is cloudy for few days.
- Their production causes pollution

Cost for solar Roof Top Plant

Factors	**Adani Solar**	**Loom Solar**
Size of power plant	35.1 kW	35.1 kW
Cost of Plant: MNRE Current Benchmark cost: Total Cost	 Rs. 55000Rs./kW Rs. 1930500	 Rs. 55000Rs./kW Rs. 1930500
Total Elecricity Generation From solar Plant Annual: Life time(25 years):	 47701 1192525	 56160 kWh 1404000 kWh
Financial saving: Traiff @ Rs. 5.5/KWh Monthly : Annual: Life- time (25Years) :	 21863 262355.5 6558887.5	 Rs. 25740 Rs. 308880 RS. 7722000
Carbon dioxide emissions mitigated is	978 tonnes.	1151 tonnes.
This installation will be equivalent to planting	1565 Over the life time	1842 Over the life time

8.1.8Solar LED Street light(Electrical Design)

INTRODUCTION

With the intensification of energy crisis all over the world, all the countries are looking for the way to solve this serious problem. One way is to search the new energy and take advantage of the renewable energy. Another way is to exploit the new energy-

saving technologies to reduce energy consumption, and improve utilization efficiency of energy.

Solar energy is the most direct, common, and clean energy on our planet we have already found until now. Total solar energy absorbed by the Earth is about 3,850,000 exajoules (EJ) in one year, which is even twice as much as all the non-renewable resources on the earth found and used by human being, including coal, oil, natural gas, and uranium etc. The solar resources can be seemed inexhaustible.

LED is a solid state semiconductor device which can convert electrical energy into visible light. It is characterized with small size, low power consumption, long service life, environmental protection and durance. The spectrum of the LED is almost concentrated in the visible light spectrum, so it has a high luminous efficiency which can be described as the great reform in the solid light source

This essay briefly describes the solar led street lighting system. It uses the solar radiation energy to charge the battery with the solar panel during day time, and offer energy to the LED light equipment at night. This system has a double advantage in both utilization of new energy and energy-saving.

Requirements on solar LED street light and significance of design

The solar street light does not need to set up the transmission line or route the cable, and no any special management and control are required. It can be installed in the entire public place such as the square, the parking lot, the campus, the street or the highway etc.

The street lighting is closely related to people's daily life. Following quick development in process of the global urbanization, the green, efficient, and long-life LED light gradually enters into our lives.

A good LED street lighting system is characterized with high efficiency, energy-saving, long-life, high color rendering index and environmental protection, which not only has a great significance on energy-saving of the city lighting , but also has close relationship with people's health and the economic development. So it is a noticeable issue how to design a reasonable LED street light system.

In my opinion, following basic requirements on a qualified solar LED street light system shall met during design process:

(1) Learn general information of the meteorological conditions in the area.
(2) Select the cost-effective solar panel, the controller, the battery and a series of components.
(3) Adopt effective measures to protect the system.

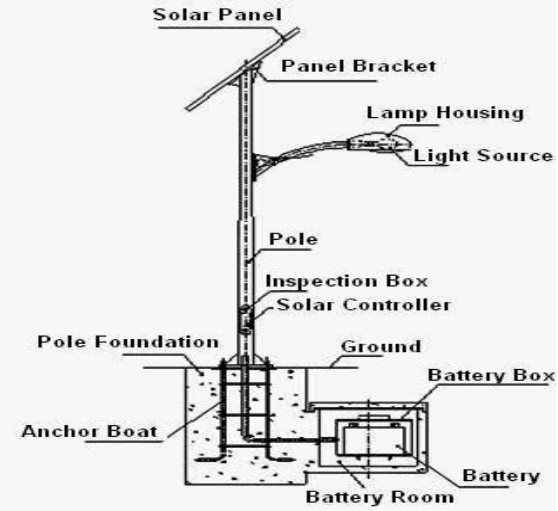
These conditions ensure to design a reasonable solution and realize the significance and value of the existence of solar LED Street Light Street.

Basic components

As shown in Figure The system consists of:
(1) Solar cell
(2) LED lamps

(3) Light pole
(4) Control box (charger, controller, battery)

- **Design of solar street light**



Operation principle

According to principle of photovoltaic effect, the solar panels receive solar radiation during the day time and then convert it into electrical energy through the charge and discharge controller, which is finally stored in the battery. When the light intensity reduced to about 10 lx during night and open circuit voltage of the solar panels reaches at a certain value, the controller has detected voltage value and then act, the Battery offer the energy to the LED light to drive the LED emits visible light at a certain direction. Battery discharges after certain time passes, the charge and discharge controller will act again to end the discharging of the battery in order to prepare next charging or discharging again.

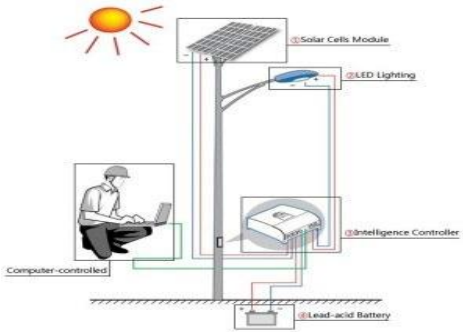


Figure 76:-Solar LED street light

Charge and discharge management

Another function of the controller is to manage charging and discharging of the battery.

Rated Voltage	Anti-overcharge voltage	Anti-over discharge voltage
6 V	7.2V ±0.1v	5.5V±0.1V
12V	14.3V ±0.1V	11.0V±0.1V
24 V	28.6V ±0.1V	22.0±0.1V

The large-capacity lead-acid battery can be charged with large current in order to fully charge in a limited time during day time. When voltage of the battery's cell reaches limit voltage, it could easily lead to breakage of battery if it still uses a large current to charge. Therefore, when the battery reaches the overcharge voltage, it Can be automatically converted into a trickle charge(small current). The general parameters of protection voltage has shown in Table, in generally the over-discharge protection voltage is 90% of the nominal voltage and the overcharge protection voltage is usually 120% of the nominal voltage. The precision of anti overcharge control voltage is ± 0.1v.

The working life under different depth of discharge is not the same, in particular deep discharging of the battery can cause permanent damage. In order to protect the battery life, we must avoid deep discharge. When the battery voltage falls below over discharge point, it should promptly cut off load and stop lighting. Once the protection circuit act, we must ensure that the battery does not automatically discharge anymore before no recharging.

Cost of solar street light

Sr.no.	Solar street light(in watt)	Price(in RS)	Warranty(years)
1	12	15000	2
2	20	17500	2
3	30	20000	2
4	40	30000	2
5	60	45000	2
6	80	60000	2
7	100	75000	2
8	120	90000	2

Cost of poll

Cost of one iron poll price is 4500rs

Cost of battery

Cost of one chargeable battery price is minimum 5000rs

Implementation in village

Solar street light were provide on road and near government properties like school, hospital etc.

Design Utillized by:-

- All villages people using.
- Rood users

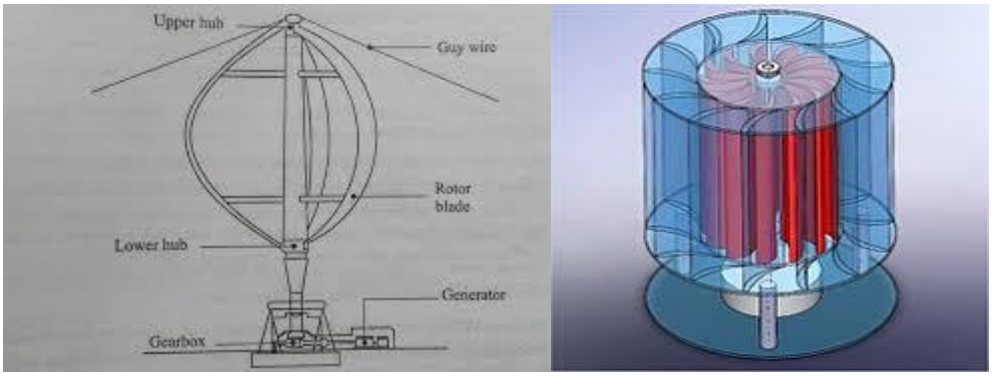
8.1.9Vertical Wind Turbine (Electrical Design)

Introduction

If the efficiency of a wind turbine is increased, then more power can be generated thus decreasing the need for expensive power generators that cause pollution. This would also reduce the cost of power for the common people. The wind is literally there for the taking and doesn't cost any money. Power can be generated and stored by a wind turbine

with little or no pollution. If the efficiency of the common wind turbine is improved and widespread, the common people can cut back on their power costs immensely.

A vertical-axis wind turbine (VAWT): is a type of wind turbine where the main rotor shaft is set transverse to the wind while the main components are located atthe base of the turbine. This arrangement allows the generator and gearbox to be located closeto the ground, facilitating service and repair. VAWTs do not need to be pointed into the wind. which removes the need for wind-sensing and orientation mechanisms. Major drawbacks for the early designs included the significant torque variation or "ripple"during each revolution, and the large bending moments on the blades. Later designs addressedthe torque ripple issue by sweeping the blades helically.Savonius vertical-axiswind turbines (VAWT) are not widespread, but their simplicity and better performance indisturbed flow-fields, compared to small horizontal-axis wind turbines (HAWT) make them agood alternative for distributed generation devices in urban environment.

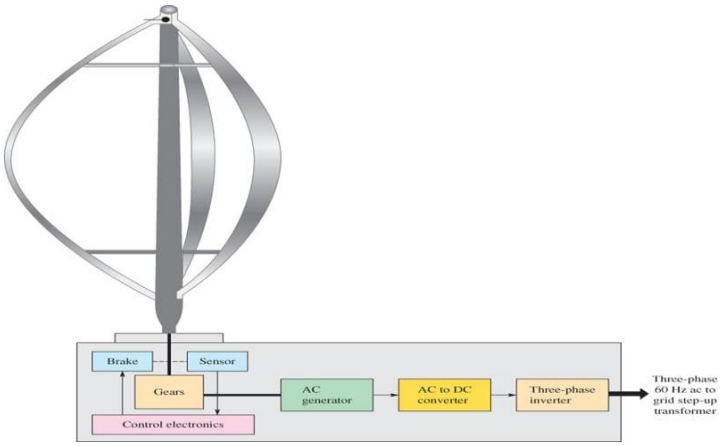


A vertical axis wind turbine has its axis perpendicular to the wind streamlines and vertical to the ground. A more general term that includes this option is "transverse axis wind turbine" or "crossflowwind turbine." For example, the original Darrieus patent, US Patent 1835018, includes bothoptions.

Drag-type VAWTs such as the Savonius rotor typically operate at lower tipspeed ratios than liftbasedVAWTs such as Darrieus rotors and cycloturbines.

Computer modelling suggests that wind farms constructed using vertical-axis wind turbines are15% more efficient than conventional horizontal axis wind turbines as they generate less turbulence.

Working Principle: Vertical Axis Wind Turbines are designed to be economical and practical, as well as quiet and efficient. ... A wind turbine secures air into a hub, which them turns into a generator. The air that passes through the blades of the wind turbine is spun into the generator through rotational momentum.



Internal Parts of the Darrieus Wind Turbine

When the Darrieus blade is operating, it is moving through the air in a circular path. The oncoming airflow generates a net force pointing obliquely forward and is projected inward past the turbine axis at a certain distance, giving a positive torque to the shaft. This helps the blade to rotate in the direction it is already traveling.

The action of this blade is similar to the aerodynamic principles used in helicopters, and it makes the operation of this type of wind turbine quieter than a horizontal-axis wind turbine of the same size.

Because there is less friction on the blade, the blade can rotate with equal torque regardless of the wind's direction

A problem with the Darrieus wind turbine is that it is not self-starting, so it uses its generator as a motor to get the rotor started. As the wind increases the blade speed, the power to the motor is turned off and it begins working as a generator.

Darrieus wind turbines were installed on early wind farms, but most of them have been taken out of use in commercial applications because they are not as efficient as HAWTs and they require constant maintenance.

Benefits

- Omni-directional VAWTs may not need to track the wind. This means they don't require acomplex mechanism and motors to yaw the rotor and pitch the blades
- Some designs can use screw pile foundations, which reduces the road transport of concreteand the carbon cost of installation. Screw piles can be fully recycled at end of life.
- VAWTs can be installed on HAWT wind farms below the existing HAWTs, supplementing power output.
- Gearbox replacement and maintenance are simpler and more efficient, because the gearbox isaccessible at ground level instead of requiring the operator work hundreds of feet in the air.Motor and gearbox failures generally are significant operation and maintenanceconsiderations

Disadvantages

- The blades of a VAWT are fatigue-prone due to the wide variation in applied forces during each rotation. This can be overcome by the use of composite materials and improvements in design - including the use of aerodynamic wing tips that cause the

spreader wing connections to have a static load. The vertically oriented blades can twist and bend during each turn, shortening their usable lifetimes.

- Other than the drag-types, VAWTs have proven less reliable than HAWTs,although modern designs have overcome many early issues.

8.2 Reason for Students Recommending this Design

- In this village there are about 33% children and elder so proposal of designing public garden is good for them.
- In this village there are seven ponds so we can also use this for architectural purpose,
- We can redevelop these ponds by growing plant along the pond and by making a swimming pool we can also create employment for the people.
- Mandir village has two primary school and one secondary and higher secondary school but there is no library at or near the village, so we include this proposal in our design.
-

8.3 Estimation & Costing

- As per the need of the village people and their requirement we'll decide the built-up area.
- The approx. cost of construction for $1m^2$ area is Rs. 2000.
- Area of land is not allocated by the village so, we take suitable area as per our knowledge for different purpose.

Chapter 9:- Proposing design for future development of the village for Part-II Design

For future development of the Mandir village we are proposing the following designs for Part II :

- **Sustainable design:Panchayat Office**

In our allocated village the Panchayat office is not in a good condition and the Talati asked us to redesign the Panchayat with modern technology.

- **Social design : Solid waste dumping**

Currently the villagers are dumping their solid waste at outer part of the village and burn it at a specific location. By that air pollution will increase and waste collection is not done regularly so that solid waste management system should be there in the village for cleanliness and safe environment.

- **Physical design : Widening of Road**

In the Mandir village there are short roads and villagers are demanding for widening of roads for better public and transportation movement.

- **Socio-Cultural design : Community Hall**

There is no community hall in the village and for public gathering they need a community hall.

- **Smart village design : Solar RO Plant**

For the smart development of the Mandir village we have proposed the smart concepts as the Solar RO Plant.

- **Heritage village design : Lake Side Development**

Mandir village is between two beautiful lakes so by developing the lake side for good Aesthetics view.

These are the proposed designs for the future development of Mandir village for VishwakarmaYojana phase VIII , Part 2 design.

Chapter 10:- Conclusion of the entire village activity of the project

Village Mandir which is allotted to us is very good in approachable and also to communicate with the Sarpanch, Talati, Principal and teachers of the school and also village residents.

Based on the data collection of village we can easily identify which facility is required and which facilities is not sufficient to meet the requirement of growing population of village, By carrying out various survey we can easily find the problems and this data can also help to make improvement in the village. This project give very wonderful opportunity to develop our skill and to grain practical knowledge regarding to field work.

Chapter 11 :- References refereed for this project

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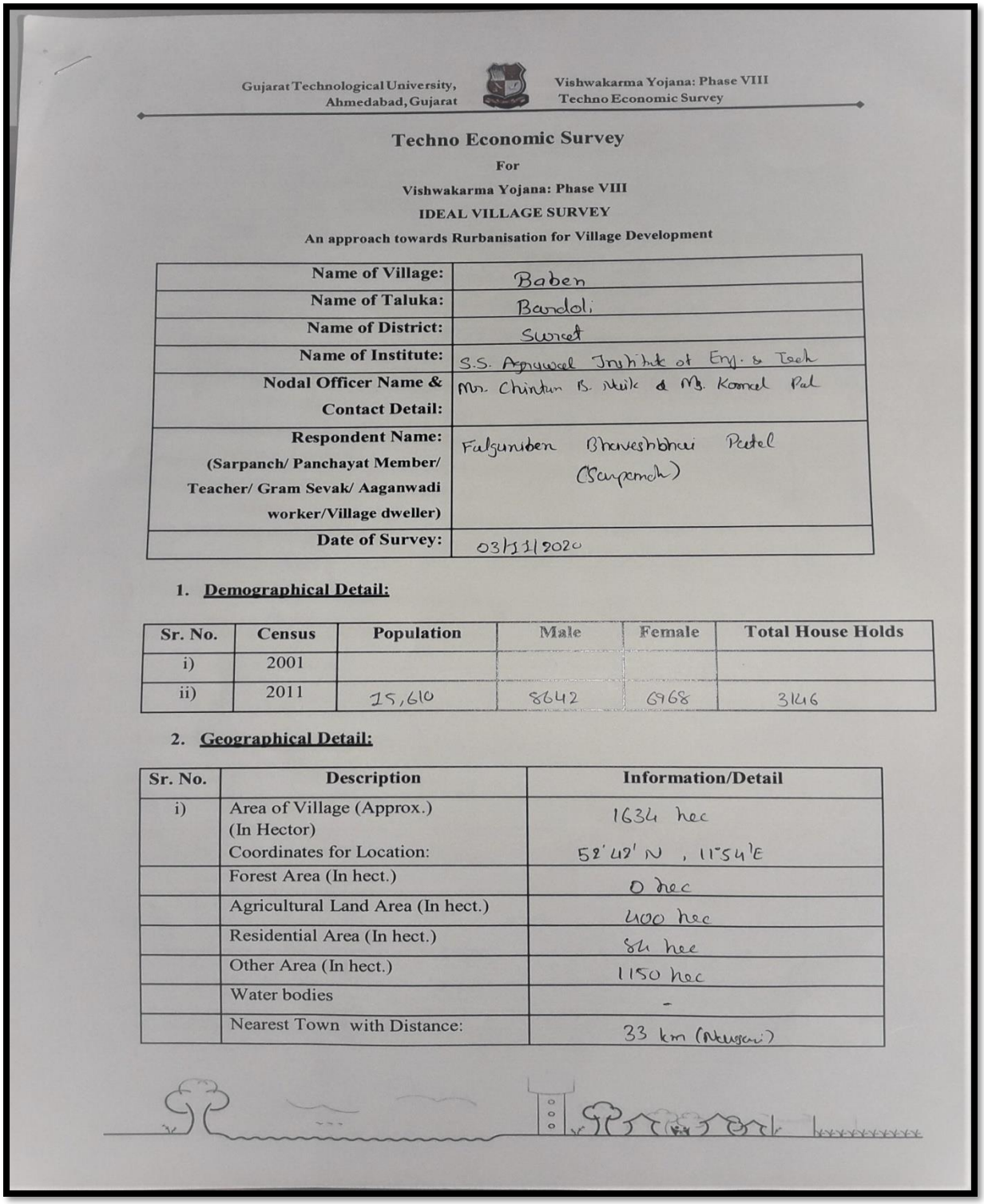
Chapter 12:-Annexure attachment

12.1 Techno Economic Survey form of Ideal Village



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Vishwakarma Yojana: Phase VIII
Techno Economic Survey

Techno Economic Survey

For

Vishwakarma Yojana: Phase VIII

IDEAL VILLAGE SURVEY

An approach towards Rurbanisation for Village Development

Name of Village:	Baben
Name of Taluka:	Bardoli
Name of District:	Surat
Name of Institute:	S.S. Agrawal Institute of Eng. & Tech
Nodal Officer Name & Contact Detail:	Mr. Chintan B. Naik & M. Komal Pal
Respondent Name: (Sarpanch/ Panchayat Member/ Teacher/ Gram Sevak/ Aaganwadi worker/Village dweller)	Falguniben Bhaveshbhai Patel (Sarpanch)
Date of Survey:	03/11/2020

1. **Demographical Detail:**

Sr. No.	Census	Population	Male	Female	Total House Holds
i)	2001				
ii)	2011	15,610	8642	6968	3146

2. **Geographical Detail:**

Sr. No.	Description	Information/Detail
i)	Area of Village (Approx.) (In Hector) Coordinates for Location:	1634 hec 52°42' N , 11°54'E
	Forest Area (In hect.)	0 hec
	Agricultural Land Area (In hect.)	400 hec
	Residential Area (In hect.)	84 hec
	Other Area (In hect.)	1150 hec
	Water bodies	-
	Nearest Town with Distance:	33 km (Navsari)

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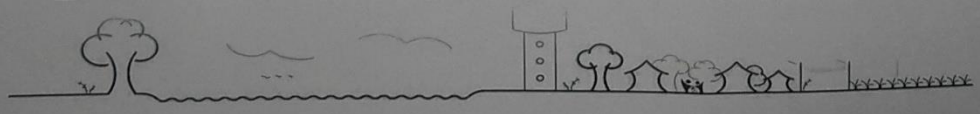
3. Occupational Details:

Name of Three Major Occupation groups in Village	1. Farming
	2. Restaurants
	3.

4. Physical Infrastructure Facilities:

Sr. No.	Descriptions	Detail	Adequate	Inadequate	Remarks
A.	**Main Source of Drinking water**				
	• Tap Water (Treated/ Untreated)	Yes	✓		
	• RO Water	Yes	✓		
	• Well (Covered/ Uncovered)	Yes	✓		
	• Hand pumps	Yes	✓		
	• Tube well/ Borehole	Yes	✓		
	• River/ Canal/ Spring/ Lake/ Pond	Yes	✓		
Suggestions if any:					
B.	**Water Tank Facility**				
	Overhead Tank Total 6	Capacity:			
	Underground Sump	Capacity:			
Suggestions if any:					
C.	**Drainage Facility**				
	Available (Yes/ No)	Yes			
Suggestions if any:					
D.	**Type of Drainage**				
	Closed/ Open	Open			
	If Open than Pucca / Kutchcha	Pucca			
	Whether drain water is discharged directly in to Water bodies/ Sewer plants	-			
Suggestions if any:					



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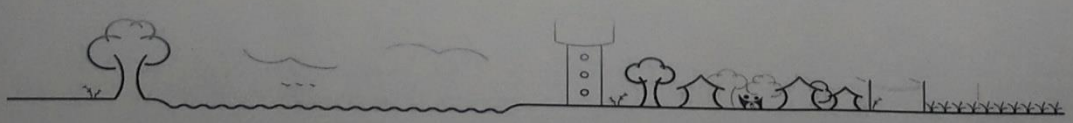
E.	**Road Network :All Weather/ Kutchha (Gravel)/ Black Topped pucca/ WBM**				
	Village approach road	WBM	✓		
	Main road	WBM	✓		
	Internal streets	Conc. Block	✓		
	Nearest NH/SH/MDR/ODR Dist. in kms.	SH (≈ 5 km)	✓		
Suggestions if any:					
F.	**Transport Facility**				
	Railway Station (Y/N) (If No than Nearest Rly Station---Kms)	No	✓		
	Bus station (Y/N) Condition: (If No than Nearest Bus Station---Kms)	Yes	✓		
	Local Transportation (Auto/ Jeep/Chhakda/ Private Vehicles/ Other)	Auto & Tempo	✓		
Suggestions if any:					
G.	**Electricity Distribution**				
	(Y/N) Govt./ Private (Less than 6 hrs./ More Than 6 hrs)	Yes (More than 6 hr)			
	Power supply for Domestic Use	AC			
	Power supply for Agricultural Use	AC			
	Power supply for Commercial Use	AC			
	Road/ Street Lights	AC			



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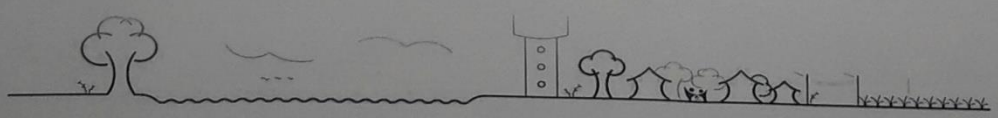
	Electrification in Government Buildings/ Schools/ Hospitals	AC			
	Renewable Energy Source Facilities (Y/ N)	No			
	LED Facilities	Solar st. light			
Suggestions if any:					
H.	**Sanitation Facility**				
	Public Latrine Blocks If available than Nos.	No	✓		
	Location Condition	-			
	Community Toilet (With bath/ without bath facilities)	Yes	✓		
	Solid & liquid waste Disposal system available	Yes	✓		
	Any facility for Waste collection from road	No		✓	
Suggestions if any:					
I.	**Irrigation Facility:**				
	Main Source of Irrigation (Stream/River/ Canal/ Well/ Tube well/ Other)	Ponds & Canal	✓		
Suggestions if any:					
J.	**Housing Condition:**				
	Kutchha/Pucca (Approx. ratio)	RCC	✓		

5. **Social Infrastructural Facilities:**

Sr. No.	Descriptions	Information/ Detail	Adequate	Inadequate	Remarks



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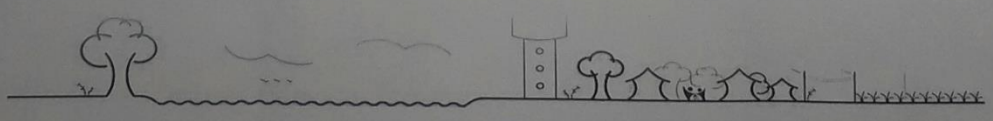
K.	Health Facilities:				
	Sub center/ PHC/ CHC /Government Hospital/ Child welfare & Maternity Homes (If Yes than specify No. of Beds) Condition:	PHC available			
	Private Clinic/Private Hospital/ Nursing Home	Yes			
	If any of the above Facility is not available in village than approx. distance from village: .....kms.				
Suggestions if any:					

L.	Education Facilities:				
	Aaganwadi/ Play group	Yes	✓		
	Primary School	Yes	✓		
	Secondary school	No		✓	
	Higher sec. School	No		✓	
	ITI college/ vocational Training Center	No		✓	
	Art, Commerce& Science /Polytechnic/ Engineering/ Medical/ Management/ other college facilities	No		✓	
	If any of the above Facility is not available in village than approx. distance from village: .....kms.				
Suggestions if any:					

M.	Socio- Culture Facilities				
	Community Hall (With or without TV) Location:	No		✓	



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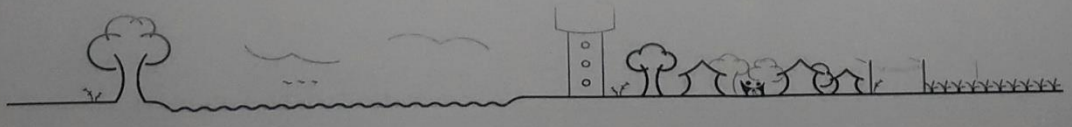
	Condition:				
	Public Library (With daily newspaper supply: Y/N) Location: Condition:	No		✓	
	Public Garden Location: Condition:	Yes	✓		
	Village Pond Location: Condition:	Yes	✓		
	Recreation Center Location: Condition:	No	✓		
	Cinema/ Video Hall Location: Condition:	No		✓	
	Assembly Polling Station Location: Condition:	Yes	✓		
	Birth & Death Registration Office Location: Condition:	Yes	✓		
If any of the above Facility is not available in village than approx. distance from village: .....kms.					
Suggestions if any:					
N.	**Other Facilities**				
	Post-office	No		✓	
	Telecommunication Network/ STD booth	Yes	✓		



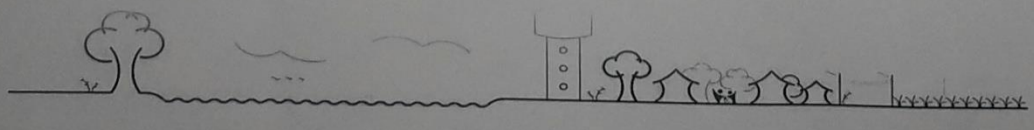
	General Market	Yes	✓		
	Shops (Public Distribution System)	Yes	✓		
	Panchayat Building	Yes	✓		
	Pharmacy/Medical Shop	No		✓	
	Bank & ATM Facility	Yes	✓		
	Agriculture Co-operative Society	No	✓		
	Milk Co-operative Soc.	No		✓	
	Small Scale Industries	No	✓		
	Internet Cafes/ Common Service Center/Wi Fi	Yes	✓		
	Other Facility				
Suggestions if any:					

6. **Sustainable /Green Infrastructure Facilities:**

Sr. No.	Descriptions	Information/ Details	Adequate	Inadequate	Remarks
O.	Adoption of Non-Conventional Energy Sources/ Renewable Energy Sources	No		✓	
P.	Bio-Gas Plant Solar Street Lights Rain Water Harvesting System	No		✓	
Q.	Any Other	Solar St. lights	✓		

7. **Data Collection From Village**

Village Base Map **Available: Hard Copy/Soft Copy**	Google maps



Recent Projects going on for Development of Village	IAY (Indirajyanthi Awas Yojna)
Any NGO working for village development	No

8. **Additional Information/ Requirement:**

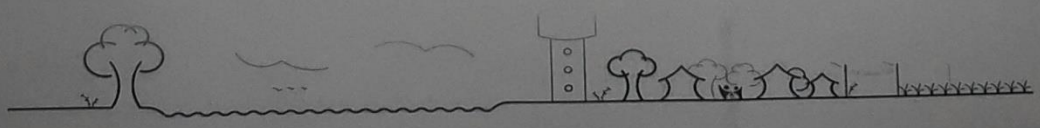
Sr. No.	Descriptions	Information/ Detail	Remarks
1.	Repair & Maintenance of Existing Public Infrastructure facilities(School Building, Health Center, Panchayat Building, Public Toilets & any other)	-	
2.	Additional Information/ Requirement	-	
		-	
		-	

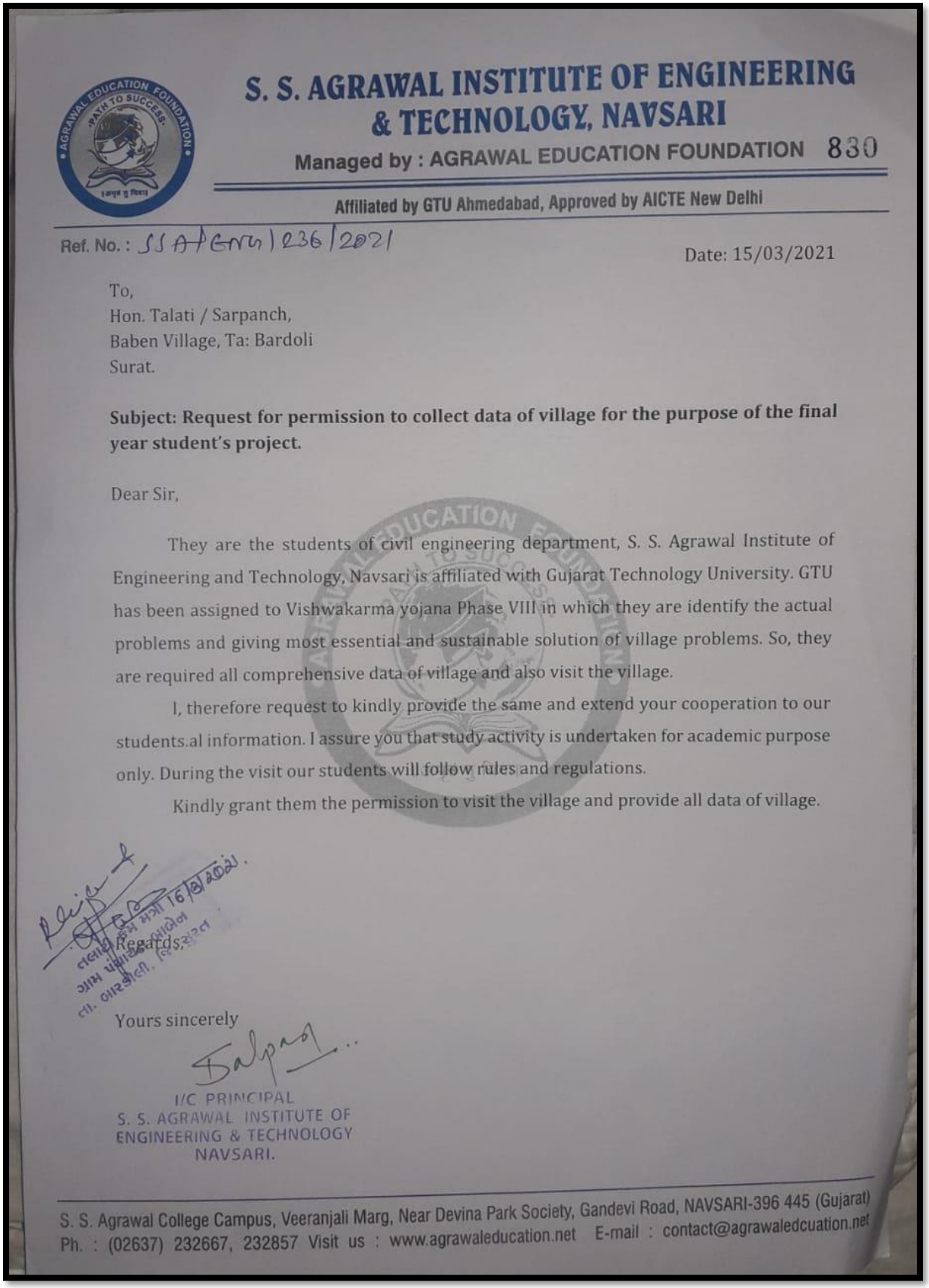
9. **Smart Village Proposal Design**

Sr. No.	Descriptions	Information/ Detail	Remarks
1.	-		

Note: Photographs/ Video/ Drawings of all existing Infrastructure facilities & conditions should be taken by students of respective villages for their record and information.

For Any Administration queries/ Difficulties:
GTU VY Section:
Contact No – 079-23267588
Email ID: rurban@gtu.edu.in





S. S. AGRAWAL INSTITUTE OF ENGINEERING & TECHNOLOGY, NAVSARI

Managed by : AGRAWAL EDUCATION FOUNDATION 830

Affiliated by GTU Ahmedabad, Approved by AICTE New Delhi

Ref. No. : SSAIEngg/236/2021

Date: 15/03/2021

To,
Hon. Talati / Sarpanch,
Baben Village, Ta: Bardoli
Surat.

Subject: Request for permission to collect data of village for the purpose of the final year student's project.

Dear Sir,

They are the students of civil engineering department, S. S. Agrawal Institute of Engineering and Technology, Navsari is affiliated with Gujarat Technology University. GTU has been assigned to Vishwakarma yojana Phase VIII in which they are identify the actual problems and giving most essential and sustainable solution of village problems. So, they are required all comprehensive data of village and also visit the village.

I, therefore request to kindly provide the same and extend your cooperation to our students.al information. I assure you that study activity is undertaken for academic purpose only. During the visit our students will follow rules and regulations.

Kindly grant them the permission to visit the village and provide all data of village.

Regards,

Yours sincerely

I/C PRINCIPAL
S. S. AGRAWAL INSTITUTE OF
ENGINEERING & TECHNOLOGY
NAVSARI.

S. S. Agrawal College Campus, Veeranjali Marg, Near Devina Park Society, Gandevi Road, NAVSARI-396 445 (Gujarat)
Ph. : (02637) 232667, 232857 Visit us : www.agrawaleducation.net E-mail : contact@agrawaledcuation.net

12.2 Survey form of smart Village

Gujarat Technological University, Ahmedabad, Gujarat

Vishwakarma Yojana: Phase VIII
Techno Economic Survey

Techno Economic Survey

Vishwakarma Yojana: Phase VIII

SMART VILLAGE SURVEY

An approach towards **"Rurbanisation for Village Development"**

Name of District:	Surat
Name of Taluka:	Bardoli
Name of Village:	Ena
Name of Institute:	S S Agrawal Institute of Engineering & Tech.
Nodal Officer Name & Contact Detail:	Mr. Chirag K Naik & Ms Komal Pal
Respondent Name: (Sarpanch/ Panchayat Member/ Teacher/ Gram Sevak/ Aaganwadi worker/Village dweller)	Tanuben Rameshbhai Rathod (Sarpanch)
Date of Survey:	05/12/2020

I. DEMOGRAPHICAL DETAIL:

Sr. No.	Census	Population	Male	Female	Total Number of House Holds
1.	2001	3771	1895	1882	848
2.	2011	5168	3228	1940	717

II. GEOGRAPHICAL DETAIL:

Sr. No.	Description	Information/Detail
1.	Area of Village (Approx.) (In Hector)Coordinates for Location:	621.93 hec. 21.13°N, 73.09°E
2.	Forest Area (In hect.)	22 hec
3.	Agricultural Land Area (In hect.)	215 hec
4.	Residential Area (In hect.)	324 hec
5.	Other Area (In hect.)	60 hec
6.	Distance to the nearest railway station (in kilometers):	10 km

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Vishwakarma Yojana: Phase VIII
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7.	Name of Nearest Town with Distance:	6 km (Surat)
8.	Distance to the nearest bus station (in kilometers):	available in village
9.	Whether village is connected to all road for the any facility or town or City?	Yes

III. OCCUPATIONAL DETAILS:

Name of Three Major Occupation groups in Village	1.	Farming
	2.	Employed in company
	3.	Marginal activity

Major crops grown in the village:	1.	Sugarcane
	2.	Paddy
	3.	Vegetables

IV. PHYSICAL INFRASTRUCTURE FACILITIES:

Sr. No.	Descriptions	Detail	Adequate	Inadequate	Remarks
A.	**Main Source of Drinking water**				
1.	**PIPED WATER** Piped Into Dwelling Piped To Yard/Plot Public Tap/Standpipe Tube Well Or Bore Well	Boring	✓		
2.	**DUG WELL** Protected Well Un Protected Well	No		✓	
3.	**WATER FROM SPRING** Protected Spring Unprotected Spring	No		✓	
	Rainwater Tanker Truck Cart With Small Tank				
4.	**SURFACE WATER (RIVER/DAM/ LAKE/POND/STREAM/CANAL/** Irrigation Channel Bottled Water Hand Pump Other(Specify)**Lake/ Pond**	No		✓	

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Vishwakarma Yojana: Phase VIII
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Suggestions if any:					
B.	**Water Tank Facility**	Not available			
	Overhead Tank	Capacity:			
	Underground Sump	Capacity:			
Suggestions if any:					
C.	**The Type of Drainage Facility**				
	A. UNDERGROUND DRAINAGE 1 2 B. OPEN WITH OUTLET C. OPEN WITHOUT OUTLET	open drainage	✓		
Suggestions if any:					
D.	**Road Network :All Weather/ Kutchha (Gravel)/ Black Topped pucca/ WBM**				
	Village approach road	WBM		✓	Needed to be bound
	Main road	WBM	✓		
	Internal streets	(conc. blocks)	✓		
	Nearest NH/SH/MDR/ODR Dist. in kms.	SH approx 5 kms			
Suggestions if any:					
E.	**Transport Facility**				
	Railway Station (Y/N) (If No than Nearest Rly Station---Kms)	No. Bardoli (9 kms)		✓	
	Bus station (Y/N) Condition: (If No than Nearest Bus Station---Kms)	No. Navsari (15 kms)		✓	
	Local Transportation (Auto/ Jeep/Chhakda/ Private Vehicles/ Other)	Auto	✓		
Suggestions if any:					
F.	**Electricity Distribution**				
	(Y/N) Govt./ Private (Less than 6 hrs./ More Than 6 hrs)	Yes	✓		

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Gujarat Technological University, Ahmedabad, Gujarat

Vishwakarma Yojana: Phase VIII
Techno Economic Survey

	Power supply for Domestic Use	✓	✓		
	Power supply for Agricultural Use	AC	✓		
	Power supply for Commercial Use	AC	✓		
	Road/ Street Lights	AC	✓		
	Electrification in Government Buildings/ Schools/ Hospitals	AC	✓		
	Renewable Energy Source Facilities (Y/ N)	No		✓	
	LED Facilities	Street lights	✓		
Suggestions if any:					
G.	**Sanitation Facility**				
	Public Latrine Blocks If available than Nos.	Yes	✓		
	Location Condition				
	Community Toilet (With bath/ without bath facilities)	No		✓	
	Solid & liquid waste Disposal system available	Yes	✓		
	Any facility for Waste collection from road	No		✓	
Suggestions if any:					
H.	**Main Source of Irrigation Facility:**				
	TANK/POND STREAM/RIVER CANAL WELL TUBE WELL. OTHER (SPECIFY)	Pond Canal & Well	✓		
Suggestions if any:					
I.	**Housing Condition:**				
	Kutchha/Pucca (Approx. ratio)	RCC	✓		

V. SOCIAL INFRASTRUCTURAL FACILITIES:

Sr. No.	Descriptions	Information/ Detail	Adequate	Inadequate	Remarks
J.	**Health Facilities:**				
	ICDS (Anganwadi)	✓			
	Sub-Centre				
	PHC	✓			
	BLOCK PHC				
	CHC/RH				
	District/ Govt. Hospital	✓			
	Govt. Dispensary				
	Private Clinic	✓			
	Private Hospital/				
	Nursing Home				
	AYUSH Health Facility				
	sonography /ultrasound facility				
	If any of the above Facility is not available in village than approx. distance from village: .....kms.				
Suggestions if any:					
K.	**Education Facilities:**				
	Aaganwadi/ Play group	Yes	✓		
	Primary School	Yes	✓		
	Secondary school	Yes	✓		
	Higher sec. School	Yes	✓		
	ITI college/ vocational Training Center	No		✓	
	Art, Commerce& Science /Polytechnic/ Engineering/ Medical/ Management/ other college facilities	No		✓	
	If any of the above Facility is not available in village than approx. distance from village: .....kms.				

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Vishwakarma Yojana: Phase VIII
Techno Economic Survey

Suggestions if any:

L.	Socio- Culture Facilities	Condition	Location	Available (YES)	Available (NO)
	Community Hall (With or without TV)	Poor	in School	✓	
	Public Library (With daily newspaper supply: Y/N)	Good	school	✓	
	Public Garden	Good	school	✓	
	Village Pond	Good		✓	
	Recreation Center				✓
	Cinema/ Video Hall				✓
	Assembly Polling Station	Good	school	✓	
	Birth & Death Registration	Good	Taluki	✓	

If any of the above Facility is not available in village than approx. distance from village: .....kms.

Suggestions if any:

M.	Other Facilities	Condition	Location	Available (YES)	Available (NO)
	Post-office	Good		✓	
	Telecommunication Network/ STD booth				✓
	General Market				✓
	Shops (Public Distribution System)	Good		✓	
	Panchayat Building	Poor		✓	
	Pharmacy/Medical Shop				✓
	Bank & ATM Facility	Good		✓	
	Agriculture Co-operative Society				✓
	Milk Co-operative Soc.				✓
	Small Scale Industries				✓
	Internet Cafes/ Common Service Center/Wi Fi				✓
	Youth Club				✓
	Mahila Mandal	Good		✓	

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Vishwakarma Yojana: Phase VIII
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	Credit Cooperative Society Agricultural Cooperative Society Milk Cooperative Society Fishermen's Cooperative Society Computer Kiosk/ e-chaupal / Mills / Small Scale Industries	Cheap wheat Distribution		✓	
	Other Facility				

Suggestions if any:

N.	Other Facilities	Condition		Available (YES)	Available (NO)
	1. Have these programme implemented the village?				
	2. Are there any beneficiaries in the village from the following programme?				
	3. Janani Suraksha Yojana				
	4. Kishori Shakti Yojana				
	5. Balika Samriddhi Yojana				
	6. Mid-day Meal Programme				
	7. Intergrated Child Development Scheme (ICDS)				
	8. Mahila Mandal Protsahan Yojana (MMPY)			✓	
	9. National Food for work Programme (NFFWP)				
	10. National Social Assistance Programme				
	11. Sanitation Programme (SP)			✓	
	12. Rajiv Gandhi National Drinking Water Mission				
	13. Swarnjayanti Gram Swarozgar Yojana				
	14. Minimum Needs Programme (MNP)				
	15. National Rural Employment Programme				
	16. Employee Guarantee Scheme (EGS)				
	17. Prime Minister Rojgar Yojana (PMRY)				
	18. Jawahar Rozgar Yojana (JRY)				
	19. Indira Awas Yaojna (IAY)			✓	
	20. Samagra Awas Yojana (SAY)				
	21. Sanjay Gandhi Niradhar Yojana (SGNY)				
	22. Jawahar Gram Samridhi Yojana (JGSY)				
	23. Other (SPECIFY)				

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VI. SUSTAINABLE /GREEN INFRASTRUCTURE FACILITIES:

Sr. No.	Descriptions	Information/ Details	Adequate	Inadequate	Remarks
1.	Adoption of Non-Conventional Energy Sources/ Renewable Energy Sources	No			
2.	Bio-Gas Plant Solar Street Lights Rain Water Harvesting System	No			
3.	Any Other	Solar Street lights	✓		

VII. DATA COLLECTION FROM VILLAGE

Sr. No.	Descriptions	Information/ Details	Adequate	Inadequate	Remarks
1.	Village Base Map Available: Hard Copy/Soft Copy	Google maps	✓		
2.	Recent Projects going on for Development of Village	IAY	✓		
3.	Any NGO working for village development	No			
4.	Any natural calamity in the village during the last one year: EARTHQUAKES FLOODS CYCLONE DROUGHT LANDSLIDES AVALANCHE OTHER (SPECIFY)	No.			

VIII. ADDITIONAL INFORMATION/ REQUIREMENT:

Sr. No.	Descriptions	Information/ Detail	Remarks

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1.	**Repair & Maintenance of Existing Public Infrastructure facilities,**		
	School Building	✗	
	Health Center	✗	
	Panchayat Building	✓	
	Public Toilets & any other	✓ ✗	
2.	**Additional Information/ Requirement**		
3.	**During the last six months how many times CLEANING ………… FOGGING………… Drive was undertaken in the village?**	Usually Households clean their Streets	

IX. Smart Village / Heritage Details

Sr. No.	Descriptions	Information/ Detail	Remarks
1.	IS THEIR ANY THING FOR THE VILLAGE ENHANCEMENT POSSIBLE ?		

Note: Photographs/ Video/ Drawings of all existing Infrastructure facilities & conditions should be taken by students of respective villages for their record and information.

For Any Administration queries/ Difficulties:
GTU VY Section
Contact No – 079-23267588
Email ID: rurban@gtu.edu.in

જયનાબેન પરેશભાઈ આહિર
સરપંચ
એના-ગોઠીયા ગ્રુપ ગ્રામ પંચાયત
તા. પલસાણા, જિ. સુરત

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12.3 Survey form of allocated village

Gujarat Technological University, Ahmedabad, Gujarat

Vishwakarma Yojana: Phase VIII
Techno Economic Survey

Techno Economic Survey

Vishwakarma Yojana: Phase VIII

ALLOCATED VILLAGE SURVEY

An approach towards **"Rurbanisation for Village Development"**

Name of District:	Navsari
Name of Taluka:	Jalalpore
Name of Village:	Mandir
Name of Institute:	SSAIET
Nodal Officer Name & Contact Detail:	Chintan B. Naik. chintannaik2711@gmail.com
Respondent Name: (Sarpanch/ Panchayat Member/ Teacher/ Gram Sevak/ Aaganwadi worker/Village dweller)	Mrs. Megha R. Virani
Date of Survey:	11 - 11 - 2020

I. DEMOGRAPHICAL DETAIL:

Sr. No.	Census	Population	Male	Female	Total Number of House Holds
1.	2001	3300	1806	1494	756
2.	2011	3556	1776	1780	1050

II. GEOGRAPHICAL DETAIL:

Sr. No.	Description	Information/Detail
1.	Area of Village (Approx.) (In Hector)Coordinates for Location:	847
2.	Forest Area (In hect.)	–
3.	Agricultural Land Area (In hect.)	677
4.	Residential Area (In hect.)	170
5.	Other Area (In hect.)	–
6.	Distance to the nearest railway station (in kilometers):	4km

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Gujarat Technological University, Ahmedabad, Gujarat

Vishwakarma Yojana: Phase VIII
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7.	Name of Nearest Town with Distance:	NAVSARI
8.	Distance to the nearest bus station (in kilometers):	4.3 km
9.	Whether village is connected to all road for the any facility or town or City?	Yes

III. OCCUPATIONAL DETAILS:

Name of Three Major Occupation groups in Village	1. Farmer 2. Rikshaw driver 3. Labourer

Major crops grown in the village:	1. Dangar 2. Sugarcane 3. Wheat

IV. PHYSICAL INFRASTRUCTURE FACILITIES:

Sr. No.	Descriptions	Detail	Adequate	Inadequate	Remarks
A.	**Main Source of Drinking water**				
1.	**PIPED WATER**				
	Piped Into Dwelling		yes		
	Piped To Yard/Plot				
	Public Tap/Standpipe				
	Tube Well Or Bore Well	15 nos.	yes		
2.	**DUG WELL**				
	Protected Well	7 nos.	yes		
	Un Protected Well				
3.	**WATER FROM SPRING**				Not available
	Protected Spring				
	Unprotected Spring				
	Rainwater				
	Tanker Truck				
	Cart With Small Tank				
4.	**SURFACE WATER (RIVER/DAM/ LAKE/POND/STREAM/CANAL/**				
	Irrigation Channel	Linned	yes		
	Bottled Water		yes		
	Hand Pump	Rare	yes		

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Vishwakarma Yojana: Phase VIII
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	Other(Specify)Lake/ Pond		Yes		7 Pond
Suggestions if any:					
B.	**Water Tank Facility**				
	Overhead Tank	Capacity:			
	Underground Sump	Capacity:			
Suggestions if any:					
C.	**The Type of Drainage Facility**				
	A. UNDERGROUND DRAINAGE 1	Open type		✓	Required maintenance
Suggestions if any:					
D.	**Road Network :All Weather/ Kutchha (Gravel)/ Black Topped pucca/ WBM**				
	Village approach road	Bitumen Road	✓		Need maintenance
	Main road	Bitumen Road	✓		Good condition
	Internal streets	Bitumen Road	✓		Repair required
	Nearest NH/SH/MDR/ODR Dist. in kms.	SH 0.kms.	✓		Good condition
Suggestions if any:					
E.	**Transport Facility**				
	Railway Station (Y/N) (If No than Nearest Rly Station---Kms)	N 4kms		✓	
	Bus station (Y/N) Condition: (If No than Nearest Bus Station---Kms)	N 4.3kms		✓	
	Local Transportation (Auto/ Jeep/Chhakda/ Private Vehicles/ Other)	Auto Chhakda private	✓		
Suggestions if any:					
F.	**Electricity Distribution**				
	(Y/N) Govt./ Private (Less than 6 hrs./ More Than 6 hrs)	Govt. more than 6 hrs	✓		

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Gujarat Technological University, Ahmedabad, Gujarat

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	Power supply for Domestic Use	Privatewell	✓		
	Power supply for Agricultural Use	D.G.V.C.L	✓		
	Power supply for Commercial Use	D.G.V.C.L	✓		
	Road/ Street Lights	D.G.V.C.L	✓		
	Electrification in Government Buildings/ Schools/ Hospitals	D.G.V.C.L	✓		
	Renewable Energy Source Facilities (Y/ N)			✓	
	LED Facilities		✓		
Suggestions if any:					
G.	**Sanitation Facility**				
	Public Latrine Blocks If available than Nos.	NO		✓	
	Location Condition	–			
	Community Toilet (With bath/ without bath facilities)	NO		✓	
	Solid & liquid waste Disposal system available	NO		✓	
	Any facility for Waste collection from road	NO		✓	
Suggestions if any:					
H.	**Main Source of Irrigation Facility:**				
	TANK/POND STREAM/RIVER CANAL WELL TUBE WELL OTHER (SPECIFY)	7 Pond No lined type Avilable " Hand Pump	✓ ✓ ✓ ✓ ✓		Good condition
Suggestions if any:					
I.	**Housing Condition:**				
	Kutchha/Pucca (Approx. ratio)	200/850 1:4.25	✓		

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Gujarat Technological University, Ahmedabad, Gujarat

Vishwakarma Yojana: Phase VIII
Techno Economic Survey

V. SOCIAL INFRASTRUCTURAL FACILITIES:

Sr. No.	Descriptions	Information/ Detail	Adequate	Inadequate	Remarks
J.	**Health Facilities:**				
	ICDS (Anganwadi)	4	✓		
	Sub-Centre	1	✓		
	PHC	—		✓	
	BLOCK PHC	—		✓	
	CHC/RH	1	✓		
	District/ Govt. Hospital	1	✓		
	Govt. Dispensary	—			
	Private Clinic	—			
	Private Hospital/	—			
	Nursing Home	—			
	AYUSH Health Facility	—			
	sonography /ultrasound facility	—			Required
	If any of the above Facility is not available in village than approx. distance from village: ...5....kms.				
Suggestions if any:					
K.	**Education Facilities:**				
	Aaganwadi/ Play group	4	✓		Good condition
	Primary School	2	✓		
	Secondary school	1	✓		Maintenance Required
	Higher sec. School	1	✓		
	ITI college/ vocational Training Center	—			
	Art, Commerce& Science /Polytechnic/ Engineering/ Medical/ Management/ other college facilities	—			

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Gujarat Technological University, Ahmedabad, Gujarat

Vishwakarma Yojana: Phase VIII
Techno Economic Survey

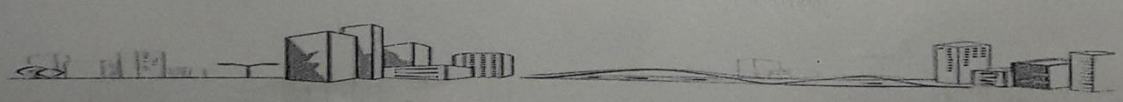
	If any of the above Facility is not available in village than approx. distance from village: ..6.....kms.
Suggestions if any:	

L.	Socio- Culture Facilities	Condition	Location	Available (YES)	Available (NO)
	Community Hall (With or without TV)				No
	Public Library (With daily newspaper supply: Y/N)				NO
	Public Garden	Bad		Yes	
	Village Pond	Good	In village	yes	
	Recreation Center				NO
	Cinema/ Video Hall				NO
	Assembly Polling Station	Good		Yes	
	Birth & Death Registration Office	Good		Yes	

If any of the above Facility is not available in village than approx. distance from village: ..5....kms.

Suggestions if any:

M.	Other Facilities	Condition	Location	Available (YES)	Available (NO)
	Post-office	Bad	In village	Yes	
	Telecommunication Network/ STD booth				NO
	General Market				NO
	Shops (Public Distribution System)	Good	"	Yes	
	Panchayat Building	Good	"	Yes	
	Pharmacy/Medical Shop				NO
	Bank & ATM Facility	Good		Yes	
	Agriculture Co-operative Society				NO
	Milk Co-operative Soc.	Good	"	Yes	
	Small Scale Industries				NO
	Internet Cafes/ Common Service Center/Wi Fi				NO
	Youth Club				NO
	Mahila Mandal	Good		Yes	



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Vishwakarma Yojana: Phase VIII
Techno Economic Survey

	Credit Cooperative Society Agricultural Cooperative Society Milk Cooperative Society Fishermen's Cooperative Society Computer Kiosk/ e-chaupal / Mills / Small Scale Industries	Good Good	In village "	yes yes	 No No
	Other Facility				No

Suggestions if any:

N.	Other Facilities	Condition		Available (YES)	Available (NO)
	1. Have these programme implemented the village?		In village	yes	
	2. Are there any beneficiaries in the village from the following programme?			yes	
	3. Janani Suraksha Yojana	Good		yes	
	4. Kishori Shakti Yojana	Good		yes	
	5. Balika Samriddhi Yojana	Good		yes	
	6. Mid-day Meal Programme	Good		yes	
	7. Intergrated Child Development Scheme (ICDS)	Good		yes	
	8. Mahila Mandal Protsahan Yojana (MMPY)	"		yes	
	9. National Food for work Programme (NFFWP)			No	No
	10. National Social Assistance Programme			No	No
	11. Sanitation Programme (SP)	Good		yes	
	12. Rajiv Gandhi National Drinking Water Mission			No	
	13. Swarnjayanti Gram Swarozgar Yojana	Good		yes	
	14. Minimum Needs Programme (MNP)			No	No
	15. National Rural Employment Programme			No	No
	16. Employee Guarantee Scheme (EGS)				No
	17. Prime Minister Rojgar Yojana (PMRY)				No
	18. Jawahar Rozgar Yojana (JRY)				No
	19. Indira Awas Yaojna (IAY)				No
	20. Samagra Awas Yojana (SAY)				No
	21. Sanjay Gandhi Niradhar Yojana (SGNY)				No
	22. Jawahar Gram Samridhi Yojana (JGSY)				No
	23. Other (SPECIFY)				No

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VI. SUSTAINABLE /GREEN INFRASTRUCTURE FACILITIES:

Sr. No.	Descriptions	Information/ Details	Adequate	Inadequate	Remarks
1.	Adoption of Non-Conventional Energy Sources/ Renewable Energy Sources	No			Required
2.	Bio-Gas Plant Solar Street Lights Rain Water Harvesting System	No			Required
3.	Any Other	No			

VII. DATA COLLECTION FROM VILLAGE

Sr. No.	Descriptions	Information/ Details	Adequate	Inadequate	Remarks
1.	Village Base Map Available: Hard Copy/Soft Copy	Hard copy			old map
2.	Recent Projects going on for Development of Village	No			
3.	Any NGO working for village development	No			
4.	Any natural calamity in the village during the last one year: EARTHQUAKES No FLOODS No CYCLONE No DROUGHT No LANDSLIDES No AVALANCHE OTHER (SPECIFY)	No			

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Gujarat Technological University,
Ahmedabad, Gujarat

Vishwakarma Yojana: Phase VIII
Techno Economic Survey

VIII. ADDITIONAL INFORMATION/ REQUIREMENT:

Sr. No.	Descriptions	Information/ Detail	Remarks
1.	Repair & Maintenance of Existing Public Infrastructure facilities, School Building Health Center Panchayat Building Public Toilets & any other	Good condition Good condition Good condition Maintenance required —	
2.	Additional Information/ Requirement		
3.	During the last six months how many times CLEANING ……1…….. FOGGING……—…….. Drive was undertaken in the village?		

IX. Smart Village / Heritage Details

Sr. No.	Descriptions	Information/ Detail	Remarks
1.	IS THEIR ANY THING FOR THE VILLAGE ENHANCEMENT POSSIBLE ?	Solar street light	

Note: Photographs/ Video/ Drawings of all existing Infrastructure facilities & conditions should be taken by students of respective villages for their record and information.

For Any Administration queries/ Difficulties:
GTU VY Section
Contact No – 079-23267588
Email ID: rurban@gtu.edu.in

તલાટી-કમ મંત્રી
ગ્રામ પંચાયત મંદિર
તા. જલાલપોર, જી. નવસારી

16

12.4 GAP ANALYSIS

Village Facilities	**Planning Commission/UDPFI Norms**		**Village Name: Mandir**		
Population: 3556					
Existing		**Required as per Norms**	**Smart Village / Cities / Heritage Future Projection Design**		**Gap**
Social Infrastructure Facilities					
Education					
Anganwadi	Each or Per 2500 population	2	1	-	+1
Primary School	Each Per 2500 population	1	1	-	0
Secondary School	Per 7,500 population	0	0	-	0
Higher Secondary School	Per 15,000 Population	0	0	-	0
College	Per 125,000 Population	0	0	-	0
Tech. Training Institute	Per 100000 Population	0	0	-	0
Agriculture Research Centre	Per 100000 Population	1	0	-	+1
Skill Development Center	Per 100000 Population	1	0	-	+1
Health Facility			-		
Govt/Panchayat Dispensary or Sub PHC or Health Centre	Each Village	0	1	-	-1
Primary Health & Child Health Center	Per 20,000 population	0	0	-	0
Child Welfare and Maternity	Per 10,000 population	0	0	-	0

Home					
Multispecialty Hospital	Per 100000 Population	0	0	-	0
Public Latrines	1 for 50 families (if toilet is not there in home, especially for slum pockets &kutcha house)	0	1	-	-1
Physical Infrastructure Facilities					
Transportation	**Adequate**		-	-	
Pucca Village Approach Road	Each village	**Adequate**	2 km approach road	-	-
Bus/Auto Stand provision	All Villages connected by PT (ST Bus or Auto)	**Inadequate**	Pickup stand at main highway of Gandhi Fatak	-	-

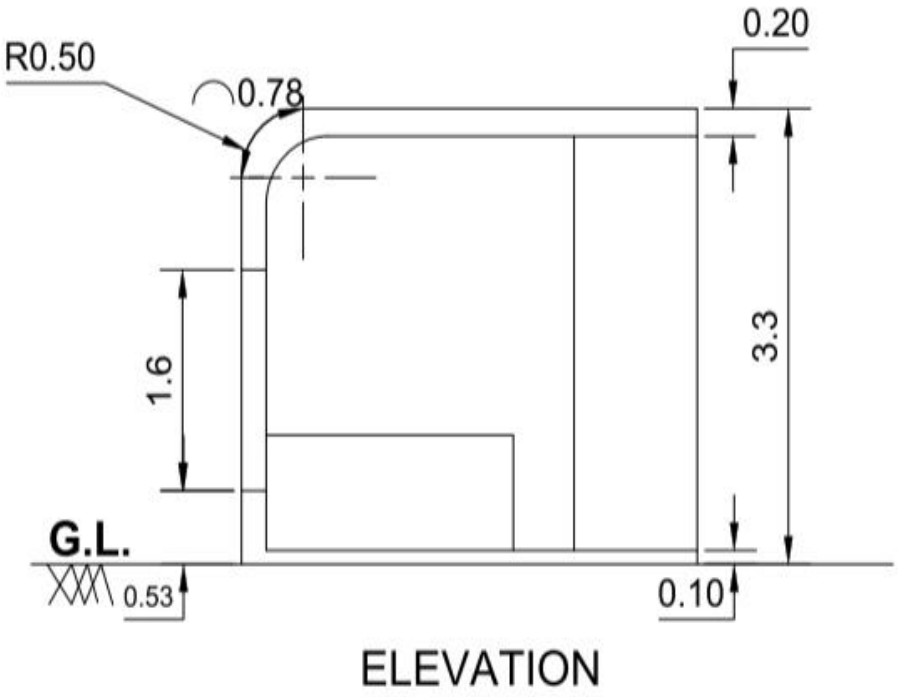
12.5 Summary details of all the village designs

Village Name	Field	Part-I	Part-II
Mandir	Civil	Bus Stop	Panchayat office
		Public Toilet	Widening of road
		Entrance Gate	Solid waste dumping ground
		Library	Community Hall
		Garden	Lake side development
		Medical Store	Rainwater Harvesting
	Electrical	Solar Street light	Off Grid Soalr roof top
		Solar roof top	Solar RO Plant
		Solar water heater	Solar pump
		Primary Health Care Centre	Krisiseva Kendra

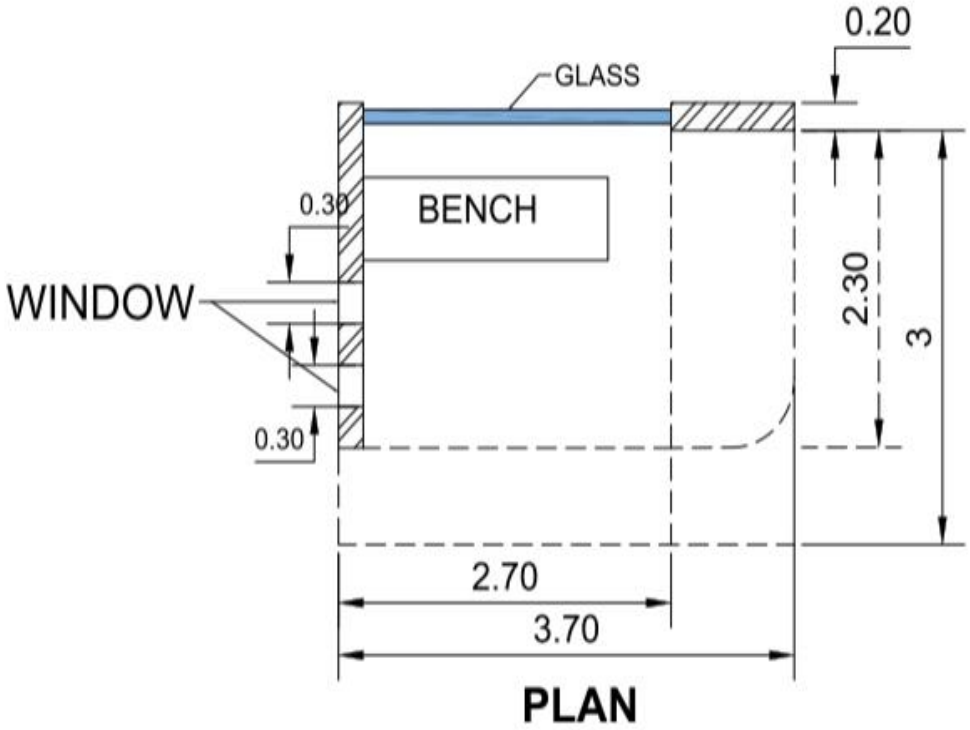
Danti	Civil	Library	Community hall
		Pharmacy	Solid waste management
		Panchayat Office	Public Toilet block
		Bus Stop	Chabutara
		Entrance Gate	Water Treatment Plant
	Electrical	Fully Automatic Solar Street Lights	Solar roof top
		Agricultural Solar Pump	Solar Based RO Plant
		Fish farm aquaculture monitoring and controlling system	Smart Library
Hansapore	Civil	Bus Stop	Solid waste management
		DoodhutpadanMandali	Water tank
		Library	Community hall
		Medical Shop	Panchayat building
		Water Harvesting Tank	Public toilet block
		Entrance Gate	School
	Electrical	Solar based Water Pump Irrigation	Solar water heter
		Solar Water Purifier	Fully automatic solar street light
		Grid Connected Solar Roof Top	Fish farm aquaculture monitoring and controlling system

12. 6 Drawings

- **Bus stop**

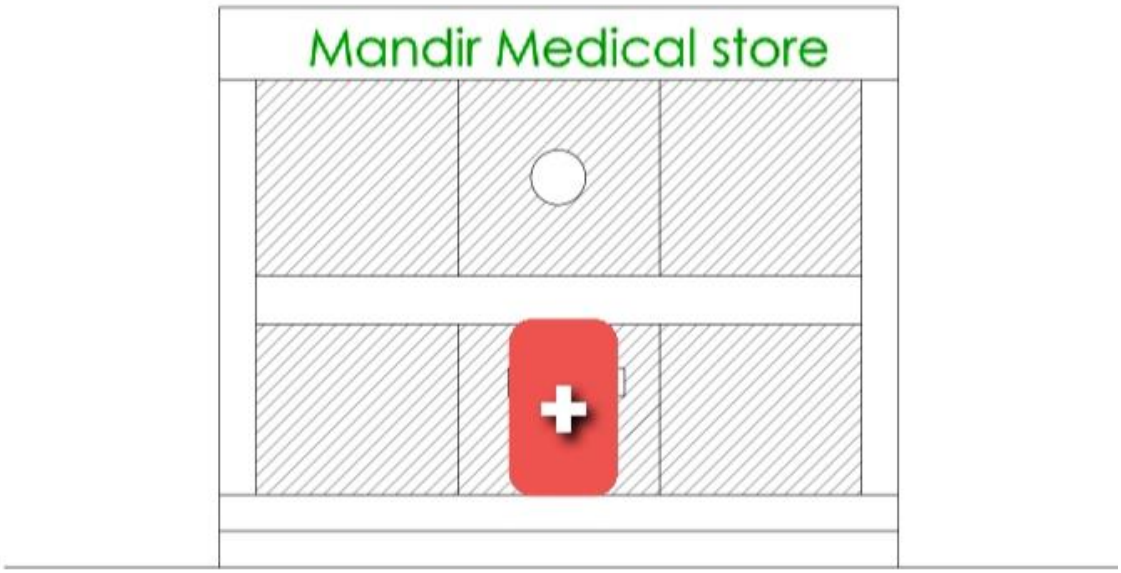


ELEVATION

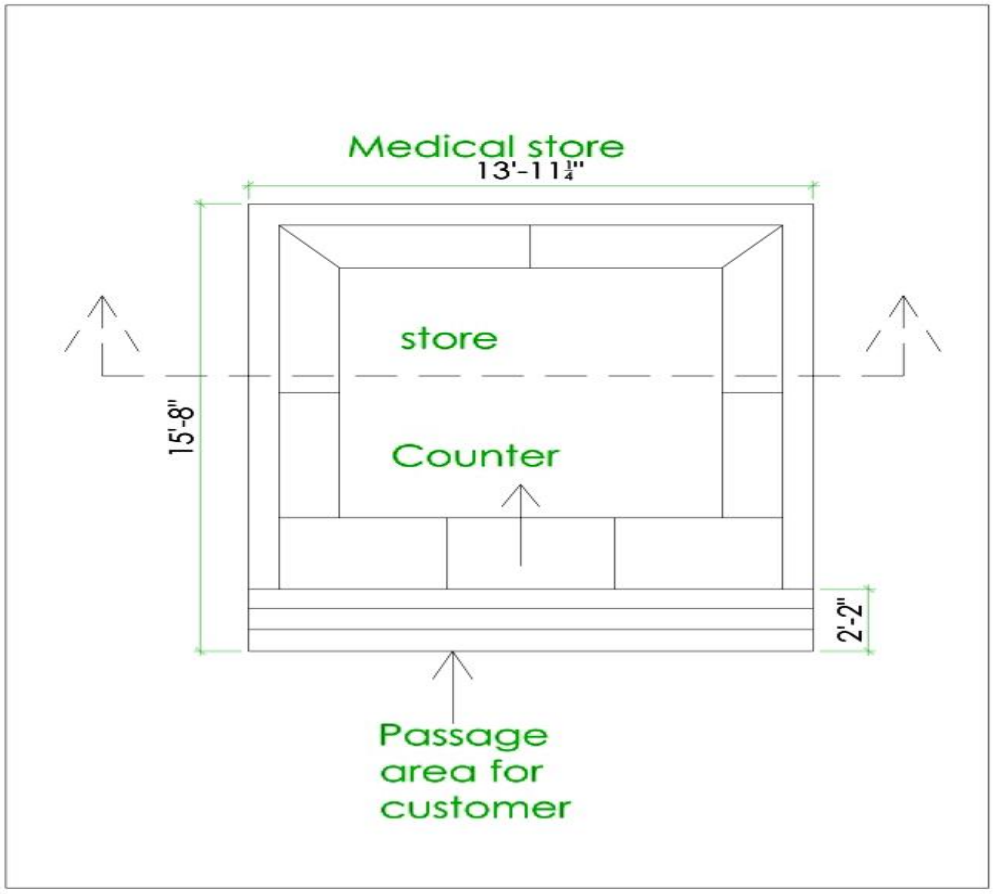


PLAN

- **Medical store**

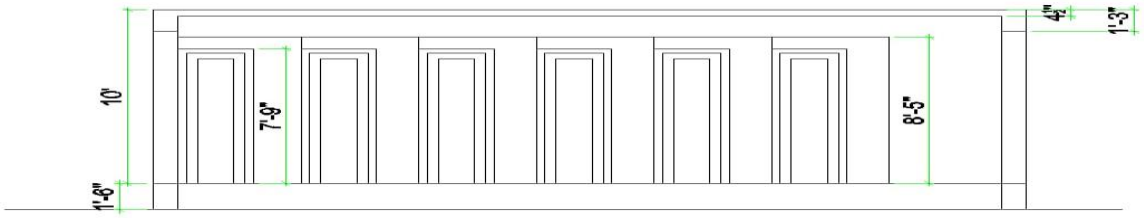


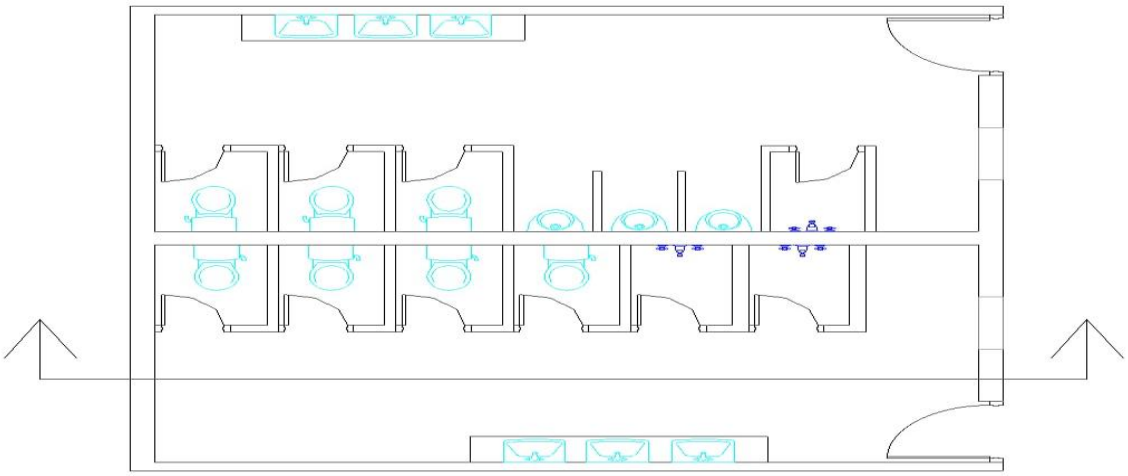
ELEVATION



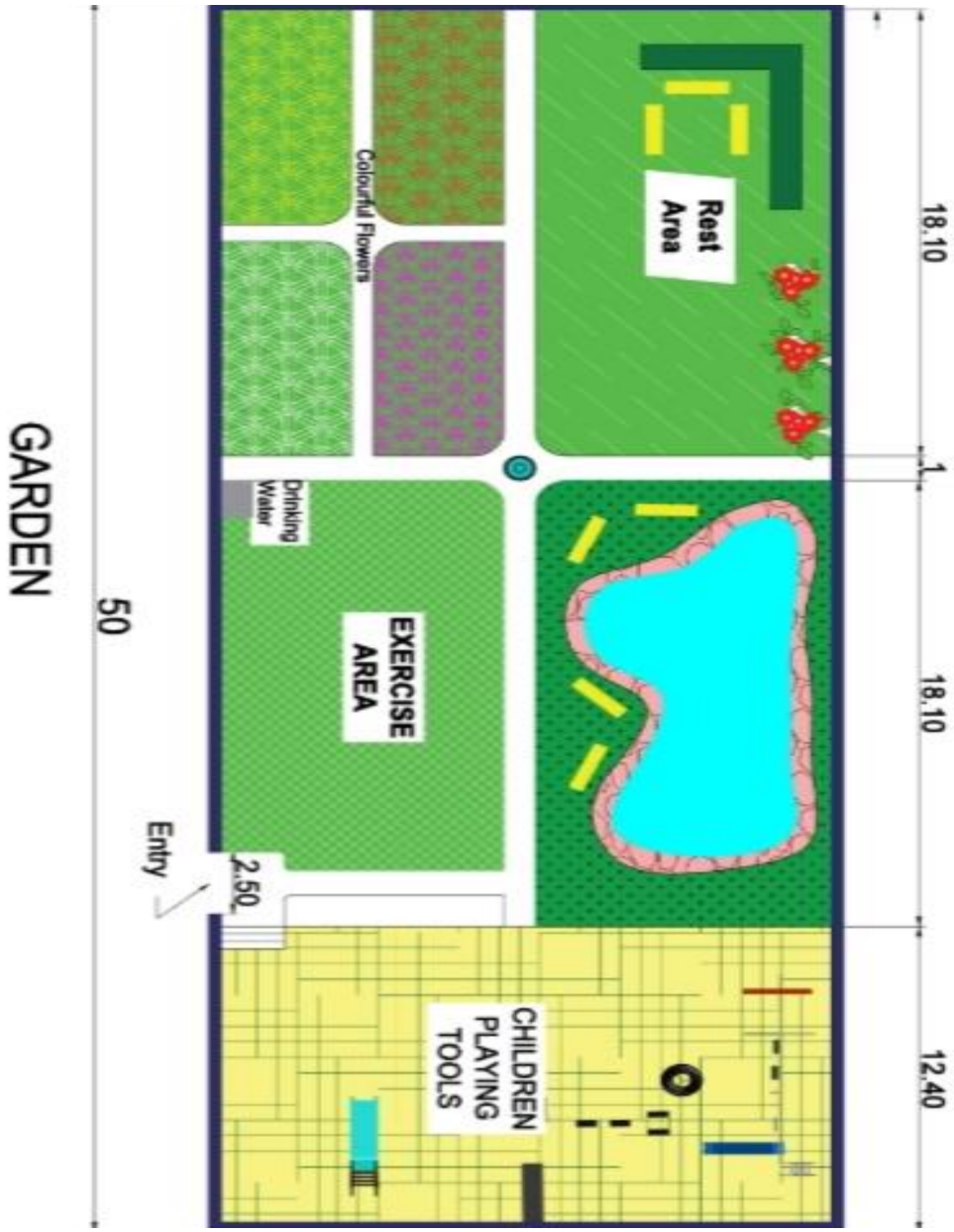
PLAN

- **Public Toilet**

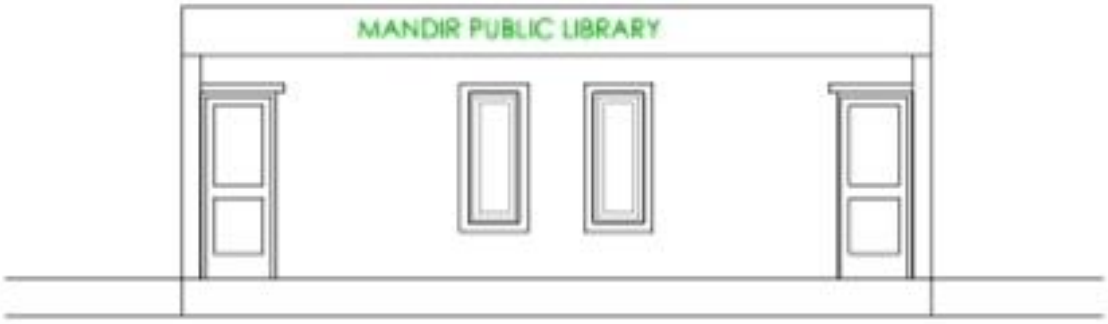


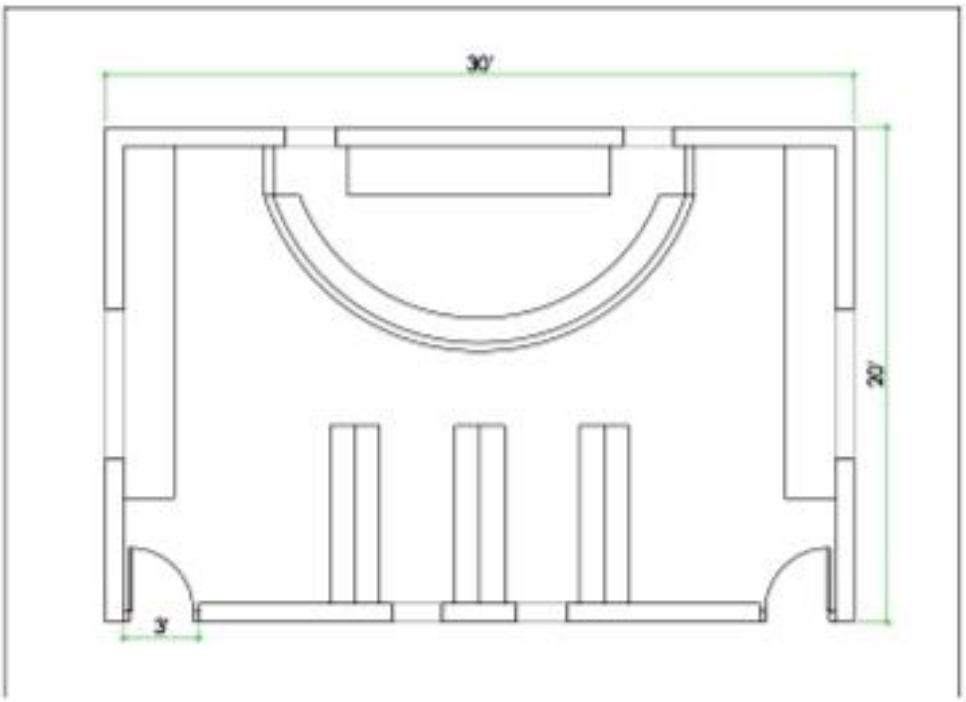


- **Public Garden**



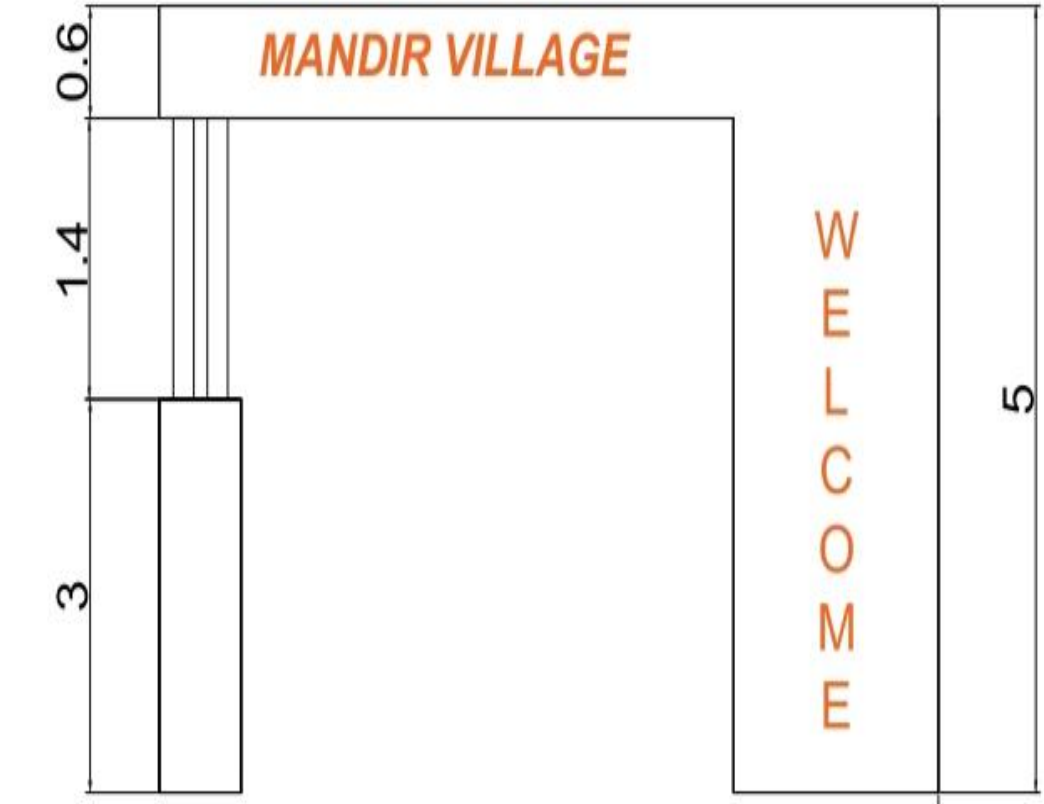
- **Public Library**



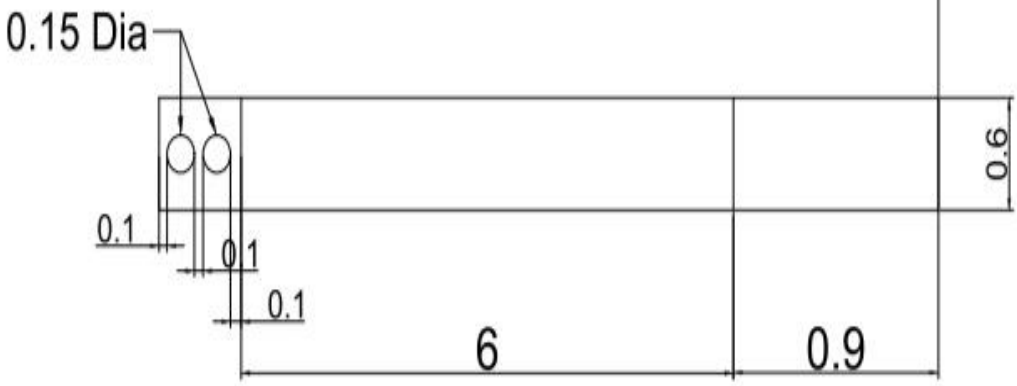


PLAN & ELEVATION

- **Entrance Gate**



ELEVATION

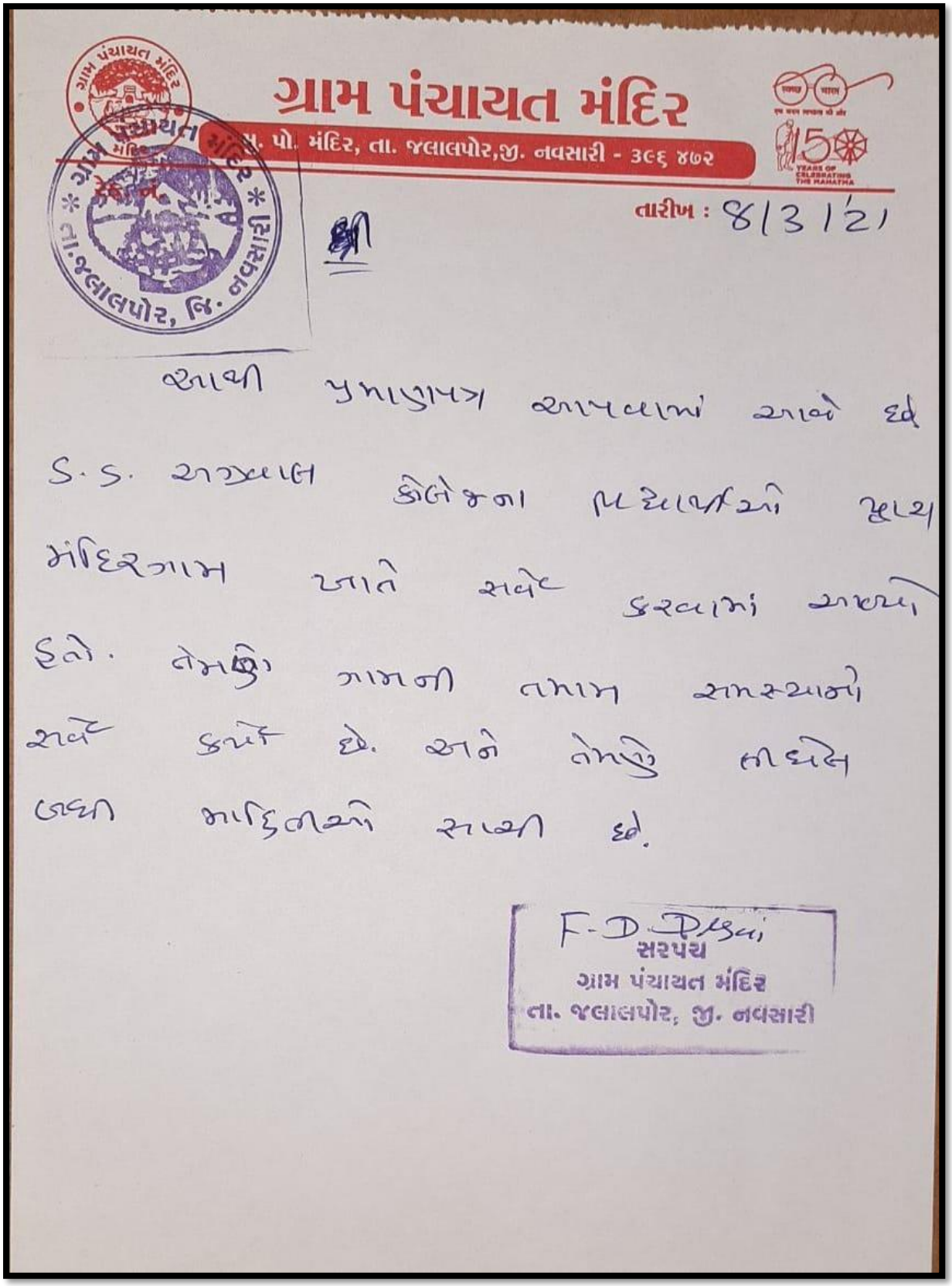


PLAN

12.7 Summary of Good photographs

12.8 Village interaction with sarpanch with photograph

12.9 Sarpanch Letter



ગ્રામ પંચાયત મંદિર

પો. મંદિર, તા. જલાલપોર,જી. નવસારી - ૩૯૬ ૪૭૨

તારીખ : 8/3/21

આથી પ્રમાણપત્ર આપવામાં આવે છે S.S. અગ્રવાલ કોલેજના પ્રોફેસરશ્રીઓ દ્વારા મંદિરગામ ખાતે સર્વે કરવામાં આવ્યો છે. તેમણે ગામની તમામ સમસ્યાનો સર્વે કર્યો છે. અને તેમણે લીધેલ બધી માહિતીઓ સાચી છે.

F-D Desai
સરપંચ
ગ્રામ પંચાયત મંદિર
તા. જલાલપોર, જી. નવસારી

Chapter 13:- Future designs of the aspects

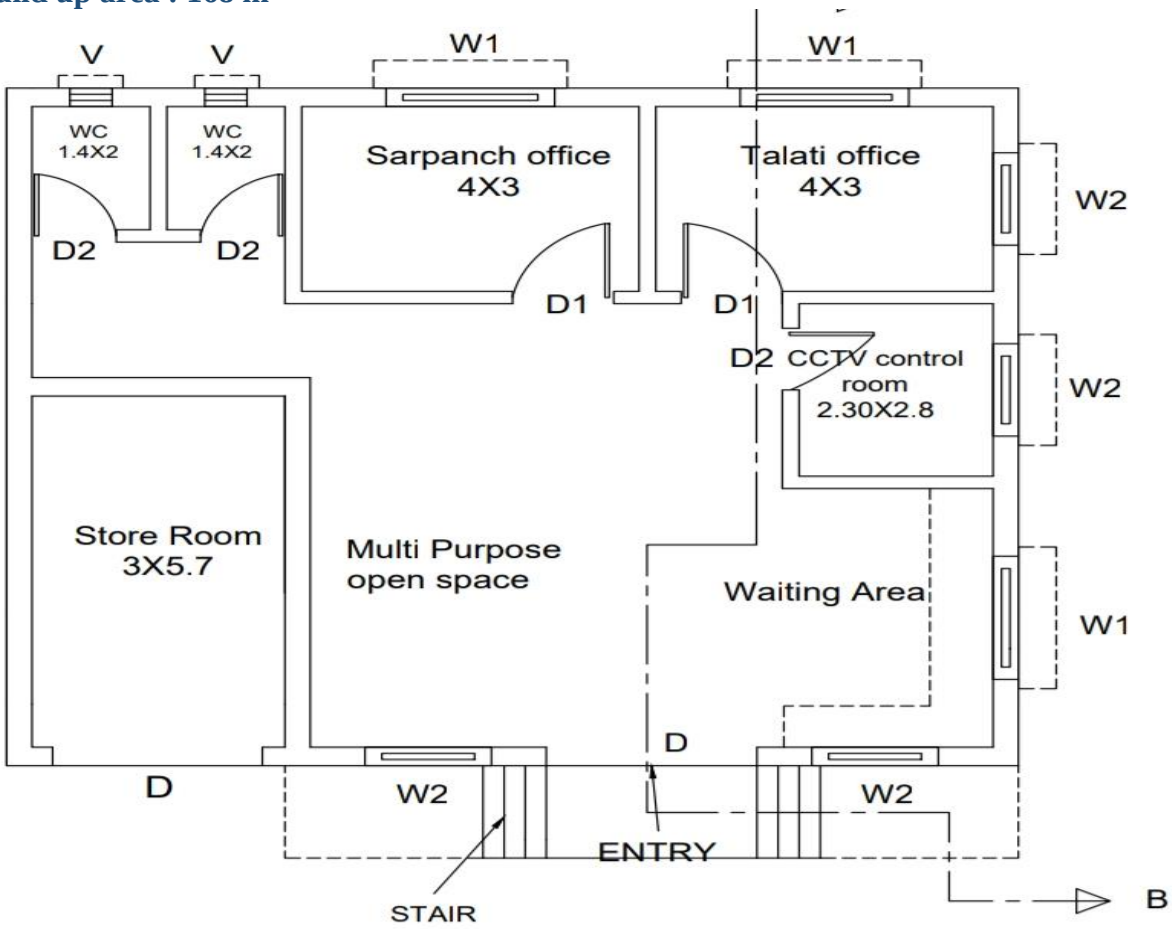
13.1 Design Proposal

13.1.1 Civil Design 1 (Panchayatoffice)

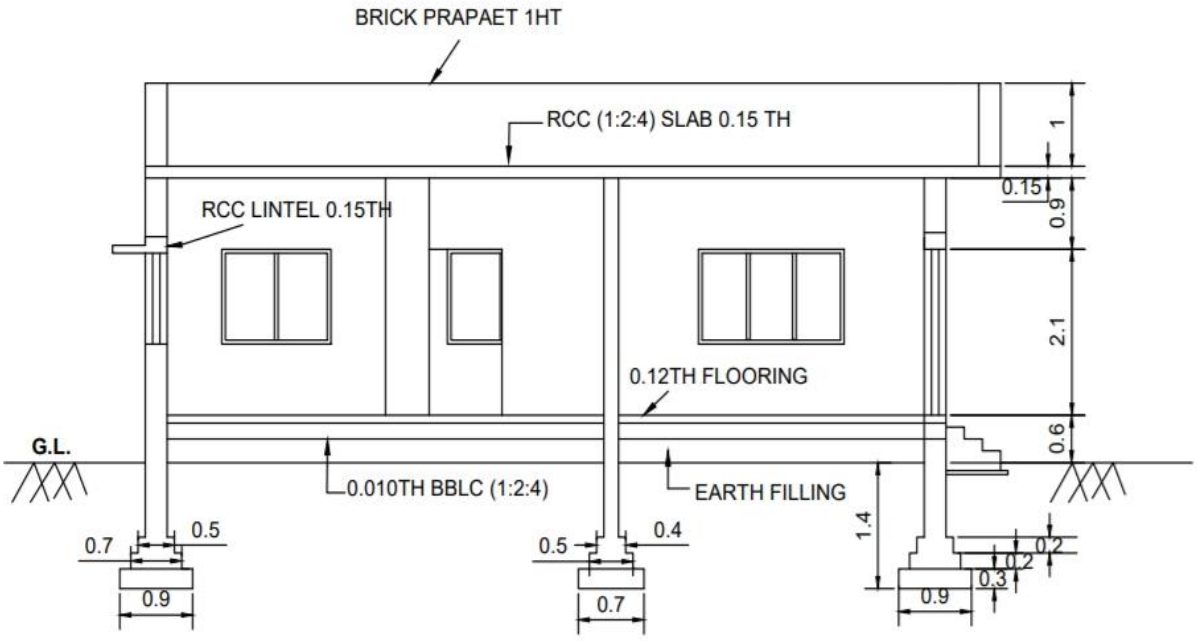
Panchayat office is the working Body of the Village so it is so essential to Upgrade the Panchayat office with modern technology in order to increase the working Efficiency of Panchayat office.

Design Utilized by:-
People of Mandir Village, Govt. Body etc.

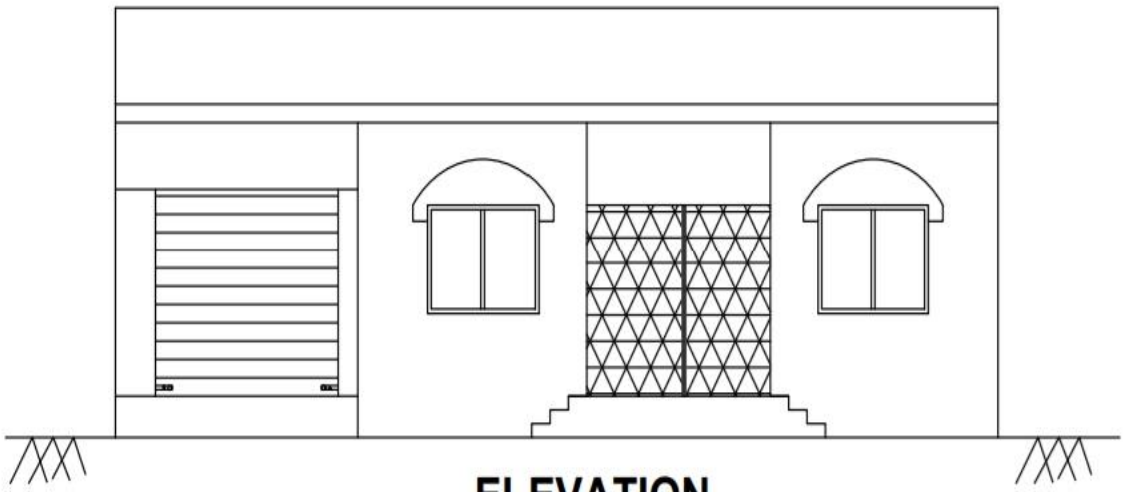
Panchayat office Design :-
Length : 12m
Width : 14m
Height : 4.6 m
Build up area : 168 m^2



PLAN OF GRAM PANCHAYAT (MANDIR)



SECTION AB



ELEVATION

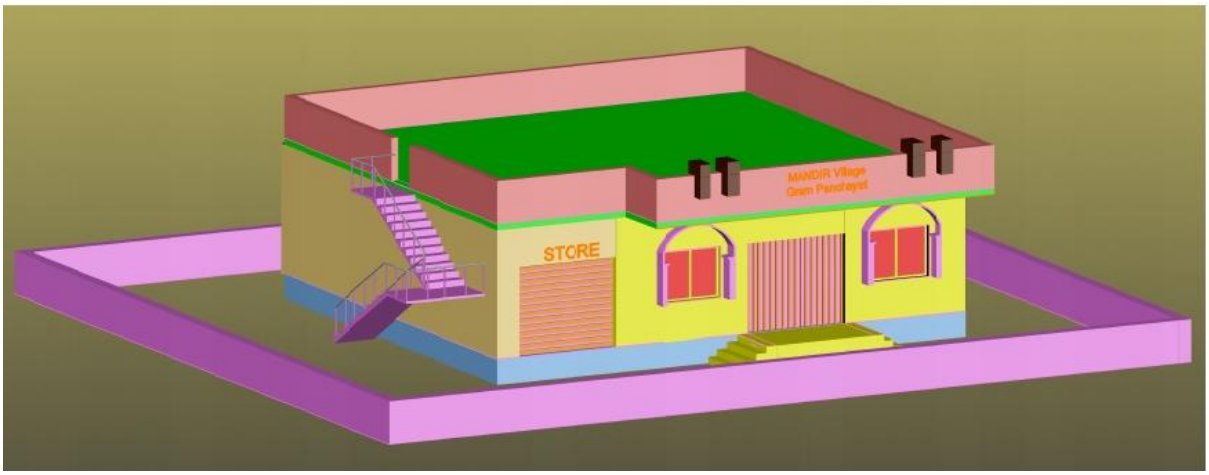
Measurement Sheet

Sr.No	Description	Nos.	Length (m)	Width (m)	Height (m)	Total Quantity (m^3)
1.	**Excavation**	**1**	**49.3**	**1.2**	**1.5**	**88.74**
2.	**Wall**	**1**	**49.3**	**0.3**	**3.048**	**45.08**
3.	**Parapat**	**4**	**40.7**	**0.2**	**1**	**8.14**
4.	**Window(W1)**	**3**	**2.0**	**0.3**	**1.2**	**-2.16**
5.	**Window(W2)**	**4**	**1.5**	**0.3**	**1.2**	**-2.16**
6.	**Door (D)**	**2**	**2.5**	**0.3**	**2.1**	**-3.15**

7.	**Door (D1)**	**2**	**1.2**	**0.3**	**2.1**	**-1.51**
8.	**Door(D2)**	**3**	**1.0**	**0.3**	**2.1**	**-1.89**
9.	**Plinth**	**1**	**12.14**	**6.1**	**0.46**	**34.06**
10.	**Slab**	**1**	**12.14**	**6.1**	**0.15**	**11.08**

Abstract Sheet

Sr.No	Description	Quantity (m^3)	Rate	Per	Amount
1.	**Excavation**	**88.74**	**85**	**m^3**	**7542.9**
2.	**Wall**	**42.35**	**5050**	**m^3**	**213857.4**
3.	**Plinth**	**34.06**	**3500**	**m^3**	**119210**
4.	**Slab**	**11.08**	**3700**	**m^3**	**40999.7**
				Total	**381608**



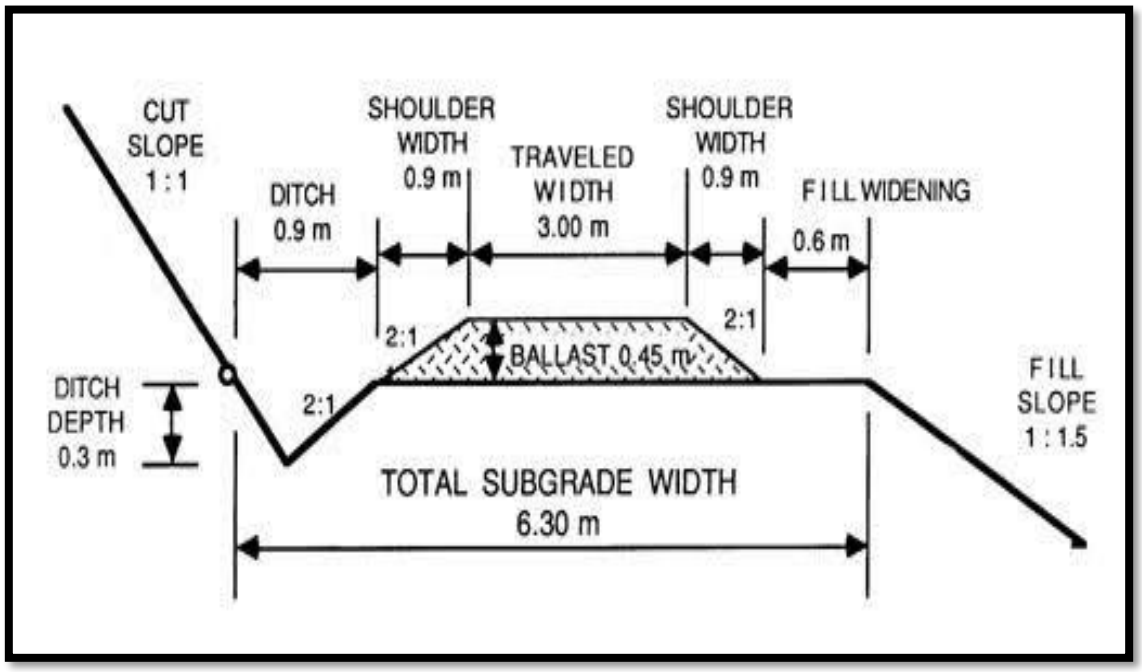
3D View of Mandir Village Panchayat Office

13.1.2 Civil Design 2 (Widening of Road)

Road is Essential for all the People for transportation. Road is mainly used for transportation of people and good so it is very important to maintain the Road in Good condition.

Design Utilized by:-
All the villagers as well as the visitor.

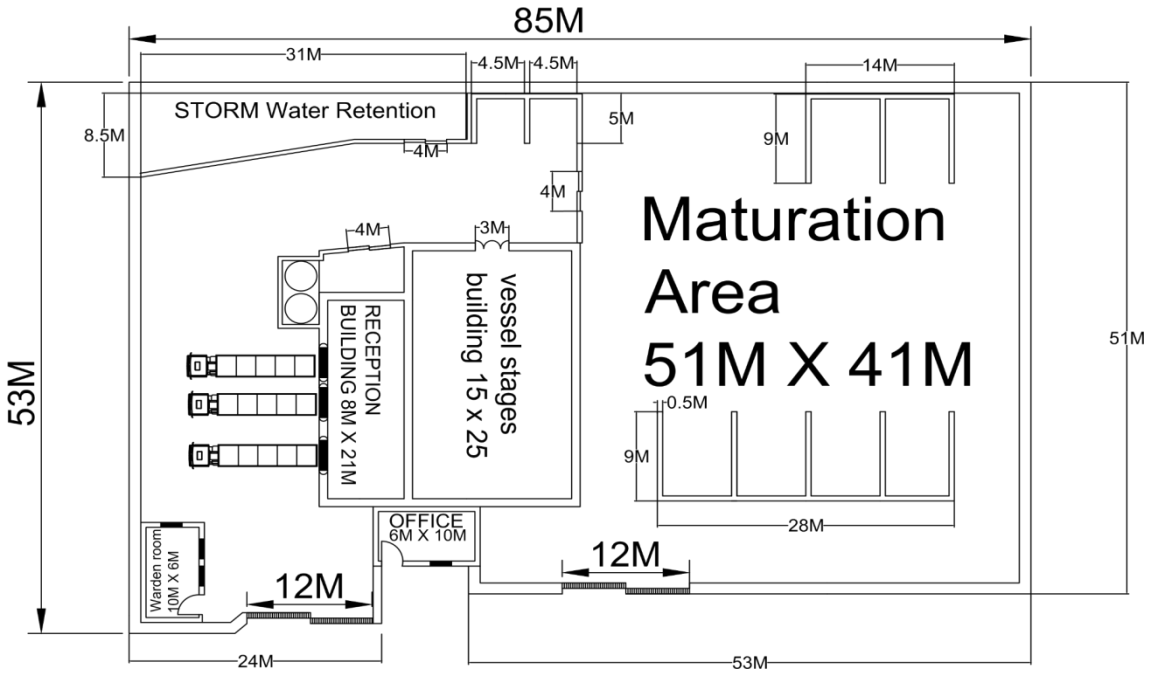
Road Design :-
Length :-1.2 Km (Aprox.)
Width :- 3 m

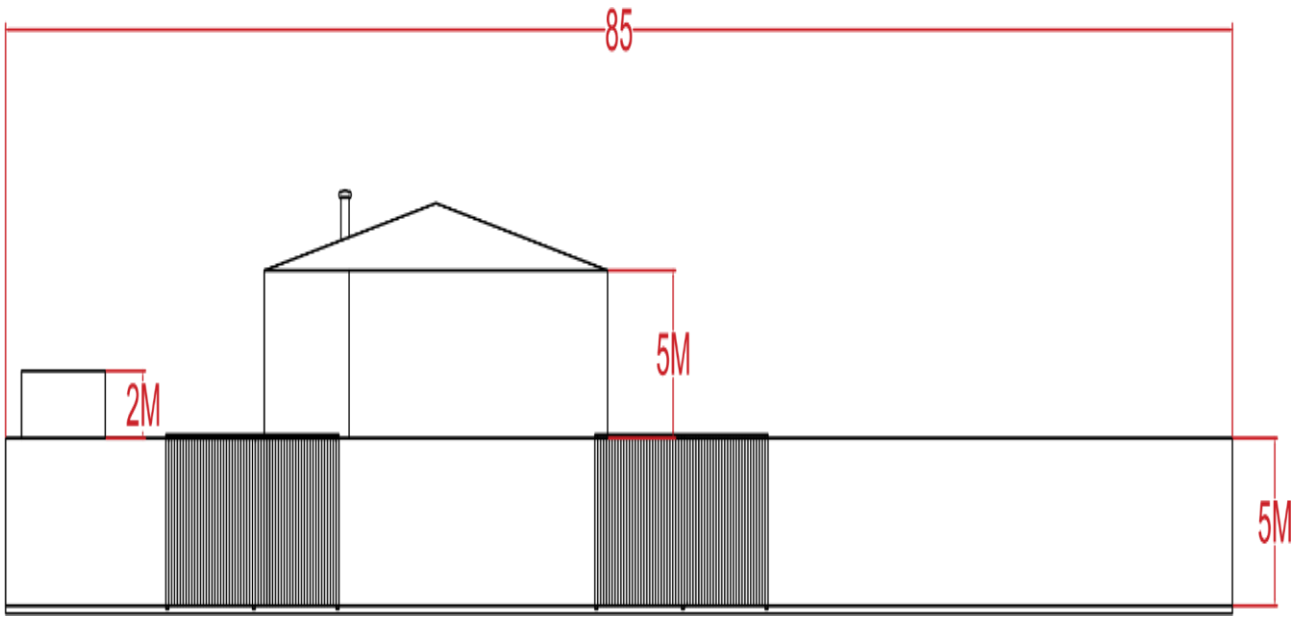


13.1.3 Civil Design (**ORGANICCOMPOSTINGPLANT**):

ORGANICCOMPOSTINGPLANTis a place where all solid wastage of village can be collected and recycled. It will create employment opportunites and a sustainable environment in village.

H





Measurement Sheet

Sr.No	DESCRIPTION	NO.	L	B	H	QUANTITY
1.	Earthwork in excavation L=348.50m No.of junction=13 ∴L=341.30m	1	341.30	0.90	1.10	**337.99 m^3**
	Brickbat cement concrete (1:4:8)	1	341.30	0.90	0.20	**61.43m^3**
2.	Brick masonry upto plinth In C.M.1:1	1	337.50	0.50	0.30	**449.92 m^3**
				Total:		**449.92 m^3**
3.	Earth filling work in plinth					
	1.Maturation Area	1	51.00	41.00	1.00	**2019.00m^3**
	2.VesselStagesBuilding	1	15.00	25.00	1.00	**375.00 m^3**
	3.ReceptionBuilding	1	8.00	21.00	1.00	**168.00 m^3**
	4.Office	1	6.00	10.00	1.00	**60.00m^3**
	5.WardenRoom	1	10.00	6.00	1.00	**60.00m^3**
				Total:		**2754m^3**
`4.	Brick masonry in superstructure	1	344.50	0.50	5.00	**861.25 m^3**
5.	R.C.C. Slab	1	85.00	53.00	0.25	**1126.25m^3**
6.	Plastering work(1:3)					
	1.Maturation Area					
	Horizontal wall	2	51.00	-	5.00	**510.00 m^2**
	Vertical wall	2	41.00	-	5.00	**410.00 m^2**
	2.VesselStagesBuilding					
	Horizontal wall	2	15.00	-	5.00	**150.00 m^2**
	Vertical wall	2	25.00	-	5.00	**250.00 m^2**
	3.ReceptionBuilding					
	Horizontal wall	2	8.00	-	5.00	**80.00m^2**
	Vertical wall	2	21.00	-	5.00	**210.00 m^2**
	4.Office					
	Horizontal wall	2	6.00	-	5.00	**60.00m^2**
	Vertical wall	2	10.00	-	5.00	**100.00 m^2**
	5.WardenRoom					
	Horizontal wall	2	10.00	-	5.00	**100.00 m^2**

	Vertical wall	2	6.00	-	5.00	**60.00m^2**
						Total: 1930.00m^2

Abstract Sheet:

Sr.No	DESCRIPTION	QUANTITY	RATE	PER	AMOUNT (Rs.)
1.	Excavation for foundation	151.34 m^3	100	M	**44992**
2.	Earthing work in plinth	83.80m^3	75	M	**206550**
3.	Brick work in super Structure frame	61.84m^3	1500	M	**1292625**
4.	Laying of R.C.C. Slab	18.94m^3	2500	M	**2815625**
6.	Plasterwork(1:3)	419.73 m^3	150	M	**289500**
			Totalamount:		**4463398**
		20%watercharges			**892679.40**
		3%contingencies			**133901.91**
		2%workchargeestablishment			**89268**
		Total			**5579246.31**
		10%contractorprofit			**557924.63**
		Grand Total			**61397170.95**

3.1.4 Civil Design4 (Community Hall)

Community hall is the place were People gathering and celebrate their function like Birth day party , Marriage etc.

Design utilized By:-

All the Villagers

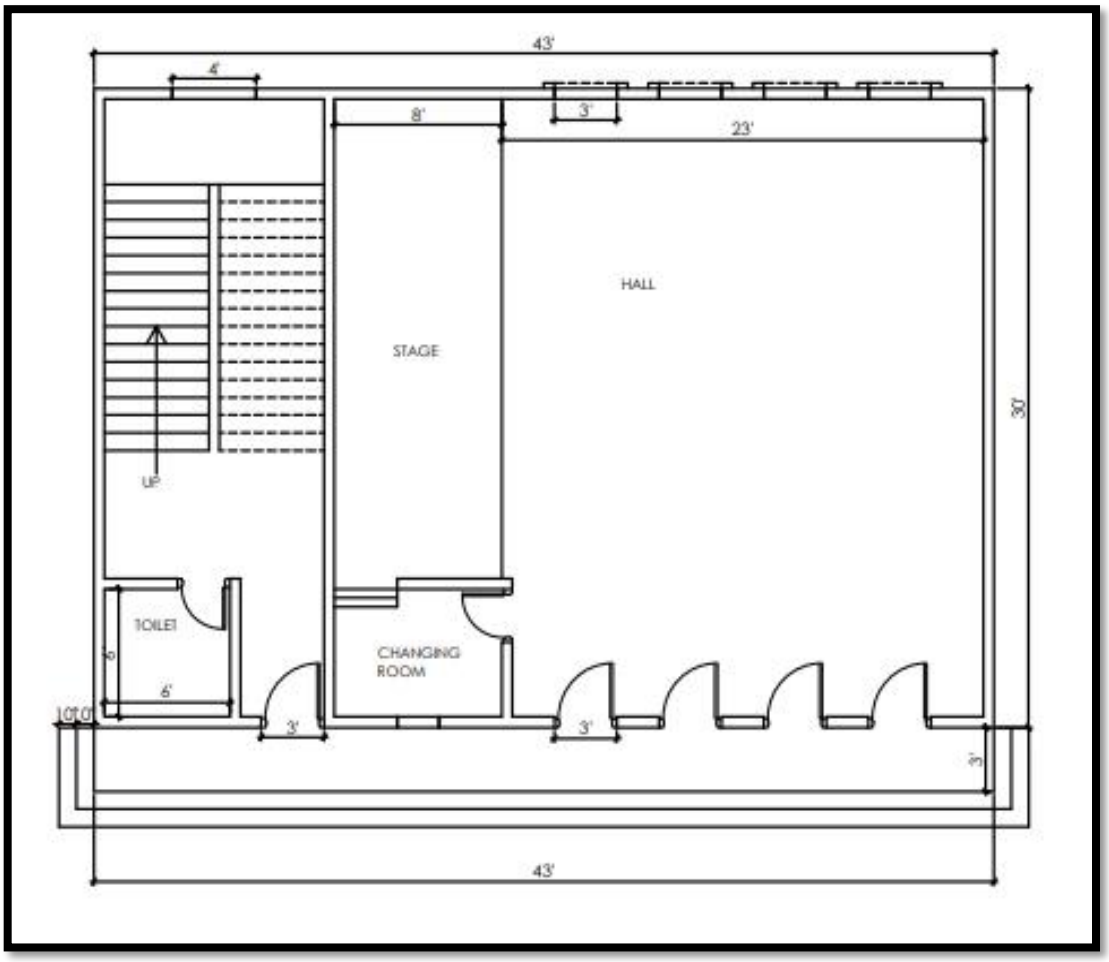
Community hall

Length :-13.10

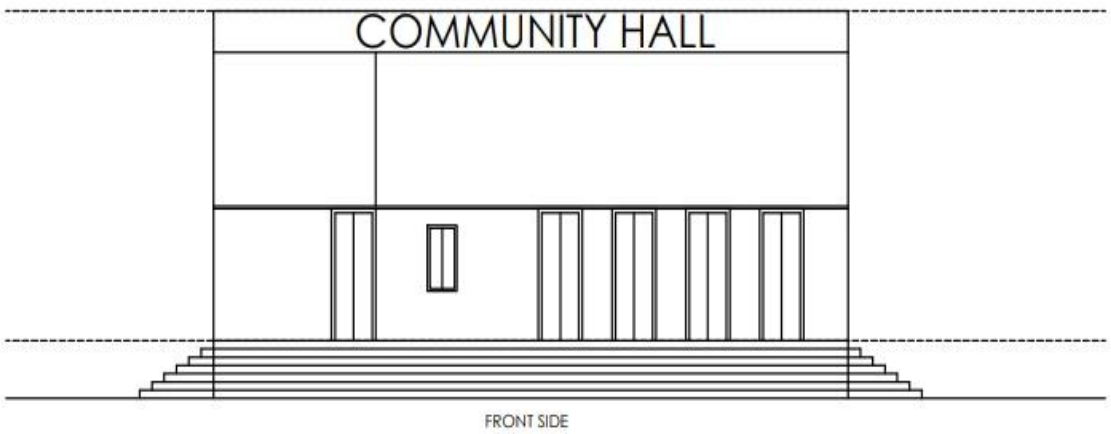
Width:- 9.14

Height :- 4.2m

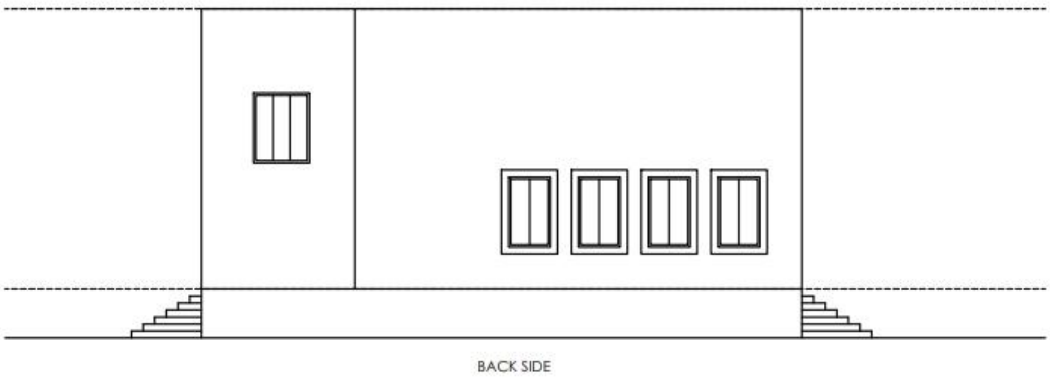
Build up Area :-119.734 m²



PLAN OF COMMUNITY HALL



Front Elevation



Back side Elevation

Measurement Sheet

Sr.No	Description	Nos.	Length (m)	Width (m)	Height (m)	Total Quantity (m^3)
1.	**Excavation**	**1**	**55.48**	**1.2**	**1.5**	**99.86**
2.	**Wall**	**1**	**55.48**	**0.3**	**3.048**	**50.73**
3.	**Parapet**	**1**	**44.48**	**0.2**	**1**	**8.89**
4.	**Window**	**4**	**1**	**0.3**	**2.1**	**-3.78**
5.	**Door**	**6**	**1**	**0.3**	**1.2**	**-1.44**
6.	**Plinth**	**1**	**17.14**	**8.45**	**0.55**	**79.66**
7.	**Slab**	**1**	**13.10**	**9.14**	**0.15**	**17.96**

Absract Sheet

Sr.No	Description	Quantity (m^3)	Rate	Per	Amount
1.	**Excavation**	**99.86**	**85**	**m^3**	**8488.1**
2.	**Wall**	**54.40**	**5050**	**m^3**	**274720**
3.	**Plinth**	**79.66**	**3500**	**m^3**	**278810**
4.	**Slab**	**17.96**	**3700**	**m^3**	**66452**
				Total	**628470.1**

13.1.5 Civil Design (Lakeside Development)

Lake is the Major Source of Water for agricultural Activity as well as for fishing Activity.
In our project we decide to make the lake more attractive and pleasant place By growing The tree surrounding the lack and making barricading Surrounding the lake.

Design Utilized By :-
People of Mandir Village As well as the Surrounding Village People.

Lake Side Development

Barricading Length:- 408 m
Barricading Height :- 1.2 m

Lack side Barricading & Plantation

13.1.6 Civil Design (Rain Water Harvesting)

Rainwater harvesting (RWH) is the collection and storage of rain, rather than allowing it to run off. Rainwater is collected from a roof-like surface and redirected to a tank, cistern, deep pit (well, shaft, or borehole), aquifer, or a reservoir with percolation, so that it seeps down and restores the ground water

Design Utilized By:-
Domestic as well as Agricultural activity Purpose by all the Villagers

Rain Water Harvesting:-

Tank Capacity :- 1 lakh Liter.
Type of Tank :- UPVC Tank
Source of Water Collection :- Roof Top

Mode of Tank:- Under Ground Tank

Individual water Collection from Roof Top

Under Ground Water storage Tank

13.1.7 Electrical Design 1 ((Fish Farm Aquaculture Monitoring & Controlling System)

Abstract:

Aquaculture, also known as aqua farming, is the farming of aquatic organisms such as fish, crustaceans and crabs by using the various sensors to reduce the risks. Water problem is the major effect for the growth of fish. Monitoring is essential for water quality. This can help to save number of lives.
The proposed work supports remote monitoring of the fish farming system based on Internet of Things (IOT) for real-time monitor and control of a fish farming system. This will be helpful to be aware of the danger and can take necessary safety measures.
IoTis used in this project helps updating the information about water quality through mail. pH sensor, Water level Indicator, Temperature Sensor & Turbidity sensor is used to measure the water quality level. Esp32 takes the information and sends the information through the mail if the water quality is not in the given thresholds suitable for aquatic organisms.
Key Words: Internet of Things (IoT), Aquaculture, Water Quality Monitoring, Raspberry Pi, pH, Temperature, Conductivity, Sensors, Wi-Fi, Internet, Smartphone

Introduction:

With the rapid development of the economy, more and more serious problems of environment arise. Water pollution is one of these problems. In 2014 Hindustan company mercury wastes are dissolved in Kodaikanal Lake due to this effect many lives get into danger. It contaminates the whole water in the lake. So it affects thousands of fishes. It is important to collect this measurement because these factors might affect and be affected by organisms in the pond. Because of continuous monitoring the parameters helps to reduce the problems arrived in future. Research in aquaculture is an input to increase stabilized production. In last decade various scientists have made sustained efforts that resulted in development of modern production technologies that have revolutionized farm production. The main aim of the project is to remote monitoring of the fish farming system by using the various sensors to reduce the risks. In this processes we use sensors like pH value, temperature and level sensors. By using these sensors all the work is automated and it will also be easy to monitor the fish farming remotely from other location. Fish farming have been used for more than three decades. Research in aquaculture is an input to increase and stabilize production.

Fish farming refers to farming variety of marine species such as shellfish, sport fish, bait fish, ornamental fish, crustaceans, mollusks, algae, sea vegetables, and fish eggs to breed, rear and harvest in different water environments such as ponds, rivers, lakes, and ocean. Fish are cold-blooded animals, regulating their body temperature directly by the water environment. Changes in water temperature affect the amount of dissolved oxygen in the water and fish oxygen consumption. Although the fish can withstand a broad water temperature range, any sudden, extreme changes in water temperature will have a considerable impact on fish physiology. A chilling injury will cause the fish to rush into, paralysis with a loss of balance, leading to death. The reason may be the respiratory center, or osmotic regulation is affected at high temperatures. As the water temperature increases the fish suffer respiratory arrest. Fish World magazine found that the amount of dissolved oxygen

in water increases or decreaseswith the seasons. When the water temperature rises, fish metabolic rate will be increased and results in less dissolved oxygen in thewater. Low water temperature decreases fish metabolic rate and increases amount of dissolved oxygen in the water. If the amount of dissolved oxygen in water is reduced to below a certain limit fish growth will be hindered. When the amount of dissolved oxygen becomes lower than the fish survival conditions the fish will die.
In general fish farming the acidity and alkaline of the water should be maintained between 6 to 8.Too acidic or alkaline will cause adverse effects, acid erosion of the gill tissue, tissue coagulation necrosis, increased mucus secretion, abdominal congestion and inflammation. If the PH value is less than 4.5, the fish will die. Water quality will directly affect the growth of aquaculture objects which affects the production and economic benefits. In the promotion of health culture concept and environment friendly aquaculture, it has greater demands on water quality management. In the introduction a definition of monitoring suggested that monitoring was for compliance with regulatory standards for protection and safeguarding environmental quality. This is true and forms the basis for monitoring, but other reasons are also important. The aquaculture industry has an important & interest in environmental quality.

As pointed out earlier water quality (in particular) is of essential importance in maintaining the health of the cultured resource. This is true whether the reason be for optimization of fish growth to legal liability in case of litigation due to unacceptable environmental change which affects other resource users Environmental monitoring is therefore an important part of fish farm management.

The continuous and real-time automatic monitoring of water parameters will not only lead to a high quality aquaculture management but also provide accurate experimental data which help to optimize breeding process reduce farming costs and improve breeding efficiency.

Sr. No.	Parameter	Acceptable range	Desirable rang	Stress
1.	Temperature	15-35	20-30	<12,>35
2.	Ph	7-9.5	6.5-9	<4,>11

Ranges of the Parameters

Proposed Method & System Architecture:

This section comprises of two subsections which are the introduction of required hardware and software technologies and description of the functionality of the architecture.

Required hardware and software:

1) Sensors: Analog pH Sensor for ESP 32(shown in Fig.) is used to measure pH of water in this work. This pH sensor is specially intended for ESP 32 and has built-in convenient connection and features. A BNC connector is required to connect the sensor with ESSP 32. The range of this sensor is 0-14 pH. It has an accuracy of ±0.1 pH at a standard temperature of 25ºC and operating temperature range is 0-60°C. Just

a few sections of the sensor may be inserted into the water. The reliability of this pH sensor can last for a half year when the water is clean and one month for water with high turbidity. Temperature sensor (DS18B20) connected to the connecting terminal of the terminal sensor adapter with Arduino. This sensor has an accuracy of <±10% F.S and operating temperature range is 5-40°C. We also use Waterproofed DS18B20 Temperature sensor (shown in Fig.). It has ±0.5°C accuracy from - 10°C to +85°C. The upside of this sensor is just required one pin data communication for multiple sensors at once. One Wire Library for ESP 32 is used to measure temperature with this sensor.

Temperature Sensorph sensor

2) ESP 32: ESP32 is a series of low-cost, low-power system on a chip microcontrollers with integrated Wi-Fi and dual- mode Bluetooth. The ESP32 series employs a TensilicaXtensa LX6 microprocessor in both dual-core and single-core variations and includes built-in antenna switches, RF balun, power amplifier, low-noise receive amplifier, filters, and power-management modules. ESP32 is created and developed by Espressif Systems, a Shanghai-based Chinese company, and is manufactured by TSMC using their 40 nm process. It is a successor to the ESP8266 microcontroller.

1. Processors:

a. CPU: Xtensa dual-core (or single-core) 32-bit LX6 microprocessor, operating at 160 or 240 MHz and performing at up to 600 DMIPS

b. Ultra low power (ULP) co-processor

2. Memory: 520 KiB SRAM

3. Wireless connectivity:

a. Wi-Fi: 802.11 b/g/nb. Bluetooth: v4.2 BR/EDR and BLE (shares the radio with Wi-Fi)

4. Peripheral interfaces:

a. 12-bit SAR ADC up to 18 channels

b. 2 × 8-bit DACs

c. 10 × touch sensors (capacitive sensing GPIOs)

d. 4 × SPI

e. 2 × I²S interfaces

f. 2 × I²C interfaces

g. 3 × UART

h. SD/SDIO/CE-ATA/MMC/eMMC host controller

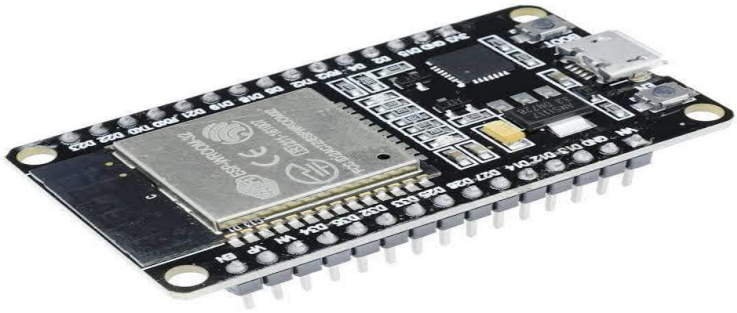
i. SDIO/SPI slave controller
j. Ethernet MAC interface with dedicated DMA and IEEE 1588 Precision Time Protocol support
k. CAN bus 2.0
l. Infrared remote controller (TX/RX, up to 8 channels)
m. Motor PWM
n. LED PWM (up to 16 channels)
o. Hall effect sensor
p. Ultra low power analog pre-amplifier

5. Security:

a. IEEE 802.11 standard security features all supported, including WFA, WPA/WPA2 and WAPI
b. Secure boot
c. Flash encryption
d. 1024-bit OTP, up to 768-bit for customers
e. Cryptographic hardware acceleration: AES, SHA-2, RSA, elliptic curve cryptography (ECC), random number generator (RNG)

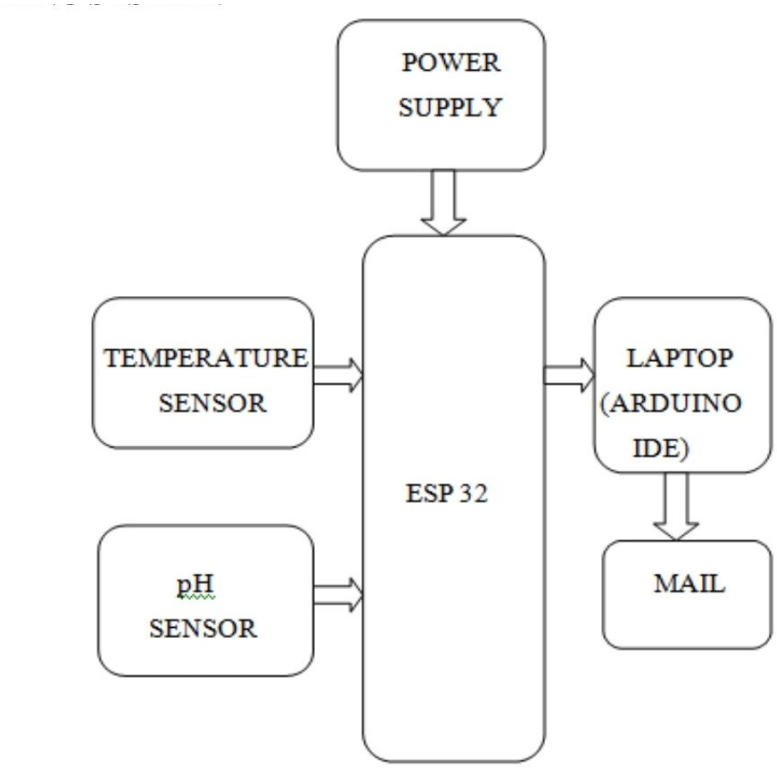
6. Power management:

a. Internal low-dropout regulator
b. Individual power domain for RTC
c. 5µA deep sleep current



ESP 32

BLOCK DIAGRAM OF FISH FARM AQUACULTURE MONITORING & CONTROLLING SYSTEM:



Block Diagram of Fish Farm Aquaculture Monitoring & Controlling System

Methodology:

Component Used:

- Power Supply Module
- pH sensor
- Temperature Sensor
- Internet of Things

Power Supply Module : The input to the circuit is applied from the regulated power supply. The a.c. input i.e., 230V from the mains supply is step down by the transformer to 12V and is fed to rectifier. The output obtained from the rectifier is a pulsating d.c voltage. So in order to get a pure d.c voltage, the output voltage from the rectifier is fed to a filter to remove any a.c components present even after rectification. Now, this voltage is given to a voltage regulator to obtain a pure constant dc voltage.

pH Sensor: pH sensor senses electro-chemical potential between a known liquid inside and outside the glass. Glass bulb allows agile and hydrogen ions to interact with glass and the glass electrode senses electro-chemical potential of hydrogen ions. To complete electrical circuit a reference electrode is needed. A pH sensor not be used in moving liquids of low conductivity.

Temperature Sensor: The DS18B20 temperature sensor is a integrated-circuit, whose output voltage is proportional to Celsius temperature. DS18B20 has advantage over linear temperature sensors because user can obtain convenient Centigrade scaling without subtract a large constant voltage from its output.

Internet of Things: This is the latest technology to transfer data from source to destination. We are using intra network for demonstration of this project. It is a kind of network of network Technology which is based on information sensing equipment such as Wi-Fi module etc. Cloud computing is a large scale processing unit which processes in run time and it is also a very low cost technology. It is remote server hosted on the internet to store, manage and process data, rather than a local server or a personal computer. The application area of IoT are Home automation, Water quality monitoring, Smart garbage.
The ESP 32 also gives a mail if the values are not in the desired range.

Conclusion:

By successfully completing this design we have concluded that this IoT based Aquaculture can be used for the Aqua farmers in order to get the good output and reduce the risk of the fishes getting killed in large numbers. Also it will save the time of the farmers to do the manual testing of the every factor as they are getting it very easily through this project. This project is reliable, cost efficient and time saving for the Aqua farmers.

Even though this design is helping the aqua farmers for good results there can be always something advancement in the prior technology. The advancement here will be the microcontroller can be replaced with raspberry pi 3 which consists of in built Wi-Fi module and for IoT one can buy website to make it more advanced and secure. Also more sensors can be used to monitor different factors in water like ammonia, Nitrate, Bicarbonates, Salt, etc. The solution can also be automated for every undesired factor. Using this maybe one can get maximum throughput with minimum loss of fishes.

13.1.8 Electrical Design 2(Sun Tracking Solar Panel)

Abstract- This project employs a solar panel mounted to a time-programmed stepper motor to track the sun so that maximum sun light is made incident upon the panel at any given time of the day. This is better compared to the light-sensing method that may not be accurate always – for example, during cloudy days. With the impending scarcity of non-renewable resources, people are considering to use alternate sources of energy. Barring all the other available resources, the solar energy is the most abundant and it is comparatively easy to convert into electrical energy. The usage of solar panel to convert Sun energy into electrical energy is very popular, but due to the transition of sun from east to west, the fixed solar panel may not be able to generate optimum energy. The proposed system solves this problem by an arrangement for the solar panel to track the Sun. This tracking movement is achieved by coupling a stepper motor to the solar panel such that the panel maintains its face always perpendicular to the sun to generate maximum energy. This is achieved by using a programmed microcontroller to deliver stepped pulses in periodical time intervals for 12 hours for the stepper motor to rotate the mounted panel in one direction and then return to the start point for next day light as desired. The Arduino controller used in this project is from the Arduino family. The Stepper motor is driven by an interfacing IC as the controller is not capable of handling the power requirements of the stepper motor. Furthermore, this project can be enhanced by using an RTC (Real Time Clock) to follow the sun. This helps in maintaining the required position of the panel even if the power is interrupted for some time.

INTRODUCTION

This project deals with the research and development of a Sun tracking system. Now a day's Renewable energy solutions are becoming increasingly popular. Maximizing power output from a solar system is desirable to increase efficiency. In order to maximize power output from the solar panels, one need is to keep the panels aligned with the sun, means that the tracking of the sun is required. This is a far more cost effective solution than purchasing additional solar panels. This system is designed with specific methodology, this system using 89C51 Microcontroller, Dummy Solar Panel, Stepper Motor, Voltage Regulator, Diodes, Relay driver IC, Transformer. Solar panels collect solar radiation from the sun and actively convert that energy to electricity. Solar panels are comprised of several individual solar cells. These solar cells function similarly to large semiconductors and utilize a large area p-n junction diode. When the solar cells are exposed to sunlight, the p-n junction diodes convert the energy from sunlight into usable electrical energy. The energy generated from photons striking the surface of the solar panel allows electrons to be knocked out of their orbits and released, and electric fields in the solar cells pull these free electrons in a directional current, from which metal contacts in the solar cell can generate electricity. The more solar cells in a solar panel and the higher the quality of the solar cells, the more total electrical output the solar panel can produce. The conversion of sunlight to usable electrical energy has been dubbed the Photovoltaic Effect. A solar tracker is a device that orients a payload toward the sun. The use of solar trackers can increase electricity production by around a third, and some claim by as much as 40% in some regions, compared with modules at a fixed angle. In any solar application, the conversion efficiency is improved when the modules are continually adjusted to the optimum angle as the sun traverses the sky. As improved efficiency means improved yield, use of trackers can make quite a difference to the income from a large plant.

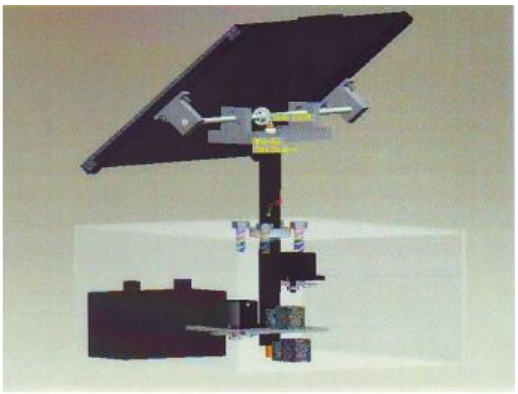
Commercial purpose of solar tracking system:
• Increase Solar Panel Output.

• Maximum efficiency of the panel.

• Maximize Power per unit area.

• Able to grab the energy throughout the day.

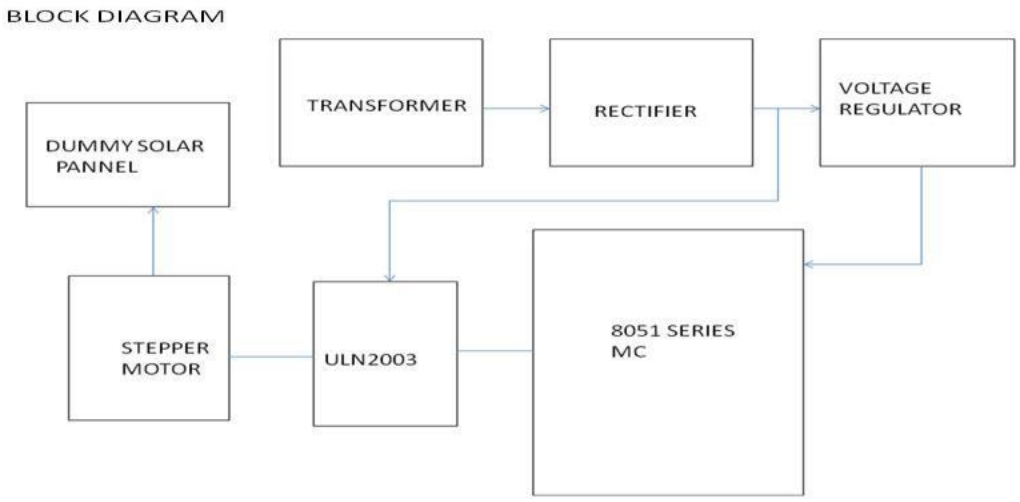
Are continually adjusted to the optimum angle as the sun traverses the sky. As improved efficiency means improved yield, use of trackers can make quite a difference to the income from a large plant.



Solar tracking system

METHODOLOGY

Irjet Template sample paragraph .Define abbreviations and acronyms the first time they are used in the text, even after they have been defined in the abstract. Abbreviations such as IEEE, SI, MKS, CGS, sc, dc, and rms do not have to be defined. Do not use abbreviations in the title or heads unless they are unavoidable.



Block Diagram

HARDWARE REQUIREMENTS:

89C51 Microcontroller, Dummy Solar Panel, Stepper Motor, Voltage Regulator, Diodes, Relay driver IC, Transformer.

SOFTWARE REQUIREMENTS:

Keil compiler**,** Languages: Embedded C or Assembly

There are many different components and also the methods used to track the sun. This system has a simple combination of electronic circuit. This project contains the basic component which deals with the Solar panel, Stepper motor, Microcontroller (89C51), Relay, keil software.

Transformer
In this project we used step down transformer the main function of step down transformer is to make higher voltage to lower voltage. The output of transformer is connected to bridge rectifier.
Bridge rectifier Output of transformer is given to input of bridge rectifier we used full wave bridge rectifier. Main function of rectifier is to convert ac to dc voltage. Output of bridge rectifier is given to regulator.

Regulator
ICLM7805 is used as a voltage regulator which regulates the voltage. output of regulator is connected to input of IC 89C51.

Microcontroller (89C51)
The microcontroller 89C51 has a basic role in this project; it takes action according to its program.

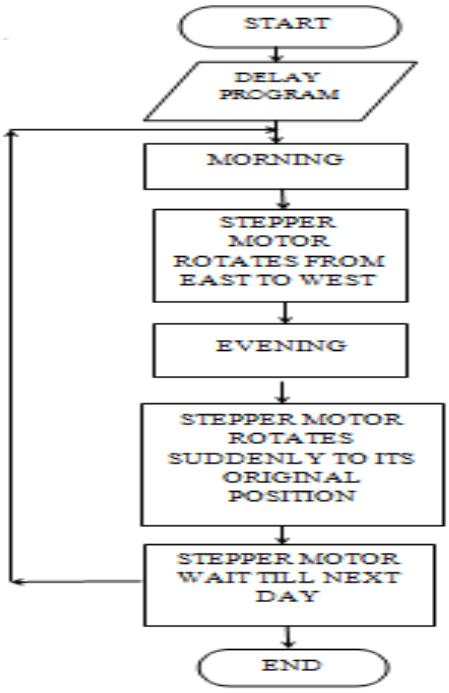
Stepper motor
The stepper motor plays an important role in this project; it directed the panel towards the sun.

Solar Panel
All the system works to keep thesolar panel directed towards the sun, the solar panel generate the DC voltage

Input power This system is using +5V DC power, as the input, for the all the three units and also +12V DC for the stepper motor of unit

SOFTWARE
In manual tracking we used software named "Keil Compiler"; this software is created on .c assembly language, with the help of this software we can move the solar panel in our desired direction on one axis, this software uses the parallel port to communicate, when the system using practically.

Flowchart

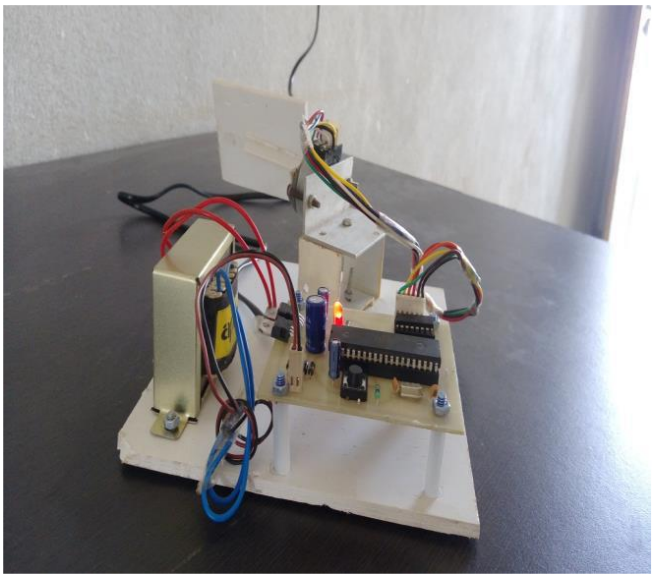


Flow chart

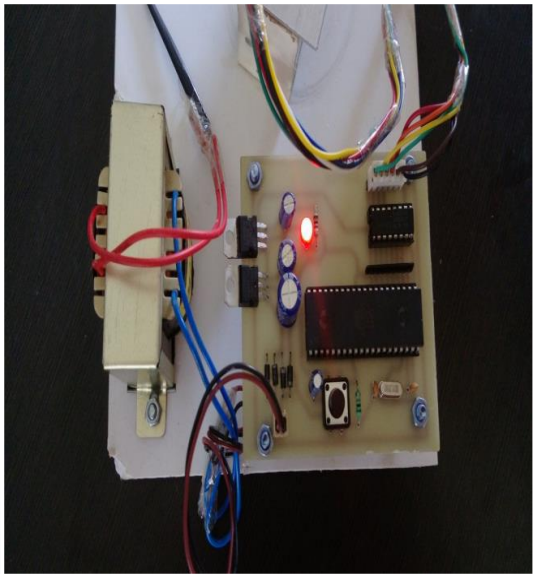
Working

This project employs a solar panel mounted to a time-programmed stepper motor to track the sun so that maximum sun light is made incident upon the panel at any given time of the day. This is better compared to the light-sensing method that may not be accurate always – for example, during cloudy days. With the impending scarcity of non-renewable resources, people are considering to use alternate sources of energy. Barring all the other available resources, the solar energy is the most abundant and it is comparatively easy to convert into electrical energy. The usage of solar panel to convert Sun energy into electrical energy is very popular, but due to the transition of sun from east to west, the fixed solar panel may not be able to generate optimum energy. This tracking movement is achieved by coupling a stepper motor to the solar panel such that the panel maintains its face always perpendicular to the sun to generate maximum energy. This is achieved by using a programmed microcontroller to deliver stepped pulses in periodical time intervals for 12 hours for the stepper motor to rotate the mounted panel in one direction and then return to the start point for next day light as desired. The microcontroller used in this project is from the 8051 family.

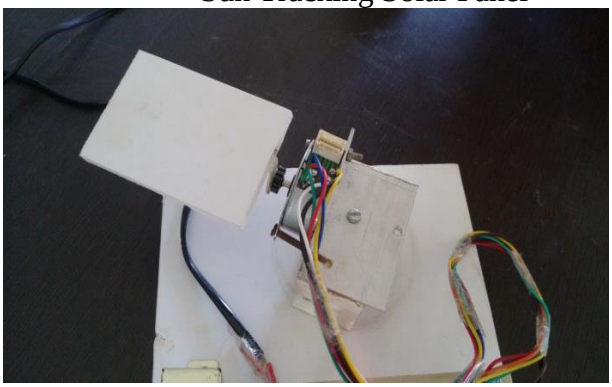
REPRESENTATION OF CIRCUIT



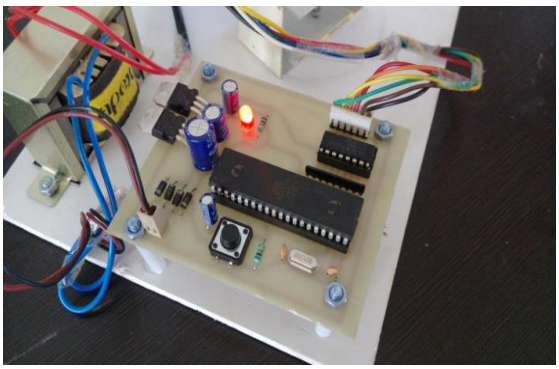
Sun Tracking Solar Panel



Aurdino Board



Solar panel



Transformer

CONCLUSION

In this project, the sun tracking system is developed based on 89C51 microcontroller. The microcontroller 89C51 based circuit is used in this system with a minimum number of components and the use of stepper motors enables accurate tracking of the sun.It has been shown that the sun tracking systems can collect maximum energy than a fixed panel system

collects and high efficiency is achieved through this tracker, it can be said that the proposed sun tracking system is a feasible method of maximizing the light energy received from sun. This is an efficient tracking system for solar energy collection.

REFERENCES

[1] Mayank Kumar Lokhande - Automatic Solar Tracking System

[2] Bipin Krishna &Kaustavsinha - Tracking of Sunfor Solar Panels and Real Time Monitoring Using Labview

[3] Reshmi Banerjee - Solar Tracking System

13.1.9 Electrical Design 3 (Railway Track Crack Detection)

ABSTRACT

As we know in India Railway is the cheapest mode of transportation, so it is the busiest mode of Transportation System. In last few years rail accidents occurred more due to derailment compared to collision or fire in trains. This derailment occurs due to crack occurs in the railway track. Therefore, a system which can detect the crack in the track is needed. Another problem is rail crossing near villages the vehicles have to wait for longtime when train is about to come. To solve this problem Automatic Gate Crossing System is implemented in this system when the train will reach at some distance the gate will get closed when they get signal from weight sensor. With the detection of cracks the system also alerts the railway authorities and the accident can be avoided.

INTRODUCTION

As we know, that Indian railway has a huge network which carries 30 million passengers and 2.8 million tons of freight, and is still growing. And hence it is the integral part of Indian economy.

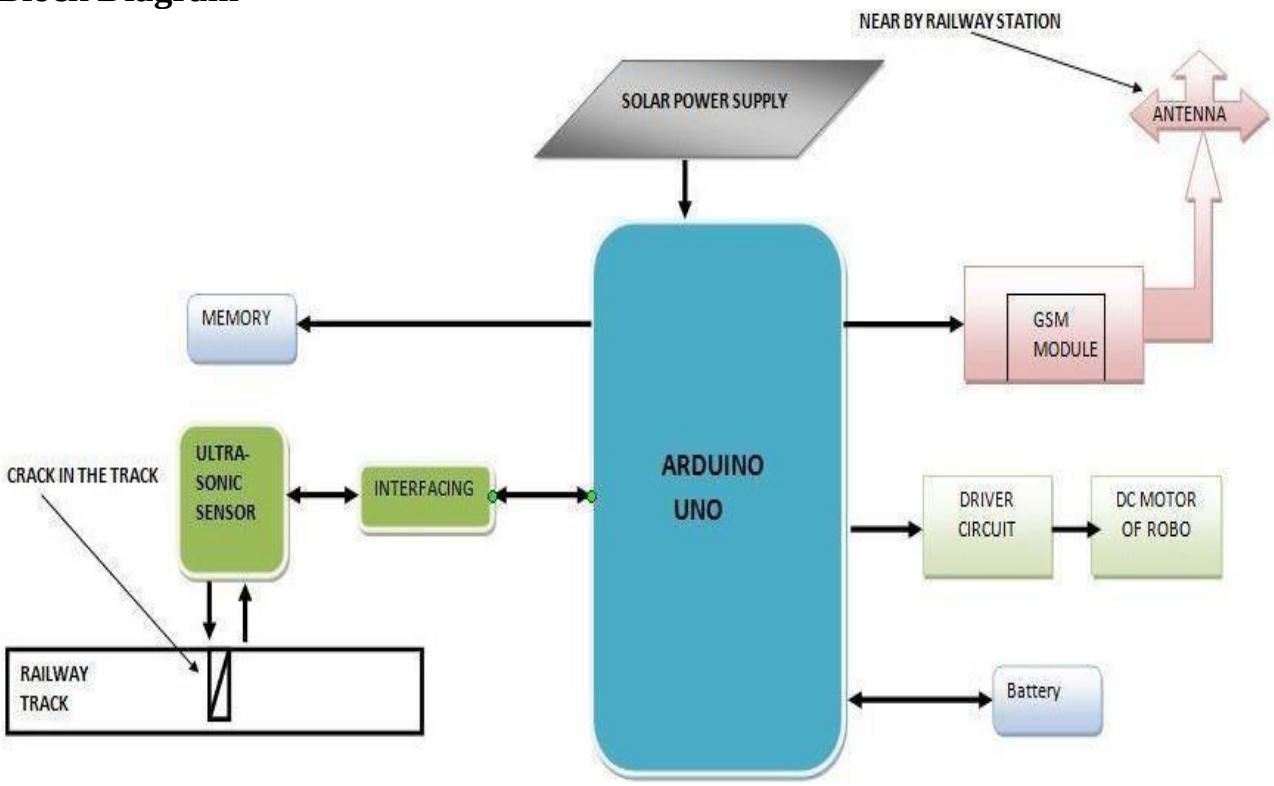
• According to survey in 2011 till the month of July there were already 11 accident recorded that year. To explain the difficulty of point in problem, the accident in railways are due to 60% derailment and 90% Cracks problem.

• Derailment accidents: 46 accidents were recorded in 2018-19 and 29 accidents were recorded in2019-20

• So the problem of cracks should be identified as soon as possible , so the risk of accident should get minimized.

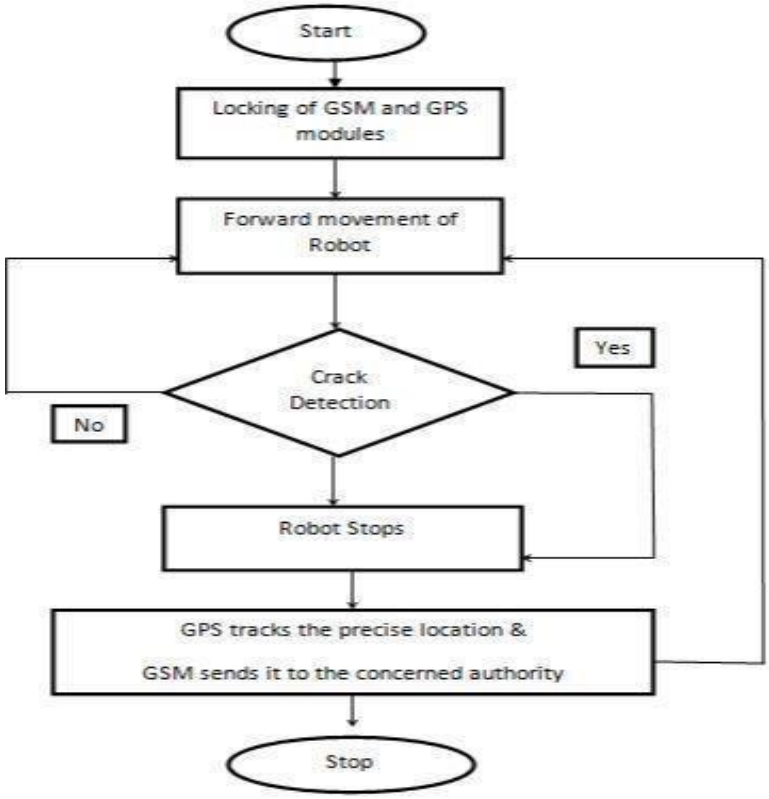
• If we use the automated safety system for the crack detection and railway crossing there is less chances of accident compare to manual because of no human involvement.

Block Diagram



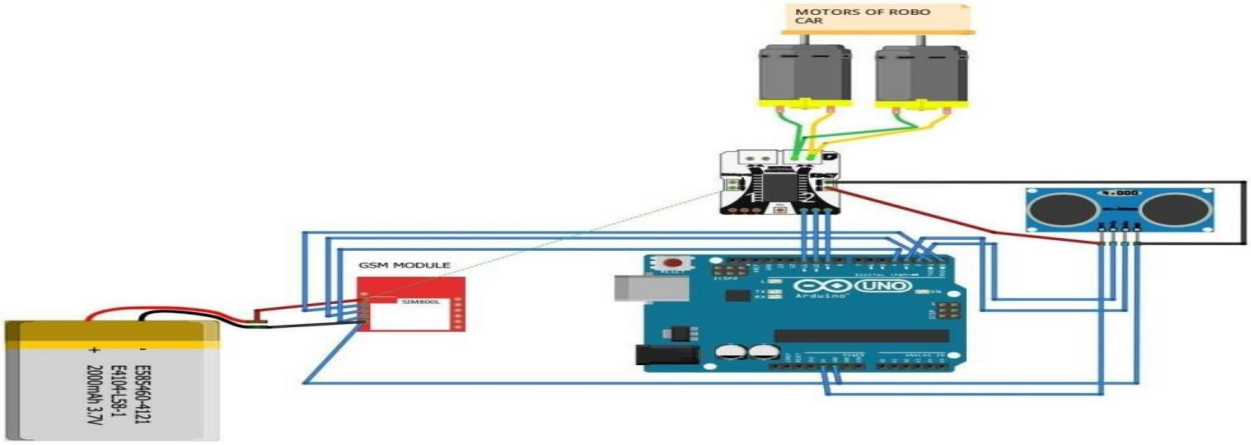
Block diagram of Automatic Railway Track Crack Detection System

FLOWCHART



Flowchart of Automatic Railway Track Crack Detection System

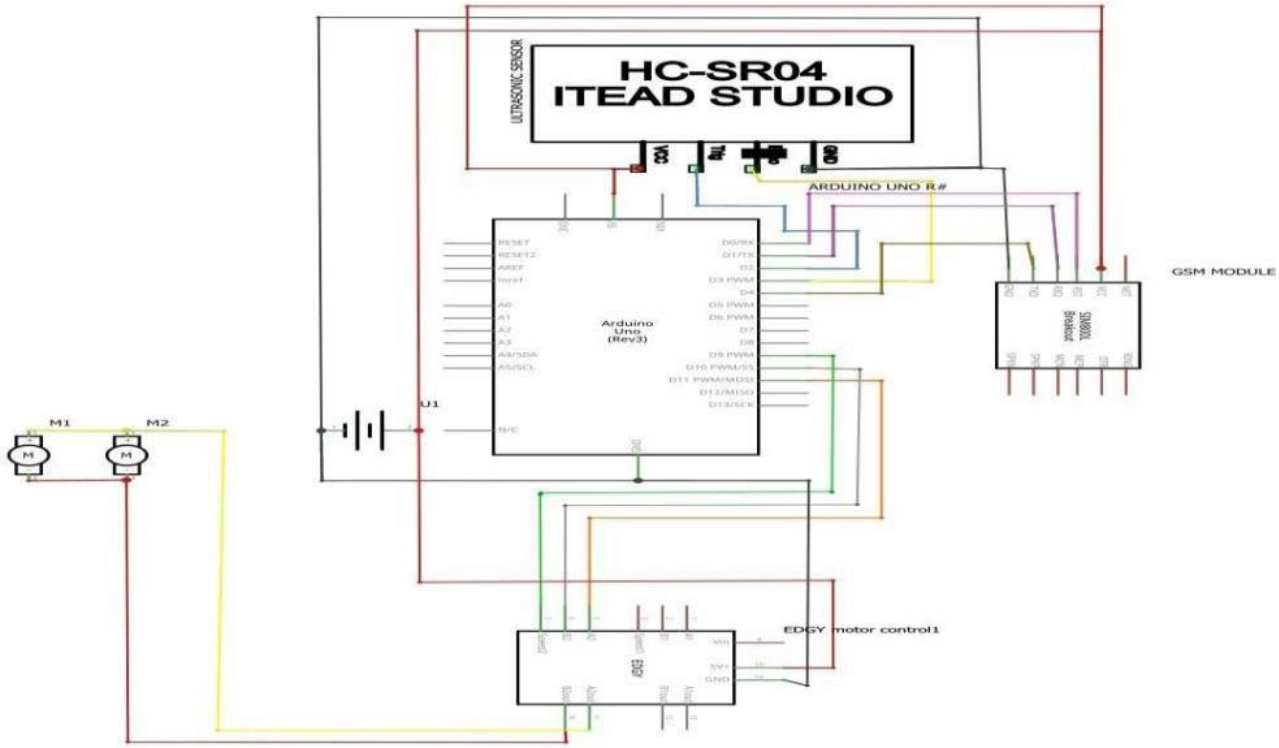
CIRCUITDIAGRAM



Circuit diagram of Automatic Railway Track Crack Detection System

SCHEMATIC

Using fritzing software we make schematic and circuit diagram interfacing of Arduino ,IRsensor,GPS,GSM Module and Ultrasonic distance sensor .



Schematic diagram of Automatic Railway Track Crack Detection System

WORKING PRINCIPLE

This project will work with the help of Arduino Mega, GPS-GSM Module along with the Ultrasonic sensor.When there will be a crack on the track ultrasonic sensor will sense it and give signal to the arduino .Arduino will fetch the co-ordinates of the location from GPS Sensor and send it to near by railway station with the help of GSM Module.

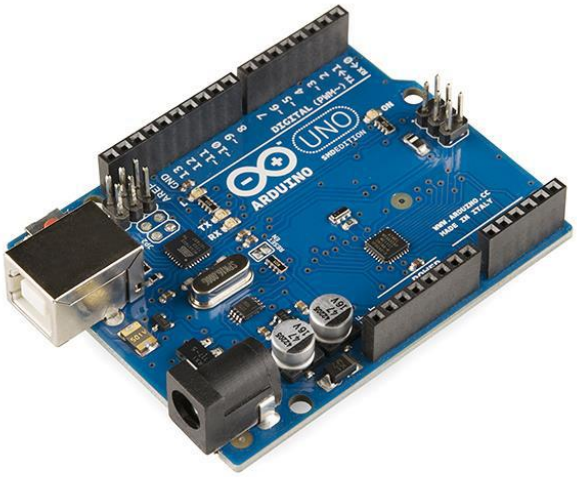
Same way In Gate Crossing the train will be detected at some distance will the help of IR Sensor. IR Sensor will transmit signal to arduino and arduino will operate the gate of the crossing. When train will be passed another sensor will sense it and give signal to the arduino and gate will be opened.

METHODOLOGY

The following analysis are considered
1. Estimation and Costing of the system for a Safety Management Information System which adequately addresses the needs of railway management for information on level crossing safety performance. 2. Review of the essential and effective safety, Enhancements, measures and priorities forlevel crossings. 3. Assessment for the safety measures of different countries according to the rules and laws. 4. Examination of Cost Benefit Analysis of investments on level crossing safety enhancement. 5. Review of the technical attributes and suitability of Networked Anti Collision System. 6. Recommendations and guidelines for adoption of Automatic Railway Security Systems by Railway. 7. The project will be based on arduino microcontroller and ultrasonic sensor. The automatic gate crossing will be done with the help of pressure senso

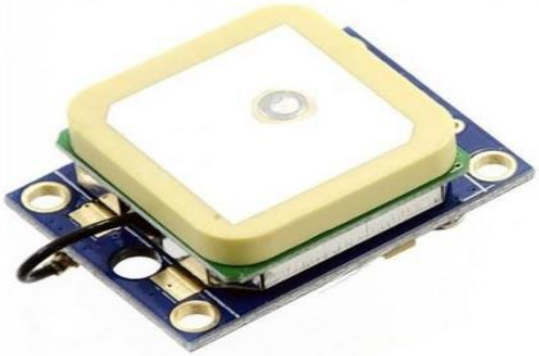
HARDWARE DESCRIPTION

Arduino Uno



The Arduino Uno is an open-source microcontroller board based on the Microchip ATmega328P microcontroller and developed by Arduino.cc.The board is equipped with sets of digital and analog input/output (I/O) pins that may be interfaced to various expansion boards (shields) and other circuits.The board has 14 digital I/O pins (six capable of PWM output), 6 analog I/O pins, and is programmable with the Arduino IDE (Integrated Development Environment), via a type B USB cable.It can be powered by the USB cable or by an external 9-volt battery, though it accepts voltages between 7 and 20 volts

NEO 6M (GPSMODULE)



NEO-6M global positioning system (GPS) module, a very popular, cost-effective, high-performance GPS module with a ceramic patch antenna, an on-board memory chip, and a backup battery that can be conveniently integrated with a broad range of microcontrollers. The module works well with a DC input in the 3.3- to 5-V range .

SIM 900A (GSMMODULE)

SIM900A Modem is built with Dual Band GSM/GPRS based SIM900A modem from SIMCOM. It works on frequencies 900/ 1800 MHz. SIM900A can search these two bands automatically. The frequency bands can also be set by AT Commands. The baud rate is configurable from 1200-115200 through AT command. The GSM/GPRS Modem is having internal TCP/IP stack to enable you to connect with internet via GPRS. SIM900A is an ultra compact and reliable wireless module. This is a complete GSM/GPRS module in a SMT type and designed with a very powerful single-chip processor integrating AMR926EJ-S core, allowing you to benefit from small dimensions and cost-effective solutions.

12V – 2Amp SUPPLY

The 12 Volt Power Supply Adapter is a throwback to the early days of electronics when 12V was a common battery output voltage. The 12 Volt Power Adapter, also known as a "Brick", "Desk Wart" and "Floor" supply, provide a regulated 12 Volts DC output.

HC-SR04 SENSOR (Ultra Sonic Sensor)

HC-SR04 is an ultrasonic ranging module that provides 2 cm to 400 cm non-contact measurement function. The ranging accuracy can reach to 3mm and effectual angle is < 15°. It can be powered from a 5V power supply.

HC-SR04 Specifications

- Working Voltage: DC5V
- Working Current:15mA
- Max Range:4m
- Min Range:2cm
- Measuring Angle: 15degree
- Trigger Input Signal: 10µS TTL pulse
- Echo Output Signal Input TTL lever signal and the range in proportion
- Dimension 45 * 20 * 15mm

IR SENSOR

The IR sensor module consists mainly of the IR Transmitter and Receiver, Opamp, Variable Resistor (Trimmer pot), output LED in brief.

IR LED Transmitter

IR LED emits light, in the range of Infrared frequency. IR light is invisible to us as its wavelength (700nm – 1mm) is much higher than the visible light range. IR LEDs have light emitting angle of approx. 20-60 degree and range of approx. few centimeters to several feets, it depends upon the type of IR transmitter and the manufacturer. Some transmitters have the range in kilometers. IR LED white or transparent in colour, so it can give out amount of maximum light.

Photodiode Receiver

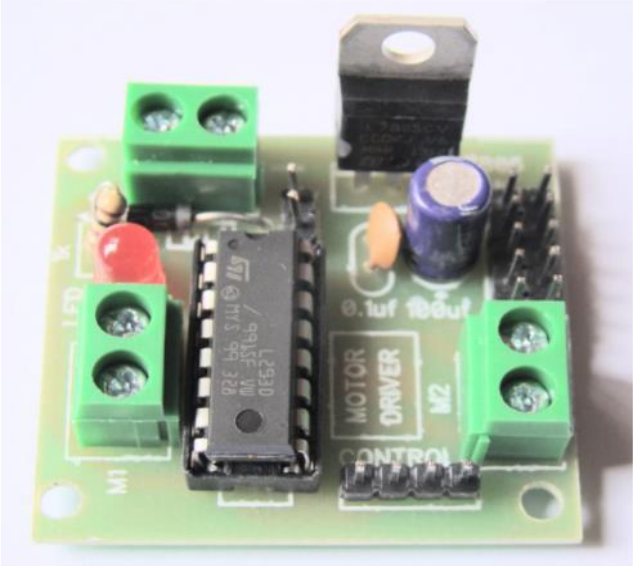
Photodiode acts as the IR receiver as its conducts when light falls on it. Photodiode is a semiconductor which has a P-N junction, operated in Reverse Bias, means it start conducting the current in reverse direction when Light falls on it, and the amount of current flow is proportional to the amount of Light. This property makes it useful for IR detection. Photodiode looks like a LED, with a black colour coating on its outer side, Black colour absorbs the highest amount of light.

LM358 Opamp

LM358 is an Operational Amplifier (Op-Amp) is used as voltage comparator in the IR sensor. the comparator will compare the threshold voltage set using the preset (pin2) and the photodiode's series resistor voltage(pin3).
Photodiode's series resistor voltage drop > Threshold voltage = Opamp output isHigh
Photodiode's series resistor voltage drop < Threshold voltage = Opamp output is Low 29

When Opamp's output is **high** the LED at the Opamp output terminal **turns ON** (Indicating the detection of Object).

L293D MOTOR SHIELD



This L293D driver module is a medium power motor driver perfect for driving DC Motors and Stepper Motors.It uses the popular L293D motor driver IC. It can drive 4 DC motors in one direction, or drive 2 DC motors in both the directions.

Features of L293D Motor Driver Board:-

• L293D motor driver IC.

• Male burg stick connectors for supply, ground and input connection

• Screw terminal connectors for easy motor connection

• On Board LM7805 Voltage Regulator

Advantages of the System

	PROJECT	**INDIAN RAILWAY**
Less Cost	25000/-	50000/-
Power Consumption	SOLAR POWER	MANUAL
Less Analysis Time **Accuracy**	350 Km/Day 80%	100-110 Km/Day 50%

CONCLUSION

The Automatic railway track detection and gate crossing system is very reliable and efficient, it contains fully automatic Arduino Uno controller with IR (Infrared), Ultrasonic and GSM system,it is easy to understand and control, Arduino Uno controller is used to control the operation of Robocar and also control the Gate Operation,Arduino Unconnected with GSM to send real time location whenever detect crack on track or detect obstacle, This is fully

automatic system so human error is not present ,this system provides reliable security to Railway Track

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Chapter 14:- Technical option with Case Studies

14.1 Advanced Earthquake Resistance Design

Earthquake-resistant or aseismic structures are designed to protect buildings to some or greater extent from earthquakes. While no structure can be entirely immune to damage from earthquakes, the goal of earthquake-resistant construction is to erect structures that fare better during Seismic activity than their conventional counterparts.

According to building codes, earthquake-resistant structures are intended to withstand the largest earthquake of a certain probability that is likely to occur at their location. This means the loss of life should be minimized by preventing collapse of the buildings for rare earthquakes while the loss of the functionality should be limited for more frequent ones.

There are so many way to built an earth quake resistance structure this method are as blow:

1. Floating Foundation:

- **The levitating or floating foundation separates the substructure of a building from its superstructure.**
- One way of doing this is by floating a building above its foundation on lead-rubber bearings that comprise a solid lead core covered in alternating layers of rubber and steel. The bearings are attached to the building and its foundation with the help of steel plates. So, when an earthquake occurs, the floating foundation can move without moving the structure above it.
- Floating foundation = Wt. of excavated soil + Wt. of Building

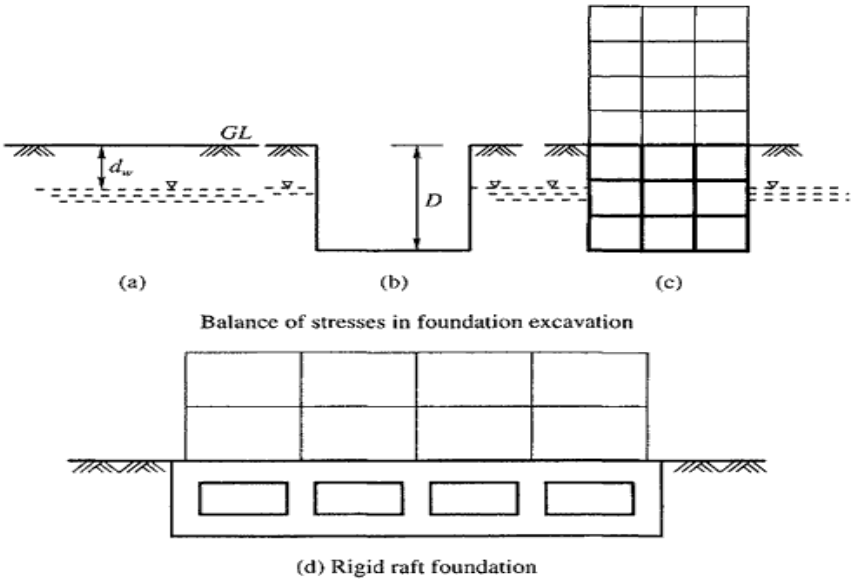
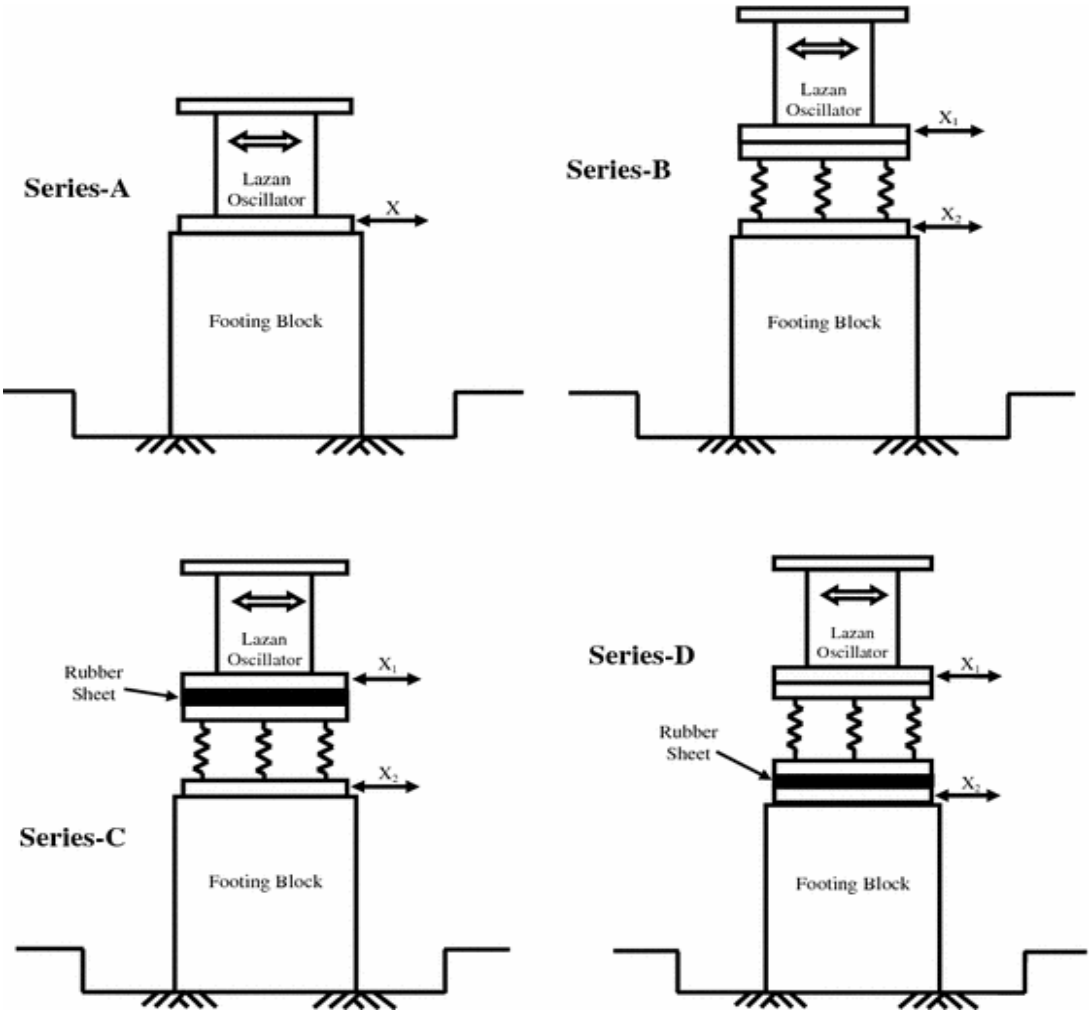


Figure 1:- Floating foundation

2. Shock Absorption

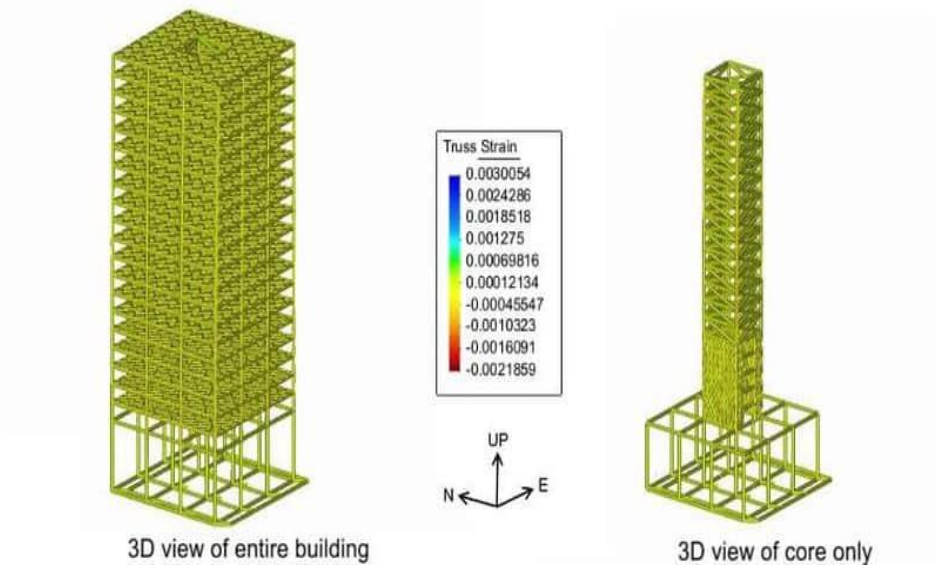
- Similar to the shock absorbers used in vehicles, buildings also makes use of this technology.
- This **earthquake resistant technology** helps buildings slow down and reduces the magnitude of vibratory motions. Ideally shock absorbers should be placed at each level of the building – one end attached to the beam and the other end to the column. Each comprises a piston head that moves inside a cylinder full of silicone oil. During earthquakes, the horizontal motion of building will make the piston push against the oil, transforming mechanical energy from the quake to heat.



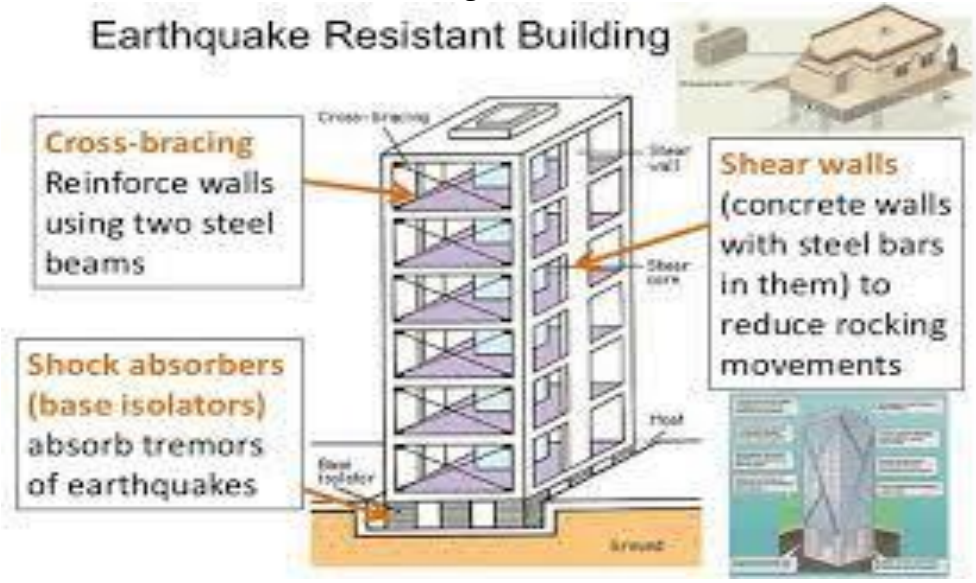
Shock absorption by Rubber sheet at Foundation

3. Rocking Core-Wall:

- Modern high-rise buildings use this technique to improve seismic resistance at a low cost. To make this work, a reinforced concrete core is set through the heart of the structure, surrounded by elevator banks.
- Many modern high-rise buildings use this technique to increase seismic resistance in an affordable way. It works most effectively when used together with base isolation.
- For base isolation, elastometric bearings are built with alternating layers of steel and natural rubber/neoprene. The bearing thus created has low horizontal stiffness and vertical rigidity. The combination is highly effective, cost-friendly and simple to implement.



Rocking core wall



14.1.2 Seismic retrofitting of Building :

- Seismic retrofitting is the modification of existing structures to make them more resistant to seismic activity, ground motion, or soil failure due to earthquakes.
- Strategies for seismic Retrofitting

1.Increasing the global capacity (strengthening). This is typically done by the addition of cross braces or new structural walls.

2. Reduction of the seismic demand by means of supplementary damping and/or use of base isolation systems.

3. Increasing the local capacity of structural elements. This strategy recognises the inherent capacity within the existing structures, and therefore adopts a more cost-effective approach to selectively upgrade local capacity (deformation/ductility, strength or stiffness) of individual structural components.

4. Selective weakening retrofit. This is a counter-intuitive strategy to change the inelastic mechanism of the structure, while recognising the inherent capacity of the structure.

5. Allowing sliding connections such as passageway bridges to accommodate additional movement between seismically independent structures.

- The Common seismic retrofitting techniques fall into several categories ,

External post-tensioning

- The use of external post-tensioning for new structural systems has been developed in the past decade. Under the PRESS (Precast Seismic Structural Systems)
- Pre-stressing can increase the capacity of structural elements such as beam, column and beam-column joints. External pre-stressing has been used for structural upgrade for gravity/live loading

Base isolators

- Base isolation is a collection of structural elements of a building that should substantially decouple the building's structure from the shaking ground thus protecting the building's integrity and enhancing its seismic performance.
- This earthquake engineering technology, which is a kind of seismic vibration control, can be applied both to a newly designed building and to seismic upgrading of existing structures. Normally, excavations are made around the building and the building is separated from the foundations
- Steel or reinforced concrete beams replace the connections to the foundations, while under these, the isolating pads, or base isolators, replace the material removed. While the base isolation tends to restrict transmission of the ground motion to the building, it also keeps the building positioned properly over the foundation.

Slosh tank

- A slosh tank is a large container of low viscosity fluid (usually water) that may be placed at locations in a structure where lateral swaying motions are significant, such as the roof, and tuned to counter the local resonant dynamic motion.

- During a seismic (or wind) event the fluid in the tank will slosh back and forth with the fluid motion usually directed and controlled by internal baffles – partitions that prevent the tank itself becoming resonant with the structure, see Slosh dynamics. The net dynamic response of the overall structure is reduced due to both the counteracting movement of mass, as well as energy dissipation or vibration damping which occurs when the fluid's kinetic energy is converted to heat by the baffles. Generally the temperature rise in the system will be minimal and is passively cooled by the surrounding air.
- A slosh tank is a passive tuned mass damper. In order to be effective the mass of the liquid is usually on the order of 1% to 5% of the mass it is counteracting, and often this requires a significant volume of liquid.

Adhoc addition of structural support/reinforcement

- The most common form of seismic retrofit to lower buildings is adding strength to the existing structure to resist seismic forces.
- The strengthening may be limited to connections between existing building elements or it may involve adding primary resisting elements such as walls or frames, particularly in the lower stories.
- Common retrofit measures for unreinforced masonry buildings in the Western United States include the addition of steel frames, the addition of reinforced concrete walls, and in some cases, the addition of base isolation.

Beam-column joint connections

- Beam-column joint connections are a common structural weakness in dealing with seismic retrofitting.
- For reinforced concrete beam-column joints – various retrofit solutions have been proposed and tested in the past 20 years. Philosophically, the various seismic retrofit strategies discussed above can be implemented for reinforced concrete joints.
- Concrete or steel jacketing have been a popular retrofit technique until the advent of composite materials such as Carbon fiber-reinforced polymer (FRP). Composite materials such as carbon FRP and Aramaic FRP have been extensively tested for use in seismic retrofit with some success.

Reinforced concrete column burst

- Reinforced concrete columns typically contain large diameter vertical rebar (reinforcing bars) arranged in a ring, surrounded by lighter-gauge hoops of rebar. Upon analysis of failures due to earthquakes, it has been realized that the weakness was not in the vertical bars, but rather in inadequate strength and quantity of hoops.
- Once the integrity of the hoops is breached, the vertical rebar can flex outward, stressing the central column of concrete. The concrete then simply crumbles into

small pieces, now unconstrained by the surrounding rebar. In new construction a greater amount of hoop-like structures are used.

- One simple retrofit is to surround the column with a jacket of steel plates formed and welded into a single cylinder. The space between the jacket and the column is then filled with concrete, a process called **grouting**.

Damage to masonry walls

- In masonry structures, brick building structures have been reinforced with coatings of glass fiber and appropriate resin (epoxy or polyester). In lower floors these may be applied over entire exposed surfaces, while in upper floors this may be confined to narrow areas around window and door openings.
- This application provides tensile strength that stiffens the wall against bending away from the side with the application. The efficient protection of an entire building requires extensive analysis and engineering to determine the appropriate locations to be treated.
- To prevent masonry infill damage and failure, typical retrofit strategies aim to strengthen the infills and provide adequate connection to the frame. Examples of retrofit techniques for masonry infills include steel reinforced plasters, engineered cementitious composites, thin layers fiber-reinforced polymers (FRP),and most recently also textile-reinforced mortars (TRM).

Retrofit methods in older wood-frame structures may consist of the following

- The lowest plate rails of walls (usually called "mudsills" or "foundation sills" in North America) are bolted to a continuous foundation, or secured with rigid metal connectors bolted to the foundation so as to resist side-to-side forces.
- *Cripple walls* are braced with plywood.
- Selected vertical elements (typically the posts at the ends of plywood wall bracing panels) are connected to the foundation. These connections are intended to prevent the braced walls from rocking up and down when subjected to back-and-forth forces at the top of the braced walls, not to resist the wall or house "jumping" off the foundation (which almost never occurs).
- In two-story buildings using "platform framing" (sometimes called "western" style construction, where walls are progressively erected upon the lower story's upper diaphragm, unlike "eastern" or *balloon framing*), the upper walls are connected to the lower walls with tension elements. In some cases, connections may be extended vertically to include retention of certain roof elements. This sort of strengthening is usually very costly with respect to the strength gained.
- Vertical posts are secured to the beams or other members they support. This is particularly important where loss of support would lead to collapse of a segment of a building. Connections from posts to beams cannot resist appreciable side-to-side forces; it is much more important to strengthen around the perimeter of a building (bracing the cripple-walls and supplementing foundation-to-wood-framing connections) than it is to reinforce post-to-beam connections.

14.1.3 Advanced Practices in construction field in Modern Material, Techniques and Equipments

Advanced Material

1. Air Cleaning Bricks :- Indoor air quality (IAQ) is becoming a more important concern for commercial real estate as we gain a better understanding of how built environments affects the health of those who live and work in them. There is no shortage of ways to improve IAQ, but most of them require active energy use to filter the air. That approach emits more carbon and other pollutants into the air over the long term.

2. Strand Rods:- In Japan, where earthquakes are an unfortunate fact of life, the Komatsu Seiten Fabric Laboratory has covered its head office in a thermoplastic carbon fiber composite that it calls **CABKOMA Strand Rod.** The composite is covered in inorganic and synthetic fibers and a finish of thermoplastic resin, using tensile strength to create the world's lightest seismic reinforcement system.

- The rods are up to five times lighter than metal wire of the same strength are make for a surprisingly attractive motif. They're also quite effective – the building is rated well above the conventional performance requirements for seismic reinforcement.

3. **Passive Cooling Ceramics :-**Air conditioning is an energy-intensive process that accounts for an outsized portion of global carbon emissions. Passive cooling methods have been used for centuries, but most are ineffective when it's very hot outside and many conflict with, rather than support, artificial cooling.

- Our bodies sweat to cool us down. When our skin is wet, heat transfers into the water, and the hottest water particles evaporate, taking the heat away with them. This material functions in the same way. Water collects in the hydrogel droplets that are embedded in the clay composite. As the building heats up, heat is transferred to the water and then lost to evaporation. This effect happens much faster when it is hotter, meaning the system is also responsive to temperature conditions.

4. Trash :-Yes, trash. Architects and builders on the cutting edge of the environmental movement are using recycled materials like scrap metal, cardboard, and even plastic bottles to create new buildings with smaller carbon footprints.

- Recycled cardboard, for example, is being used to create high-quality cellulose insulation that outperforms insulation made with traditional processes. UltraCell Insulation makes use of a wet process, as opposed to older dry processes that result in contamination and dusty products.
- Plastic soda and water bottles have always been recycled, but generally, they can only be used to create new bottles a few times before they need to be disposed of. In the last few decades, plastic bottles have increasingly found new, longer life in the form

of PET (polyethylene terephthalate) carpets. The PET in bottles is ideal for making soft, fibrous carpets, and when it reaches the end of its life as a carpet it can be used again in car parts, stuffing, and insulation.

- On New York City's Governors Island, a competition was held recently to see how design can be used to tackle environmental problems. The result was a fascinating mix of art and sustainable design. The five-member Team Aesop laid out five tons of clay to dry, resulting in large, organic cracks. These were then filled with melted-down aluminum cans from a local recycling center to create pavilion panels that are strong, lightweight, and naturally attractive.

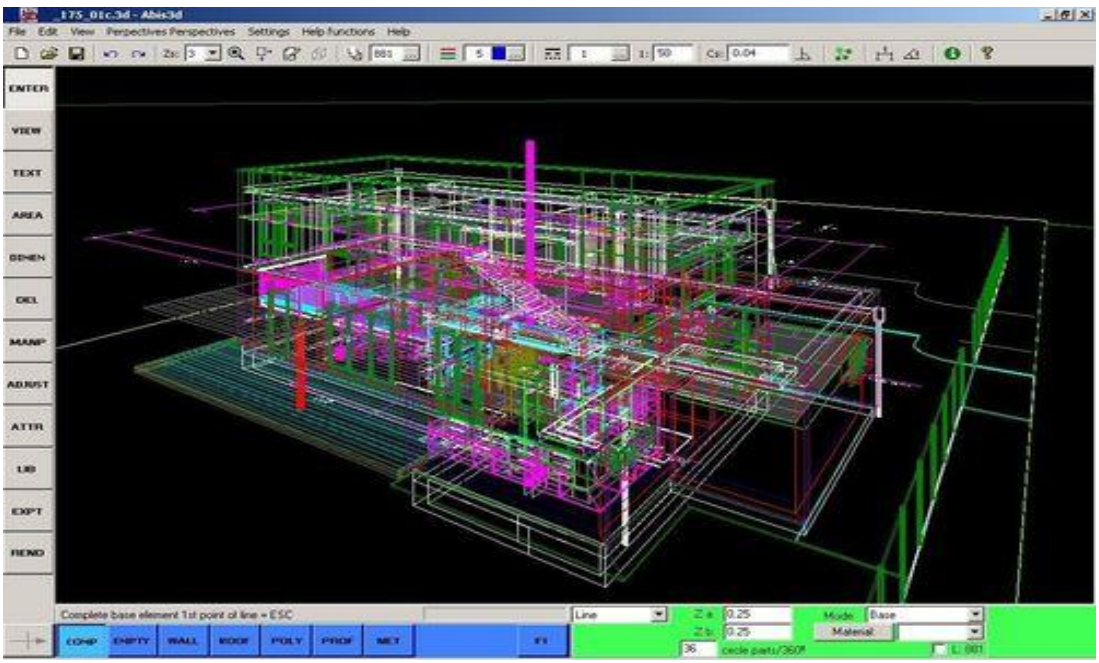
Advanced Techniques

1. **Cladding system :-** The term 'cladding' refers to components that are attached to the primary structure of a building to form non-structural, external surfaces. This is as opposed to buildings in which the external surfaces are formed by structural elements, such as masonry walls, or applied surfaces such as render.

- Building Safety Fund for the remediation of non-ACM Cladding Systems (England only) Registration prospectus, published by MHCLG in May 2020 suggests that: 'A cladding system includes the components that are attached to the primary structure of a building to form a non-structural external surface. The cladding system includes the weather-exposed outer layer or 'screen, fillers. Insulation, membranes, brackets, cavity barriers, flashing, fixings, gaskets and sealants.'
- Whilst cladding is generally attached to the structure of the building, it typically does not contribute to its stability. However, cladding does play a structural role, transferring wind loads, impact loads, snow loads and its own self-weight back to the structural framework.

Cladding for building

2. **Computer aided manufacturing :-** The combination of computer aided draughtingand computer aided manufacturing (CAM) has allowed computer numerical control (CNC) of highly-automated end-to-end component design and manufacture. Computers can produce files that translate design information into commands to operate machines, singularly or collectively, to perform pre-set sequences of tasks in the production of building components.



Computer aided manufacturing

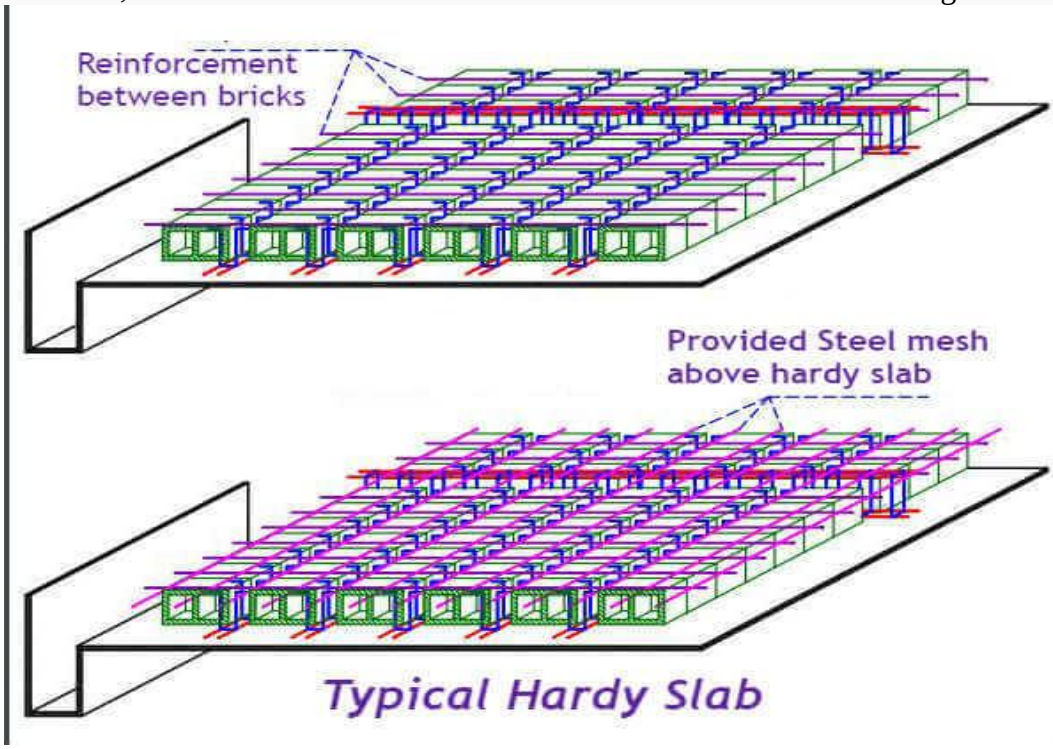
3. **Hybrid Concrete Building Technique :**-Hybrid concrete construction is a method of construction which integrates precast concrete and cast in-situ concrete to make best advantage of their different inherent qualities. The accuracy, speed and high-quality finish of precast components can be combined with the economy and flexibility of cast in-situ concrete.

- Hybrid concrete construction produces simple, buildable and competitive structures. The client is given better value and the contractor benefits from increased off-site component manufacture, safe and faster construction and consistent performance.
- A high proportion of the work for a hybrid concrete construction project is carried out in the precast factory. On site, the use of hybrid concrete construction helps ensure that each safety plan is drafted on the individual project's merits.
- Hybrid concrete construction can reduce the potential for accidents by providing successive work platforms on a generally less cluttered site.
- A high proportion of the work for a hybrid concrete construction project is carried out in the precast factory. On site, the use of hybrid concrete construction helps ensure that each safety plan is drafted on the individual project's merits. Hybrid concrete construction can reduce the potential for accidents by providing successive work platforms on a generally less cluttered site.

4. **Precast Flat Panel Modules**:- These are primarily wall and floor modules which are manufactured away from the actual site and then transported to site for erection. Load bearing components like decorative cladding and insulation panels can also be produced.

5. **Flat Slabbing Technology :-**This technique utilizes the simplicity of contemporary formwork for quickly building flat slabs to facilitate easy and swift placing of horizontal amenities and for partitioning.

- Maximization of pre-fabricated services occurs as services can be carried out in an uninterrupted manner in zones underneath the floor slabs.
- Every top-notch **building Construction Company** is using the same as internal layouts can be conveniently modified for accommodating alterations at a later date. Further, reinforcement needed is lesser which cuts down labour costs significantly.



flat slab techniques

6. Insulating Concrete Formwork (ICF) Technique:-ICF technique employs polystyrene blocks that feature twin walls and can be rapidly put together for creating building wall formwork. The formwork is then pumped in with high quality, ready mixed, factory-made concrete.

- The building construction process becomes fool-proof and the resultant structure has a high level of sound and thermal insulation.
- Building construction methods have matured significantly with advancement in technologies underlying them. Resourceful builders are taking recourse to these methods to help you optimize your investment.
- Structures developed with these methods offer unparalleled cost competitiveness, quality assurance and superiority of final outcome.

Insulating Concrete Formwork (ICF) Technique

Advanced Equipment :

- ***Construction Equipment*** is a trade publication and web site serving the information needs of construction contractors, materials producers, and other owners and operators of construction equipment.
- There are many equipment used in construction some are discuss below

1. Bulldozer :- A **bulldozer** or **dozer** (also called a **crawler**) is a large, motorized machine that travels on continuous tracks or large tires and is equipped with a metal blade to the front for pushing material: soil, sand, snow, rubble, or rock during construction or conversion work. When needed, a hook-like device (termed a ripper) can be mounted on the rear to loosen dense materials.

- Bulldozers can be found on a wide range of sites, mines and quarries, military bases, heavy industry factories, engineering projects, and farms.
- bulldozers are large and powerful tracked heavy equipment. The tracks give them excellent ground-holding capability and mobility through very rough terrain. Wide tracks help distribute the bulldozer's weight over a large area (decreasing ground

pressure), thus preventing it from sinking in sandy or muddy ground. Extra-wide tracks are known as swamp tracks or low ground pressure (lgp) tracks. Bulldozers have transmission systems designed to take advantage of the track system and provide excellent tractive force.

- Because of these attributes, bulldozers are often used in road building, construction, mining, forestry, land clearing, infrastructure development, and any other projects requiring highly mobile, powerful, and stable earth-moving equipment.

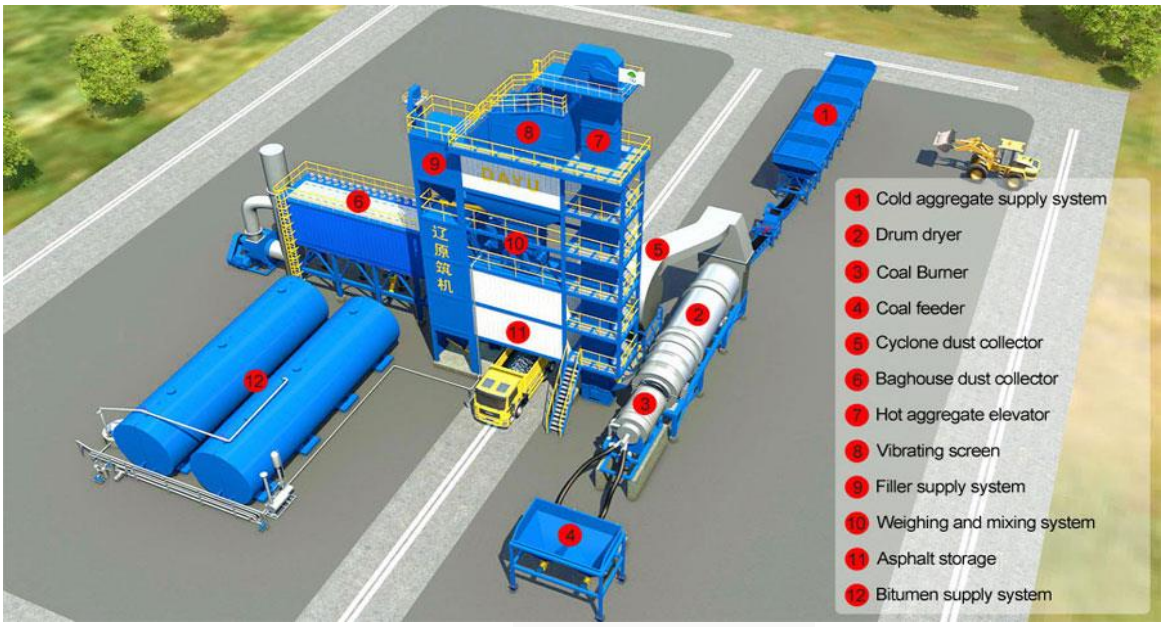

wheeledbulldozerTracked bulldozer

2. **Road Roller :-**A **road roller** (sometimes called a **roller-compactor**, or just **roller**) is a compactor-type engineering vehicle used to compact soil, gravel, concrete, or asphalt in the construction of roads and foundations. Similar rollers are used also at landfills or in agriculture.
   - The effectiveness of a roller depends to a large extent on its weight, self-powered vehicles replaced horse-drawn rollers from the mid-19th century. The first such vehicles were steam rollers. Single-cylinder steam rollers were generally used for base compaction and run with high engine revs with low gearing to promote bounce and vibration from the crankshaft through to the rolls in much the same way as a vibrating roller.
   - Road rollers use the weight of the vehicle to compress the surface being rolled (static) or use mechanical advantage (vibrating). Initial compaction of the substrate on a road project is done using a padfoot drum roller, which achieves higher compaction density due to the pads having less surface area.
   - The next machine is usually a single smooth drum compactor that compacts the high spots down until the soil is smooth. This is usually done in combination with a motor grader to obtain a level surface. Sometimes at this stage a pneumatic tyre roller is be used.

Road roller

3. **Asphalt mixing plant :-**An **asphalt plant** is a plant used for the manufacture of asphalt, macadam and other forms of coated roadstone, sometimes collectively known as blacktop or asphalt concrete.

- The manufacture of coated roadstone demands the combination of a number of aggregates, sand and a filler (such as stone dust), in the correct proportions, heated, and finally coated with a binder, usually bitumen based or, in some cases tar, although tar was removed from BS4987 in 2001 and is not referred to in BSEN 13108/1.
- The temperature of the finished product must be sufficient to be workable after transport to the final destination. A temperature in the range of 100 to 200 degrees Celsius is normal.
- The asphalt plant is mainly composed of cold aggregate supply system, drum dryer, coal burner, coal feeder, dust collector, hot aggregate elevator, vibrating screen, filler supply system, weighing and mixing system, asphalt storage, bitumen supply system. All these components have characteristics that impact not only the overall quality of the asphalt but also the effect on the environment.



Asphalt Mixing Plant

14.1.4 Engineering Aspects of Soil mechanics-Environmental Impact Assessment

- Soil consists of a multiphase aggregation of solid particles, water, and air. This fundamental composition gives rise to unique engineering properties, and the description of its mechanical behavior requires some of the most classic principles of engineering mechanics.
- **Soil mechanics** is a branch of soil physics and applied mechanics that describes the behavior of soils. It differs from fluid mechanics and solid mechanics in the sense that soils consist of a heterogeneous mixture of fluids (usually air and water) and particles (usually clay, silt, sand, and gravel) but soil may also contain organic solids and other matter.
- Along with rock mechanics, soil mechanics provides the theoretical basis for analysis in geotechnical engineering,[5] a subdiscipline of civil engineering, and engineering geology, a subdiscipline of geology.
- Soil mechanics is used to analyze the deformations of and flow of fluids within natural and man-made structures that are supported on or made of soil, or structures that are buried in soils.
- Some important index that shows strength of soil

1. Liquidity index :- The effects of the water content on the strength of saturated remolded soils can be quantified by the use of the *liquidity index, L*

$$LI = (w-PL)/(LL-PL)$$

- When the LI is 1, remolded soil is at the liquid limit and it has an undrained shear strength of about 2 kPa. When the soil is at the plastic limit, the LI is 0 and the undrained shear strength is about 200 kPa.

2. **R**elative density :- The density of sands (cohesionless soils) is often characterized by the relative density,

$$D_r = (e_{max} - e)/(e_{max} - e_{min})$$

- where: e_{max} is the "maximum void ratio" corresponding to a very loose state, e_{min} is the "minimum void ratio" corresponding to a very dense state and e is the *in situ* void ratio. Methods used to calculate relative density are defined in ASTM D4254-00(2006).
- Thus if D_r = 100% the sand or gravel is very dense, and if D_r= 0% the soil is extremely loose and unstable.

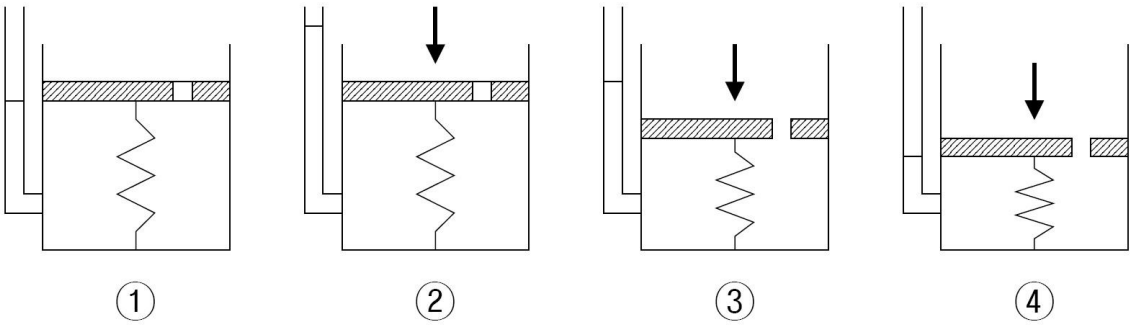
- **CONSOLODATION OF SOIL**

Consolidation is a process by which soils decrease in volume. It occurs when stress is applied to a soil that causes the soil particles to pack together more tightly, therefore reducing volume. When this occurs in a soil that is saturated with water, water will be squeezed out of the soil. The time required to squeeze the water out of a thick deposit of clayey soil layer might be years. For a layer of sand, the water may be squeezed out in a matter of seconds.

A building foundation or construction of a new embankment will cause the soil below to consolidate and this will cause settlement which in turn may cause distress to the building or embankment. Karl Terzaghi developed the theory of one-dimensional consolidation which enables prediction of the amount of settlement and the time required for the settlement to occur. Afterwards, Maurice Biot fully developed the three-dimensional soil consolidation theory, extending the one-dimensional model previously developed by Terzaghi to more general hypotheses and introducing the set of basic equations of Poroelasticity.[7] Soils are tested with an oedometer test to determine their compression index and coefficient of consolidation.

When stress is removed from a consolidated soil, the soil will rebound, drawing water back into the pores and regaining some of the volume it had lost in the consolidation process. If the stress is reapplied, the soil will re-consolidate again along a recompression curve, defined by the recompression index. Soil that has been consolidated to a large pressure and has been subsequently unloaded is considered to be *overconsolidated*.

The maximum past vertical effective stress is termed the *preconsolidation stress*. A soil which is currently experiencing the maximum past vertical effective stress is said to be *normally consolidated*. The *overconsolidation ratio*, (OCR) is the ratio of the maximum past vertical effective stress to the current vertical effective stress. The OCR is significant for two reasons: firstly, because the compressibility of normally consolidated soil is significantly larger than that for overconsolidated soil, and secondly, the shear behavior and dilatancy of clayey soil are related to the OCR through critical state soil mechanics; highly overconsolidated clayey soils are dilatant, while normally consolidated soils tend to be contractive.



consolidation Analog

- Consolidation analogy. The piston is supported by water underneath and a spring. When a load is applied to the piston, water pressure increases to support the load. As the water slowly leaks through the small hole, the load is transferred from the water pressure to the spring force.

- **Environmental Impact Assessment :- Environmental Impact Assessment (EIA) is a process of evaluating the likely environmental impacts of a**

proposed project or development, taking into account inter-related socio-economic, cultural and human-health impacts, both beneficial and adverse.

- The purpose of the Environmental Impact Assessment study is to establish existing baseline conditions in the project area and to proactively assess the potential impacts and associated impacts of the proposed project on the project area
- The International Association for Impact Assessment (IAIA) defines an environmental impact assessment as "the process of identifying, predicting, evaluating and mitigating the biophysical, social, and other relevant effects of development proposals prior to major decisions being taken and commitments made"
- EIAs are unique in that they do not require adherence to a predetermined environmental outcome, but rather they require decision makers to account for environmental values in their decisions and to justify those decisions in light of detailed environmental studies and public comments on the potential environmental impacts.

The main objectives of the EIA are :-

1. Establish the existing bio-geo-physical and socio-economic conditions of the project area.
2. Identify the resultant impacts (positive and negative) associated with the installation and operation of the project.
3. Make recommendations to eliminate/mitigate/control the magnitude and significance of the identified impacts.
4. Recommend plan and procedures to manage the consequences and
5. To integrate the views and opinions of stakeholders, National and International environmental regulations, codes and conventions relevant to the proposed dam activities into the final project design from the EIA report Review.

Procedure for Environmental Impact Assessment of Construction Projects:

1. Literature review

This will involve extensive study of existing literature particularly, from reports of previous EIA or Environmental studies (if any) and other relevant studies on the environmental characteristics of the project area. Fieldwork activities/Laboratory analysis shall also be carried out to augment data gathered from desktop review.

2. Environmental Impact Assessment Process

This shall involve impact identification, prediction and evaluation. Impact evaluation will be carried out using a methodology that is applicable, specific and quantifiable, while the overall assessment will be carried out through established matrix/methods. A method that defines numerically the degree of interdependence of the various environmental parameters shall be considered. The 1-4 rating will be assigned to characterize the interrelationship by panel of

experts. The impact evaluation results shall form the basis for developing the Environmental Management Plan for the proposed project.

3. Environmental Impact Assessment Report

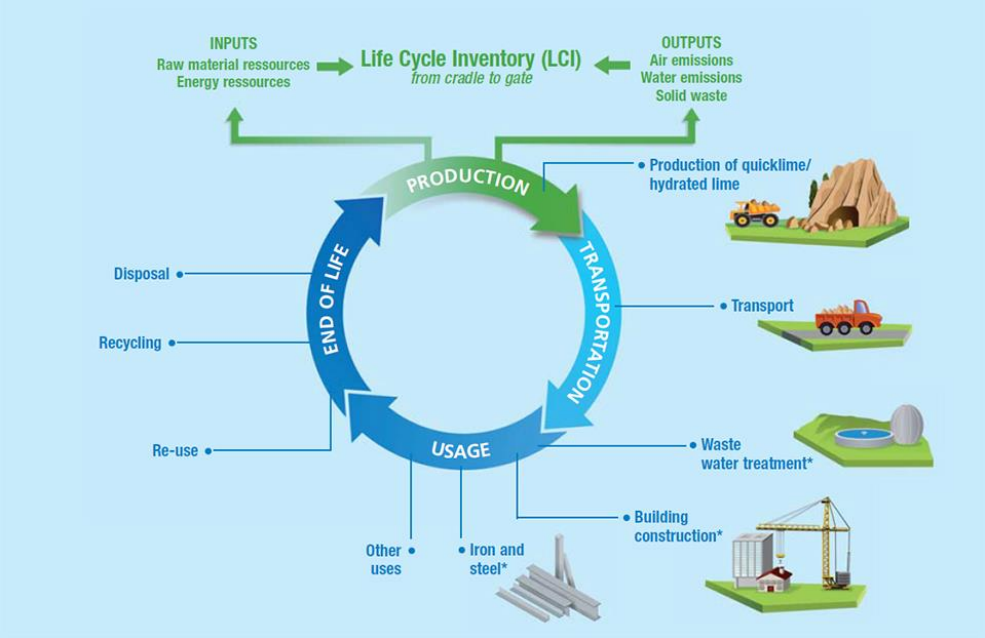
There shall be a documentation of the EIA findings in a report format as specified in the EIA procedural guidelines (FEPA, 1995) A typical process of studies is outlined below:

Preliminary Activities		Terms of Reference
		Project Initiation
		Literature/Workshop Studies
		Preliminary Assessment
		Field Strategy
Fieldwork		Terms of Reference
		Sampling & Data Collection (Soil, Water and Air)
		(Climate, Bio-diversity, Waste management, etc)
Analysis & Interpretation	Quality Control	Laboratory Studies
		Data Management Interpretation
Fieldwork		Internal Review Meetings
		Report Preparation & Production
		Submission of Report

Environmental Management Plan (EMP)

A robust Environmental Management Plan, with clearly specified guidelines for ensuring conformance of project implementation with procedure, practices and recommendations, shall be part of the EIA reports. The guidelines shall as a minimum include the following:

1. Guidelines for ensuring conformity of detailed design with concept design
2. Guidelines for implementation program
3. Guidelines by which objectives and commitments will be achieved.
4. Guidelines for responsibilities and accountabilities.
5. Guidelines for procedures for dealing with changes and modification of project
6. Guidelines for corrective action which will be employed should the need arise.
7. Guidelines for inspection, auditing and monitoring of all phases of project
8. Guidelines for decommissioning and abandonment of project.



Environmental Impact Assessment

14.1.5 Water supply –sewage system – waste water –sustainable development

- **Water supply :-**In the construction project, the need for building materials, products, labor, water, and identify the availability and possibilities of water supply sources. The priority task of the water supply project for the construction site is to determine the category of consumers, the quantity and mode of water consumption, and the requirements of individual consumers for water quality.
- Water at the construction site is intended for the following purposes: household and drinking needs of workers and the population of workers' settlements at the construction site; technological needs of construction; fire extinguishing needs.
- On construction sites with a short construction period, they use mobile car-dining rooms for 28 seats, equipped with a washbasin for two sinks. The water consumption in them is assumed to be 10 ... 15 liters per one dinner.
- According to the sanitary characteristics of production processes, construction sites can be assigned to a group of production processes 16 - causing contamination of clothing and hands. In accordance with the requirements of sanitary standards, a dressing room, a washroom and a shower room must be installed on the construction site. The shower is projected at the rate of one shower for 20 people using a shower. The water consumption is 500 liters per one shower box.
- In the production of earthen and pile works, water is used to ensure the normal operation of earth-moving machines equipped with internal combustion engines in the amount of 10 ... 15 liters per 1 mash/cm.

- In the production of concrete work, water is used for washing concrete aggregates at the rate of 0.5 ... 1 m3 per 1 m3 of crushed stone or gravel and 1.25 ... 1.5 m3 per 1 m3 of sand.
- Water used for cooling internal combustion engines and compressor equipment should have the least possible rigidity (not more than 4.5 ... 5 mg • eq/l) and turbidity (not more than 20 ... 25 mg/l). To feed steam boilers of temporary power plants, water with a hardness of not more than 3.5 mg • eq/l and a dissolved oxygen content of not more than 1 ... 2 mg/l can be used.
- If city water cannot file the required amount of water on the construction site, then it takes the water only for drinking purposes. Water for technological purposes is supplied from the nearest surface sources.
- Mobile pumping stations and small capacity stations located on pontoons, stilts or on reinforced concrete slabs are used for temporary water intake structures.

mobile water supply **Temporary water supply**

- **Sewage system :-Sewerage** (the sewer system), is the underground networks of pipes that carries sewage (waste water and excrement), waste water and surface water run-off, from buildings to treatment facilities or disposal points.
- A sewer is; 'A pipe or channel taking domestic foul and/or surface water from buildings and associated path and hard standing from two or more cartilages and having proper outfall'
- There are a number of ways of moving the contents of sewers:
  1. Gravity sewers use differing elevations to facilitate movement.
  2. Force mains use pumps where sewers are at a lower elevation than the destination.
  3. Vacuum sewers use differential atmospheric pressure

- A **sewerage** undertaker is: 'A collective term relating to the statutory undertaking of water companies that are responsible for **sewerage** and sewage disposal, including surface water from roofs and yards of premises.'

Sewage pipe line

- A drain is a pipe that serves only one building, conveying water and waste water to a sewer. A lateral drain is a section of drain positioned outside the boundary of a building, connecting with the drains from other buildings to become a sewer.
- Combined Sewer Overflow (CSO) is: 'A structure on a combined or partially separate sewer system that allows the discharge of flow in excess of that which the sewer is designed to carry, usually to a receiving surface water body.

❖ **Waste water :-**An important part of the economic and social development of any country is the **construction sector**. There are major challenges in all phases of projects, in both civil engineering and in building, to **minimise the impact on people and the environment**.

- In the developed world, environmental issues such as the efficient use of resources and their sustainability, the protection of biodiversity, climate change and the risk of accidents have become very important in all areas, including construction.
- A project is understood as a construction or other installations and works, including those devoted to the exploitation of mineral resources. Both public and private projects are subject to a process of *Environmental Impact Assessment* (EIA) and an obligation to establish an *Environmental Management Plan* (EMP), which is a tool accompanying the project at all stages of design, implementation and monitoring.
- Water is a key component of a construction project and is used as part of the fluid for excavation and foundations, as a means of cooling machines (e.g. tunnel boring machines, drilling rigs and cutting machines) and as a means of cleaning.
- In many cases, it also appears as a result of rain and effluent seepage. In any case, it must be properly managed to optimise its consumption and to ensure it does not harm the environment. There are national and local regulations in most countries establishing the properties of water being fed into a public effluent, which place limits on suspended solids (SS), acidity (pH), biological oxygen demand (BOD) and chemical oxygen demand (COD).
- To solve this problem, NIHON KASETSU has developed a simple and effective clarification system to treat construction wastewater.

waste water clarification system

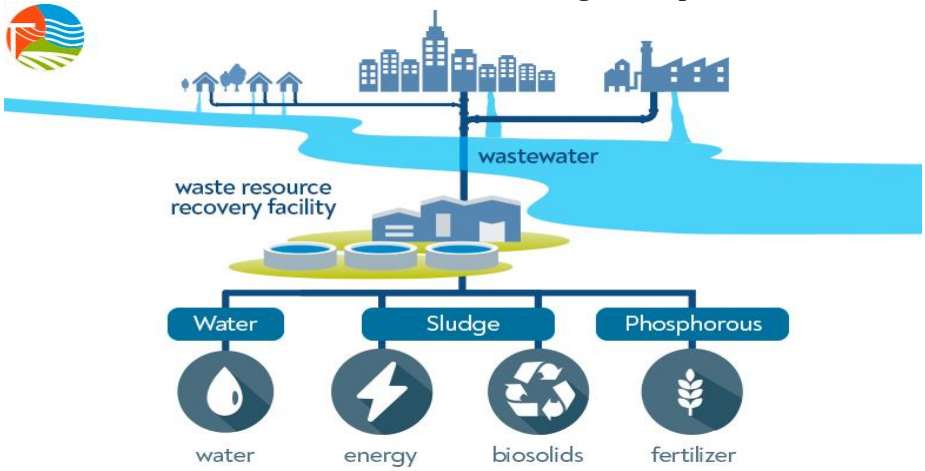
- It is based on using a single chemical additive powder, which acts as a coagulation-flocculation agent, which is largely insensitive to the water pH, so no adjustment is required in most cases. It is an inorganic chemical compound **made from 100% natural substances**, which are safe and non-polluting and are based on mollusc shells, seaweed and minerals.
- It is **safe, easy to handle** and contains no substances harmful to humans or the environment, so the final sludge can be deposited in landfill sites.
- The whole clarification process is extremely efficient and is performed in a **very compact** machine (3.5 x 2 m only), with a **large treatment capacity** (up to 90 m^3/h), and is very easy to transport, install and operate.

❖ **Sustainable development :-**The Sustainable Development Goals (SDGs) are the most recent attempt by the international community to mobilise government, private and non-governmental actors at national, regional and local levels to improve the quality of life of billions of people in the developed and developing worlds. The goals are an ambitious, challenging and much-needed action plan for "people, planet and prosperity" until the year 2030.

- This objective, however, did not take into consideration water quality or wastewater management aspects, which represented a main limitation for its achievement2. This omission has been rectified in the Sustainable Development Goals (SDGs), where one of the goals (SDG 6) calls for clean water and sanitation for all people by ensuring "availability and sustainable management of water and sanitation for all". Among other aspects, it considers improvement of water quality by reducing by half the amount of wastewater that is not treated, and increasing recycling and safe reuse globally.
- This will result in the availability of more clean water for all uses, and on an enormous progress on sanitation and wastewater management. This target unequivocally indicates the close interrelation between clean water, sanitation and wastewater management, giving these two last aspects the importance they deserve. No government of any human settlement irrespective of its size, be it a megacity, mid-size city or large or small town, can provide clean water without concurrently considering sanitation and wastewater management. Clean water is not, and will never

be possible, if wastewater is not collected, treated and disposed properly for the intended uses.

- Worsening water pollution affects both developed and developing countries. In developing countries, it is mostly due to rapid population growth and urbanisation, increased industrial and other economic activities, and intensification and expansion of agriculture, coupled with lack of local and national legal and institutional capacities (managerial, technical, financial, enforcement, etc.) and political and public apathy to improve and maintain water and wastewater management processes in the long-term.



Plan for sustainable use of water

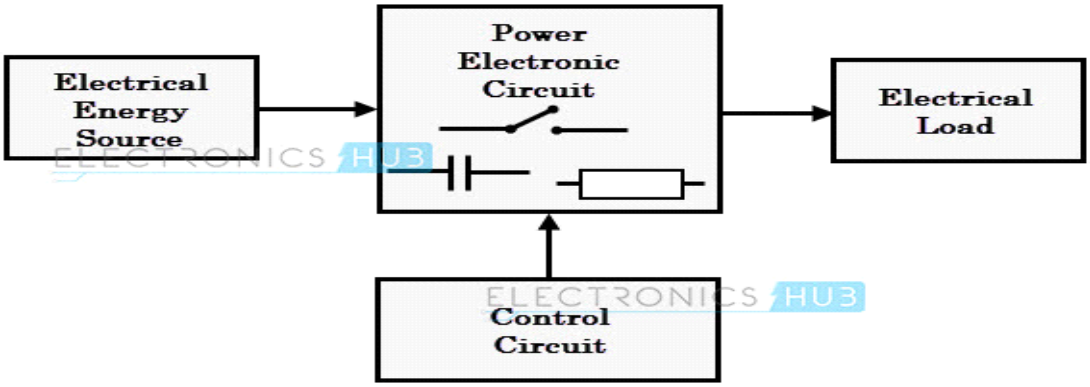
14.2 Electrical Engineering

14.2.1 Design of Power Electronics converters

Introduction of Power Electronics Converters

Power electronic technology deals with processing and controlling the flow of electrical energy in order to supply voltages and currents in a form that optimally suited for end user's requirements.

A power electronic converter uses power electronic components such as SCRs, TRIACs, IGBTs, etc. to control and convert the electric power. The main aim of the converter is to produce conditioning power with respect to a certain application.



The block diagram of a power electronic converter is shown in figure above. It consist of an electrical energy source, power electronic circuit, a control circuit and an electric load. This converter changes one form of electrical energy to other form of electrical energy.
Depending on the type of function performed, power electronic converters are categorized into following types.

- **AC to DC** = Rectifier: It converts AC to unipolar (DC) current
- **DC to AC** = Inverter: It converts DC to AC of desired frequency and voltage
- **DC to DC** = Chopper: It converts constant to variable DC or variable DC to constant DC
- **AC to AC** = Cycloconverter, Matrix converter: It converts AC of desired frequency and/or desired voltage magnitude from a line AC supply.

These types of power electronic converters may be found in a wide variety of applications such as switch mode power supplies (SMPS), electrical machine control, energy storage systems, lighting drives, active power filters, power generation and distribution, renewable energy conversion, flexible AC transmission and embedded technology.

AC to DC Converters or Rectifiers

The control block controls the firing angle of thyristors in case of phase controlled rectifiers. Since the diode is not a controllable device, control block is not needed in case of diode rectifiers.
Rectifiers are majorly classified into two types

- Uncontrolled diode rectifiers
- Controlled rectifiers

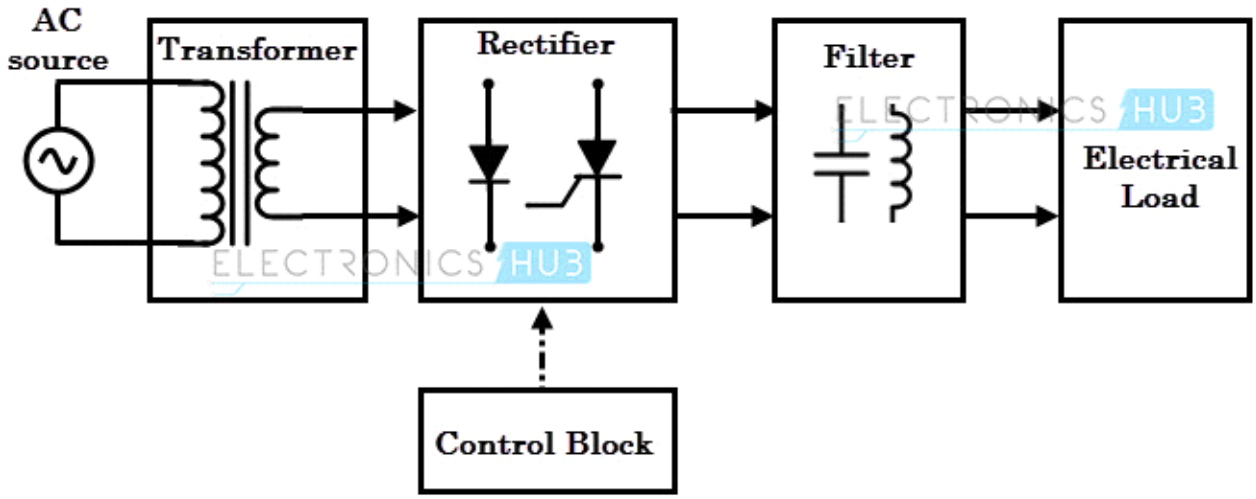
Uncontrolled Diode Rectifiers

This type of rectifier converts AC voltage from mains into a fixed DC voltage.
Since the diodes are uncontrollable components (which do not require any triggering), these converters are called as uncontrolled converters as they produce a fixed voltage. The input voltage can be either single phase or three-phase.

The diode rectifiers are classified into following types.

to DC supply for the load. The block diagram of an AC to DC converter is shown in figure below.

The essential components in this rectifier include transformer, switching unit, filter and a control block.



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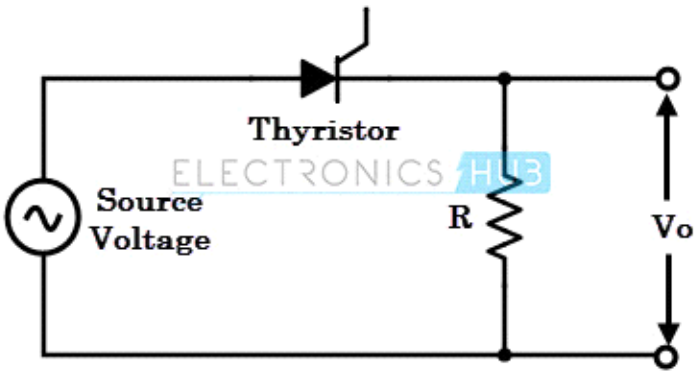
The diode rectifiers are classified into following types.

- Single phase half-wave rectifier
- Single phase center-tapped full-wave rectifier
- Single phase full-wave bridge rectifier
- Three-phase Half-wave diode rectifier
- Three-phase Full -wave diode rectifier

Single phase half-wave rectifier

In this a single thyristor or SCR is connected between the secondary of the transformer and a resistive load as shown in figure. The primary of the transformer is connected to a single phase supply and consider that load is of resistive.



Single phase half wave rectifier

During the positive half cycle of the input AC supply, thyristor T1 is forward biased, and when it is triggered at some firing angle though gate terminal, it starts conducting current to the load.

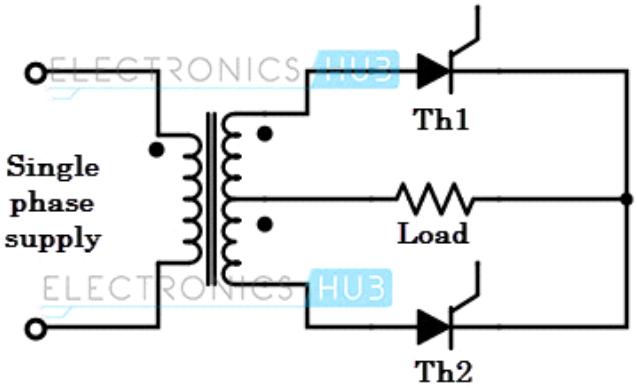
Since the SCR is a unidirectional device, it turns OFF during negative half-cycle. So the output voltage is produced only for positive half cycle.

The output power delivered by this half-wave rectifier is controlled by phase control, i.e., varying firing angle to the gate terminal. The load of this rectifier can be a RL load and RLE load with free wheeling diode.

Single phase full wave mid-point rectifier

This converter rectifies both positive and negative half-cycles of the input supply. It uses two SCRs with center-tapped secondary transformer as shown in figure.

In positive half-cycle of the input supply, thyristor T1 is forward biased while T2 is reverse biased. WhenT1 is triggered, the supply voltage appear across the load.



Singlephase full wave midpoint rectifier

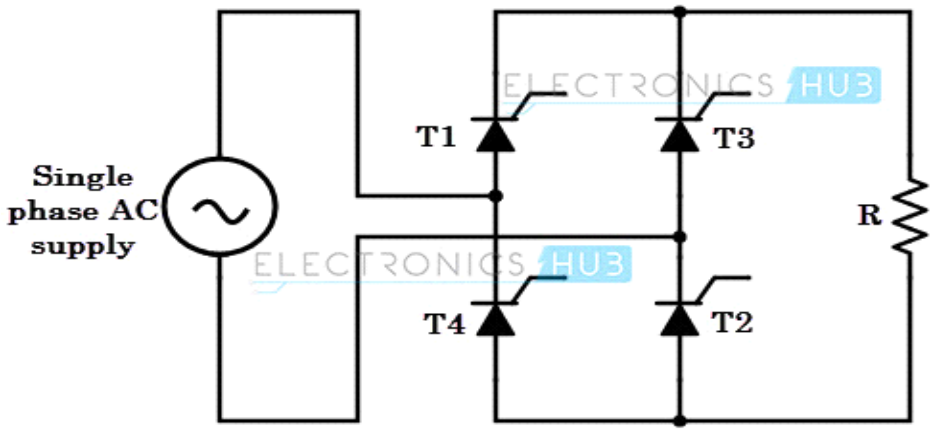
It conducts till 180 degrees of input supply and turns OFF due to natural commutation. During negative half cyle, thyristor T2 is forward biased and when it is triggered, it starts conducting. It conducts till next positive half cycle.

The load could be RL or RLE depending on the type of application it is employed. This type converter produces an output voltage twice that of single phase half-wave rectifier.

These are essential when one of the terminals on DC side has to be grounded. However, a center-tapped transformer with a VA rating twice that of load is required and also high voltage rating thyristors are needed in this converter.

Single phase full wave bridge rectifier

The circuit diagram of a full wave bridge rectifier using thyristors in shown in figure below. It consists of four SCRs which are connected between single phase AC supply and a load.



Single phase full wave bridge rectifier

This rectifier produces controllable DC by varying conduction of all SCRs.

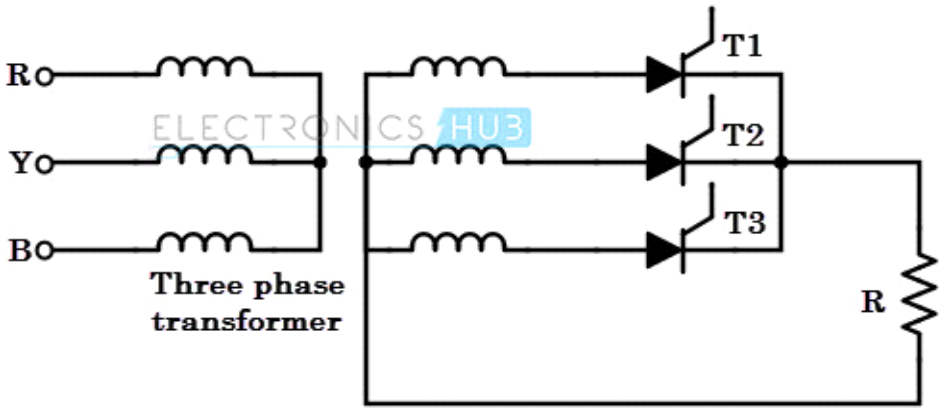
In positive half-cycle of the input, thyristors T1 and T2 are forward biased while T3 and T4 are reverse biased. Thyristors T1 and T2 are triggered simultaneously at some firing angle in the positive half cycle, and T3 and T4 are triggered in the negative half cycle.

The load current starts flowing through them when they are in conduction state. The load for this converter can be RL or RLE depending on the application.

By varying the conduction of each thyristor in the bridge, the average output of this converter gets controlled. The average value of the output voltage is twice that of half-wave rectifier.

Three-phase half-wave converter

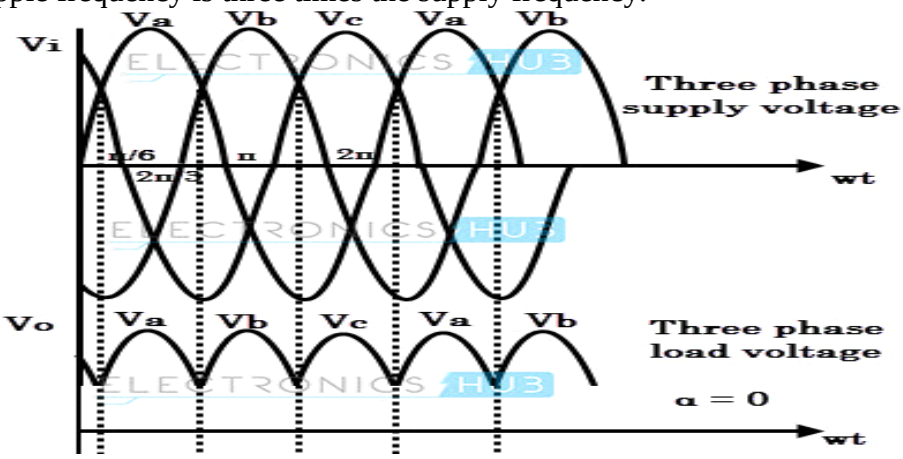
The output from single phase converter is small; when high power is required, three phase rectifiers are used. A three-phase half-wave rectifier with thyristors is shown in figure below. The three-phase supply is given to this converter through a three-phase transformer with star connected secondary.



Three phase half wave rectifire

It works as similar to the three-phase diode bridge rectifier. In this, thyristor T1 is at highest positive anode voltage in the interval $\pi/6$ to $5\pi/6$. During this interval, T1 can be made to conduct by giving a firing pulse to its gate.

This thyristor T1 continues to conduct till thyristor T2 is made to conduct in the interval 5π/6 <wt< 3π/2. Now the load current starts flowing through T2. Similarly, thyristor T3 is starts conducting once thyristor T2 is turned OFF.
In this, there are three pulses of output voltage during each complete cycle of supply voltage. Thus the ripple frequency is three times the supply frequency.

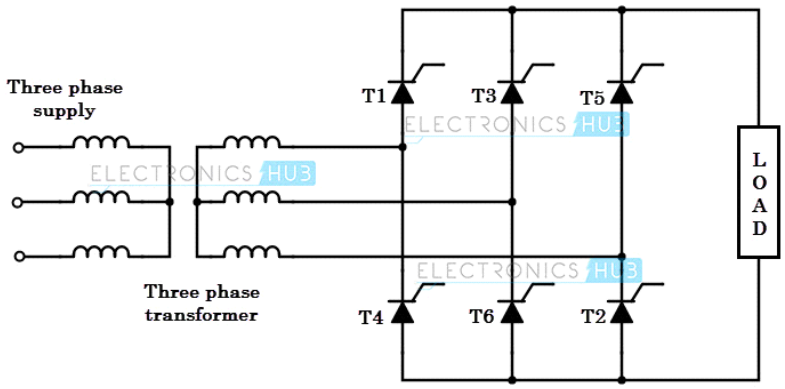


Wave form of three phase half wave rectifier

For this reason, this converter is also called as 3-pulse converter. This converter can be connected to different loads such as RL and RLE loads.

Three-phase full wave converter

It is obtained by connecting a DC terminal of two three-pulse converters in series. It is also called as 6-pulse bridge converter. This type converter is used in industrial applications where two-quadrant operation is required.
Here the load is connected via a three-phase half wave connection to one of three supply lines. Thus, there is no need of transformer; however, for isolation purpose a transformer is connected as shown in figure.
Here thyristors T1, T3 and T5 forms a positive group, whereas thyristors T4, T6 and T2 forms a negative group. And thus positive group SCRs are turned ON for positive supply voltage and negative group thyristors are turned ON for negative supply voltages.
In this, one of the thyristors from positive, whose anode voltage is maximum positive will conduct at any instant and simultaneously one of the thyristors from negative group, whose cathode voltage is maximum negative will conduct.
This converter can be connected to RL or RLE loads. By controlling the firing angle to respective thyristor, average power delivered to the load is changed.

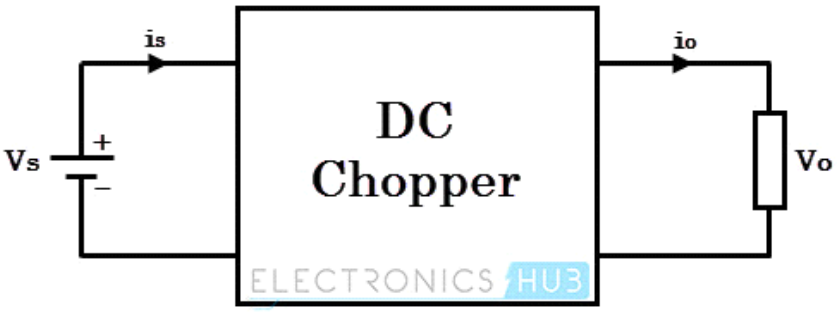


Three phase full wave rectifier

The firing angle of particular thyristor in positive group measured from the instant when its anode becomes maximum positive.
Similarly, the firing angle for a thyristor in negative group is measured from the instant when its cathode terminal attains a maximum negative value.

DC to DC Converters

Many DC operated applications need different levels of DC voltage from a fixed DC source. Some of these applications include subway cars, DC traction systems, control of large DC motors, battery operated vehicles, trolley buses, etc. They require variable DC to produce variable speed, so a power conversion device is needed.
A DC chopper is a static device that converts a fixed input DC voltage to variable DC output or a fixed DC output of different magnitude (which can be lower or higher) than input value. The block diagram of a DC chopper is shown in figure below.
The chopper circuit is connected between DC input source and DC load. This chopper consists of power electronic switching devices such as thyristors which are connected in such a way that they produce required DC voltage to the load.
The output voltage is controlled by adjusting ON time of the thyristor (or switch) which turn changes the width of DC voltage pulse at the output. This method of switching is called as pulse width modulation (PWM) control.

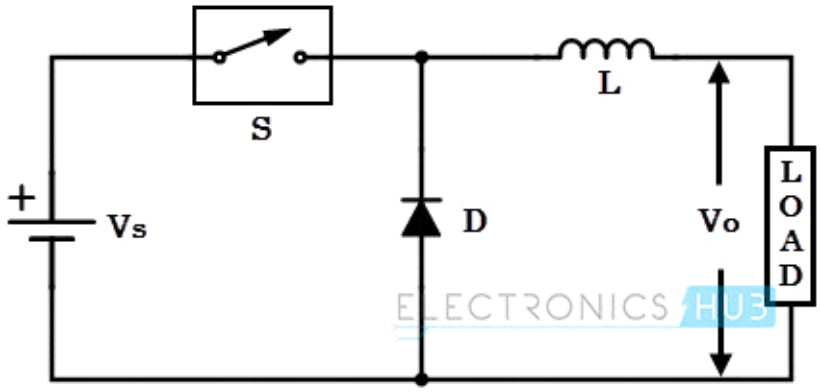


DC to DC chopper

The output of the chopper can be less or greater than the input and also it can be fixed or variable. These can be unidirectional or bidirectional devices based on the application it is intended for.
DC choppers are mainly used in DC drives, i.e., electric vehicles and hybrid electric vehicles.
DC choppers are classified into three basic types based on input and output voltage levels and are discussed below.

Step-down Chopper or Buck converter

A step-down chopper produces an average output voltage lower than the input DC voltage. The circuit for this converter is shown in figure below.
Here the switching component is a thyristor that switches the input voltage to the load when it is triggered at particular instants.
A diode acts as a freewheeling diode that allows the load current to flow through it when thyristor is turned OFF. If this diode is absent, a high induced EMF in inductance may cause damage to the switching device.



Step down chopper

The average output voltage of the converter is varied by controlling turn ON/OFF periods of thyristor. When thyristor is turned ON, the output voltage is same as the input voltage and if it is turned OFF, the output voltage is zero.

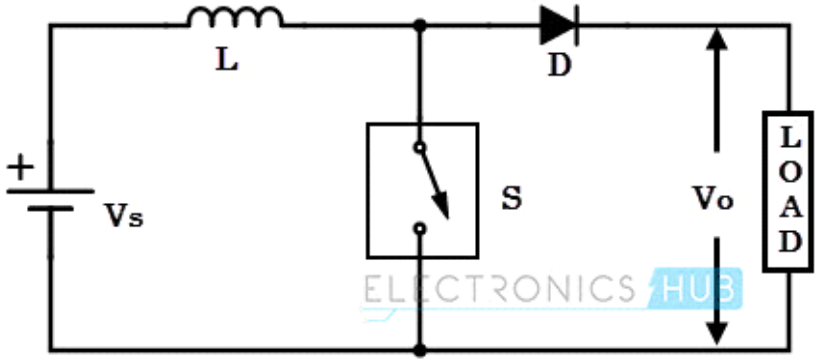
The output voltage is equal to (TON / T) Vin. So, by controlling the duty ratio K = (TON / T), the output voltage will be increased.

Step-up Chopper or Boost converter

In this chopper, the output voltage is always greater than input voltage. The configuration of a boost converter is shown in figure below.

Here also a switch is used, which is connected in parallel with the load. This switch is a thyristor or an SCR.

As similar to the buck converter, a diode is placed in series with the load that allows the load current to flow when the thyristor is turned OFF.



Step up chopper

When the thyristor is turned ON, the diode is reverse-biased and hence it isolates the load circuit from the source. So the inductor charges to the maximum input voltage source.

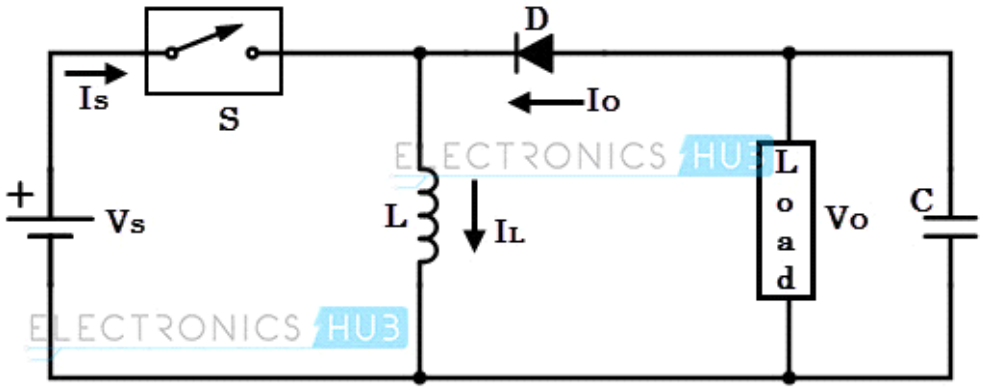
When the thyristor is turned OFF, the load gets the voltage from input as well as from inductor. So the voltage appearing across the converter output will be more than the input.

Here the output voltage is equal to (1/ 1 – d) times the input voltage, where d is the duty ratio (TON / T). By varying this duty ratio, the output voltage will be varied till the load gets desired voltage.

Buck/Boost converter

This chopper can be used both in step-down and step-up modes by continuously adjusting its duty cycle. The configuration of buck-boost converter is shown in figure below that consists of only one switching device, i.e., one thyristor.

Along with an inductor and diode, additional capacitor is connected in parallel with this circuit.



Buck boost converter

When the thyristor is turned ON, the supply current flows to the inductor through the thyristor and induces the voltage in inductor.

When the thyristor is OFF, the current in the inductor tends to decrease with the induced emf reversing polarity. The output voltage of this converter remains constant as capacitor is connected across the load.

By varying the value of duty ratio to a certain value, the output voltage is lower than the input voltage, typically in the range $0 \geq k > 0.5$, thus a buck converter.

And the output is higher than the input voltage if the duty ratio is in the range of $0.5 > K \geq 1$, thus acts as a boost converter.

AC to AC Converters

AC/AC converters connect an AC source to AC loads by controlling amount of power supplied to the load. This converter converts the AC voltage at one level to the other by varying its magnitude as well as frequency of the supply voltage.

These are used in different types of applications including uninterrupted power supplies, high power AC to AC transmission, adjustable speed drives, renewable energy conversion systems and aircraft converter systems.

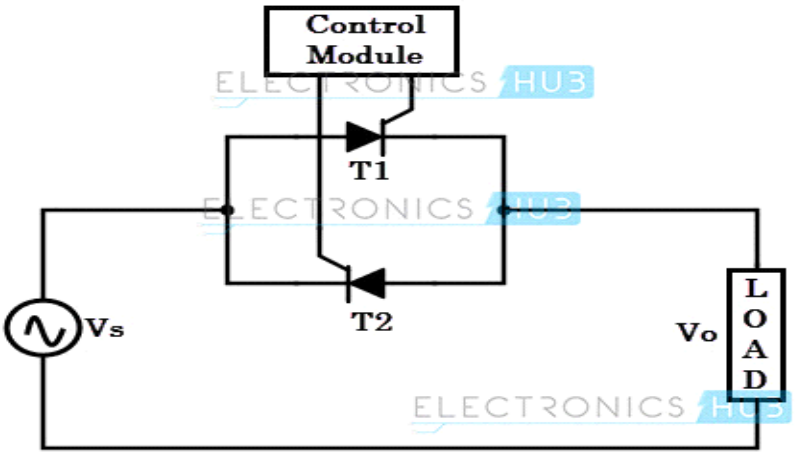
The types of AC to AC converters are discussed below.

AC/AC Voltage Converters

These converters control the rms value of output voltage at a constant frequency. The common application of these converters includes starting of AC motors and controlling power to heaters.

A single phase AC/AC voltage converter consists of a pair of anti-parallel thyristors along with a control circuit as shown in figure below.

The other names of this controller are single phase full wave converter and AC voltage controller.



AC/AC Voltage converter

During positive half cycle of the input signal, thyristor-1 is forward biased and it starts conducting, when the triggering is applied. Thus the power flows from source to load.

In negative half cycle of the input, thyristor-2 is forward biased and starts conducting when it is triggered, while thyristor-1 is turned OFF by natural commutation.

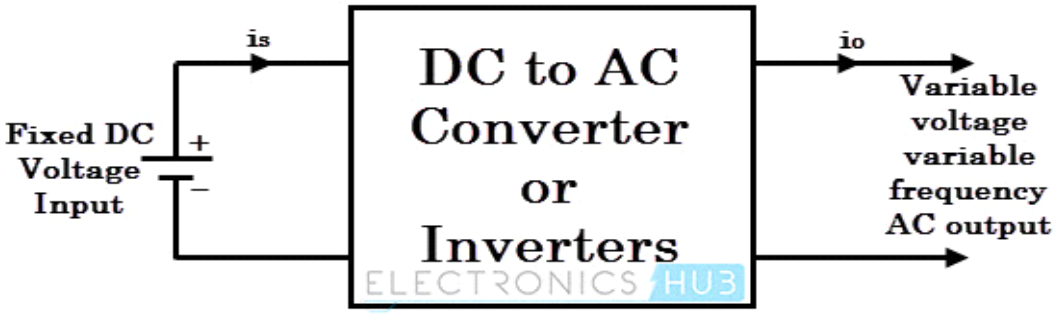
By varying the triggering or conduction angel of each thyristor during each half-cycle, the magnitude of voltage appeared across the load is controlled.

The other popular form of AC voltage controller is the use of TRIAC in place of two anti-parallel thyristors. The figure below shows TRIAC based AC controller along with triggering control circuit.

Here diac controls the positive and negative triggering to the TRIAC so that average output voltage to the load is controlled.

DC to AC Converters or Inverters

These converters are connected between DC source of fixed input, and variable AC load. Most commonly, these DC to AC converters are called as inverters. An inverter is a static device that converts fixed DC supply voltage to variable AC voltage.



20 DC to AC converter

Here the fixed DC voltage is obtained from batteries or by DC link in most power electronic converter. The output of the inverter can be variable/ fixed AC voltage with variable/fixed frequency.

This conversion from DC to AC along with variable supply is produced by varying the triggering angle to the thyristors. Most of the thyristors used in inverters are employed with forced commutation technique.

These can be single phase or three phase inverter depending on the supply voltage. These converters are mainly divided into two groups. One is PWM based inverters and other multilevel inverters.
Further, these are classified voltage source inverter and current source inverter. Each type is subdivided into different types such as PWM, SVPWM, etc. Multilevel inverters are more popular in industrial applications.
The inverters overcome the drawbacks of PWM based inverters.

14.2.2 Electronic Soft Starter for 1/3 Phase Motor for Agriculture

INTRODUCTION

The ac motor starters are increasingly becoming popular due to its controlled soft-starting capability. The ac motor starter provides limited starting current and hence conventional electromagnetic line starters and reduced-voltage starters are replaced with ac motor starters. Thyristor-based soft starters have many desirable properties and provide a viable solution to starting problems in three phase induction motors. These power semiconductor based starters are cheap, simple, and reliable and occupies less volume. The power density of these soft starters is also very high. A three phase induction motor produces electromagnetic torque on its shaft but initial switching instants of all three phases to the supply produces pulsations on the electromechanical torque when it is controlled by a direct-online starter. These severe pulsations in electromagnetic torque might cause shocks to the shaft and hence to the driven equipment. These pulsations might damage mechanical system components, such as shafts, couplings and gears etc. The electromagnetic torque pulsations also causes long term effects on various mechanical system components if the strength of materials is exceeded which might lead to fatigue also.

The reduced voltage starting by soft starters eliminates stress from the electrical supply and it also reduces the possibility of voltage dip and brown out conditions. Soft and smooth starters provide smooth acceleration of rotor of three phase induction motor. Reduced voltage starting reduces high amount of starting torque applied on the shaft and therefore eliminates the shock on the driven load. An instantaneous high amount of starting torque can cause a jolt on the conveyor which can damage products, pump cavitations and water hammer in pipes. Therefore, a soft starter ramps up the voltage applied to the motor from the initial voltage to the full voltage. The voltage is initially kept low to avoid sudden jerks during the start. The voltage and torque increases gradually so that the induction motor starts to accelerate. This ramp up voltage provides sufficient torque for the load to accelerate gradually and hence mechanical and electrical shocks are minimized from the system, The voltage supplied to stator windings are adjustable and it has ramp characteristics.

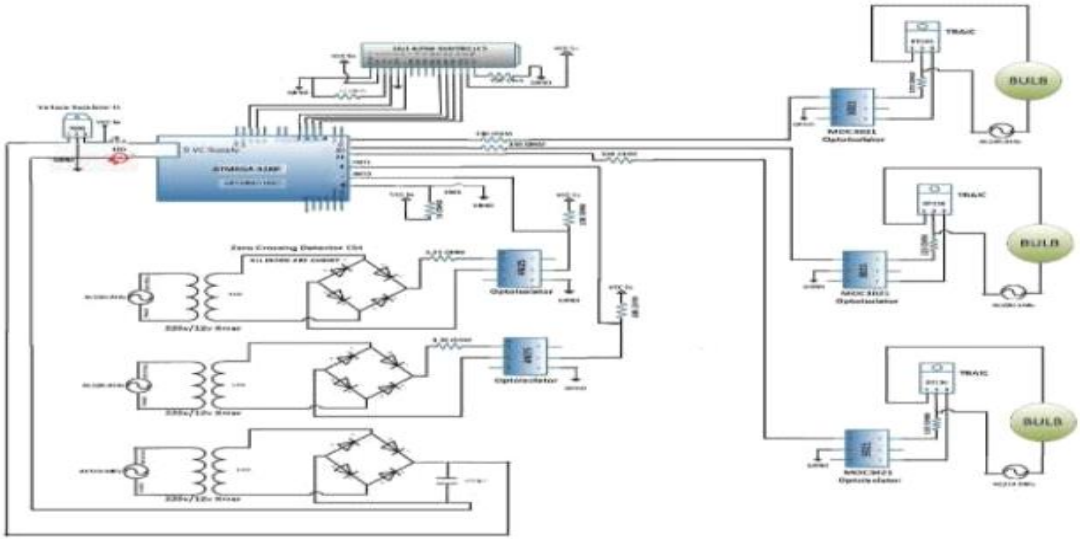
OPERATING PRINCIPLE OF SOFT STARTER

A soft starter provides reduced voltage to stator windings of three phase induction motor by controlling the acceleration of an electric motor. A three phase induction motor is a self-starting motor and electromagnetic torque is produced due to an interaction between revolving magnetic field around rotor and rotor current. Initially during starting, a rated voltage is applied which causes high current to flow through stator windings. Now this high current is greater than the rated current which can cause heating of the stator windings and eventually damaging the insulation applied on stator windings. To avoid the problem of high starting current, there is a need of motor starters in an electric motor.

Initially to perform soft starting, a firing pulseare given to the SCRs so that only the remaining part of each half period of sinusoidal voltage curve passes through them. Then the instants of firing pulses are reduced which allows larger part of the voltage to pass through SCRs. Finally, the firing pulses are applied exactly at the zero crossing of the voltage which allows 100% of the voltage to pass through. This is also seen as the ramping up of voltage from reduced voltage at starting by allowing more voltage to pass through SCRs. In this way, a full voltage is applied from reduced voltage at the starting. The opposite procedure is followed for soft stop. The full voltage is allowed to pass through the thyristors and when the stop time is about to reach, the firing pulses are delayed which allows less voltage to pass through. The instants of firing pulses are increased till the end of voltage is arrived. Then, no more voltage is applied to the motor and in this way, the motor is stopped.

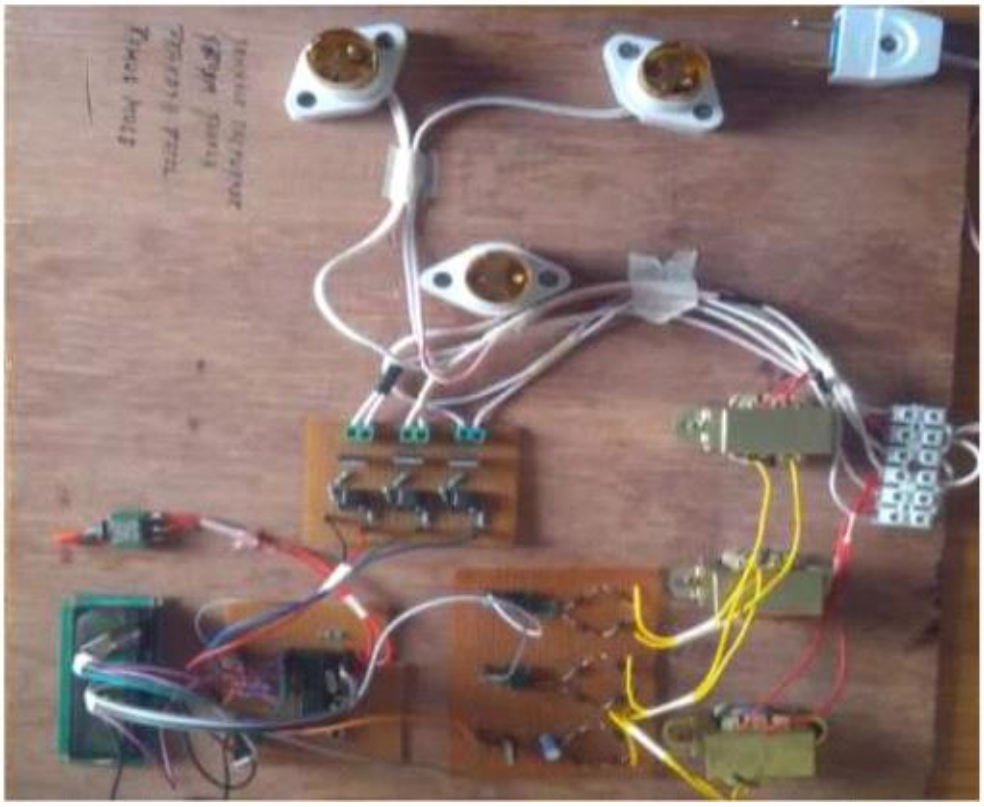
CIRCUIT DIAGRAM

The circuit diagram of soft-starting of three phases IM is shown in Fig.1. The circuit diagram comprises of voltage regulator, zero crossing detector, bridge rectifier, 4N25 opt-Isolator,Atmega 328Pmicrocontroller and TRIAC circuit. TRIAC circuit performs the role of soft starter in each phase of three phase induction motor. TRIAC circuit basically consists of two ant parallel SCRs connected back to back. This soft starter is used to give soft starring to Induction motor. A 12 V DC regulated supply is obtained with the help of step-down transformer and bridge circuit. The step down transformer converts 230V to 12V ac supply and then it is fed to bridge circuit. The bridge circuit in turn converts ac supply to dc supply. This dc supply is given to regulator IC to get positive 12V dc regulated supply. The main part of the circuit is zero crossing detector circuit which is made up of four diodes connected to form bridge rectifier circuit and output of bridge rectifier is fed to 4N25 optoIsolator. Then output of 4N25 optoIsolator is applied to interrupt pin ofAtmega 328P. Whenever the input AC waveform crosses the zero reference point, a high pulse signal triggered from 4N25 optoIsolator is given to interrupt pin of Atmega 328P. When Atmega 328P receives high signal from interrupt pin, it interrupts Atmega 328P by providing high signal on interrupt pin and then it initiates delay counter from that point and hence it provides triggering pulse to gate signal of TRIAC through MOC3021 optoIsolator.



Circuit diagram of electronic soft starter

HARDWARE PROTOTYPE OF SOFT STARTER OF IM



hardware prototype of soft starter of IM

Component use in soft starter

Sr. No.	Name of component used	Rating of component	Number of components
1	Transformer	220-240/12V	3
2	Diode	1N4007	12
3	Opto-isolator	4N25	2
4	Arduino	ATMEGA328P	1
5	LCD Display	16*2	1
6	Voltage regulator IC	7805	1
7	Capacitor	470uF	1
8	TRIAC	BT136	3
9	Toggle switch	-	1
10	Resistance	120 Ω 330 Ω 1000 Ω 3.3 kΩ 10 kΩ	3 4 3 2 2
11	Bulb	60W	3

ADVANTAGES AND DISADVANTAGES OF SOFT STARTERS

The soft starters used in three phase induction motor eliminate high inrush current and high mechanical torque on startup. It reduces cable and switch-gear rating in power supply network. It prevents any dip in line voltage. The soft starter has desirable features of soft, step-less acceleration & deceleration. It also avoids current and torque peaks and provides less electrical stress on the power supply network and mechanical stress on entire drive. It reduces stress on couplings and other transmission devices such as gear boxes, shafts, belts etc. The soft starters also suffer from certain drawbacks like harmonics, problems of speed

regulation, dependency of acceleration and deceleration time on load etc. It produces harmonics less than inverter. The operating speed of an electric motor is fixed throughout the operation. The speed regulation of an electric motor is not possible when soft-starters are employed in three phase induction motor. The speed regulation is possible only at the time of starting and stopping of motor. The acceleration & deceleration time also depend on load.

14.2.3 Advanced Wireless Power Transfer System

INTRODUCTION

The Transfer of electrical power in reliable and efficient way is always challenging for the designers and engineers. Presently all electrical power from the generating stations to the distribution station is transferred by the uses of wires and underground cables. One of the major issues in these types of systems is the losses due to resistance of the material. Generally the percentage of loss of power during the transmission and distribution is 26%

Wardenclyffe Tower

In modern technology the use of portable device has increased such as mobile robots and electric vehicle. Mobility is the main concern of these equipment i.e. they are not connected to the main source of power.

All these problems are the main motivation for researchers. Nikola Tesla was the first who introduce the concept of wireless power transfer. But this technology from the time of Tesla is underdeveloped due to lack of funding and technology .But research from past few years has always going on and recent development has been observed in the field .

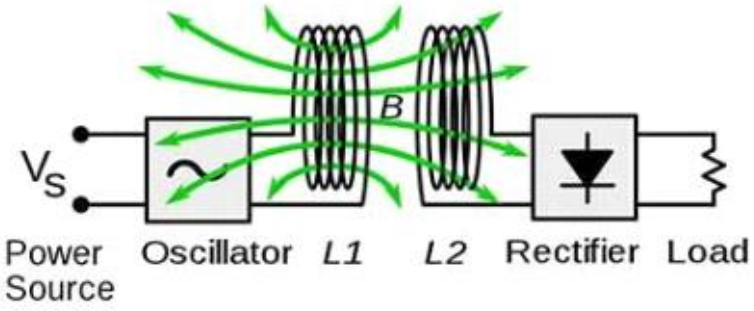
Wireless power transfer can be achieved by several methods (discussed later). Here we discussed few methods such as induction coupling, resonating coupling, LASER technology for electrical power transfer.

WIRELESS POWER TRANSFER METHOD

INDUCTIVE COUPLING

This type of WPT is simply based on inductive coupling between two coils. This is a type of near field technique measuring with appliance near the source. It is generally based on the

principle of mutual induction, where two coils are placed vicinity to each other and there is no physical connection between these two coils. The simplest example is transformer where the transfer of energy takes place due to electromagnetic coupling. Each of these coils connected without wires and it has been an important and popular technology to transfer power without wires because of its simplicity and reliability. Based on this technology there are various application device has been already made including electric brush and charging pad for cell phones or laptop. But this kind of method also has some limitation i.e. the range can be very less up to few cm and separation distance is very less than the coil diameter.



Inductive coupling

MAGNETIC RESONANCE COUPLING WPT

This is also one of the important methods for transferring power based on near field technique. It generally overcomes the disadvantage of up to some extent which arise in non resonant inductive coupling. This type of coupling used the concept of resonance. At resonance we know that natural frequency and excitation frequency are same. This leads to the maximum amplitude that means a maximum amount of energy is transferred between two coils. Here the receiver and transmitter coils are tuned to be at same resonant frequency .This allow us to transfer significant amount of power by increasing distance between coils. These type of system are used for building mid range power transfer. Mid range can be specified by distance up to 10 times the diameter of the transmitting coil. Magnetic resonance coupling have several advantage such as efficiency increases with decrease in the radiation and power loss and range can be increase up to some meter and it is directional. The mainly disadvantage is that selection of resonance frequency which tunes with the natural frequency and it cannot be used for long range application.

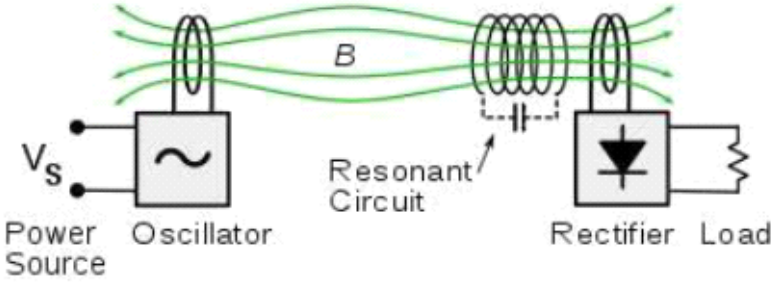


Figure 25 Magnetic resonance coupling

MICROWAVE WPT

This is one of the types of far-field technique of WPT which have range up to KM, with power transfer up to MW. This method uses microwave frequency ranging from 1GHZ to 1000GHZ generated from the microwave generator. First the microwave is generated by microwave generator which passes through the coax-waveguide adapter to the waveguide

circulator .Then a tuner and directional coupler are used to separate wave according to their propagation direction. Then they are transmitted through antenna. At the receiver terminal, a receiver antenna receives which pass through a low pass filter to finally produce DC power. Based on microwave WPT system the present application is solar power satellite. Advantages of microwave WPT are that it is used for several KM range with transferring high amount of power. Disadvantage are generally that the radiation effect to human beings from the microwave electromagnetic radiation

LASER WPT

This is also one of the types of far-field technique, where the power is transmitted through LASER beams. For power transmission firstly the electrical energy is converted to high LASER beams and at receiving side, these LASER beams are converted to electricity by using photo voltaic cells. This type of WPT has several disadvantage i.e. why it is not used for electrical power transmission because LASER beams can easily harms human being if they cut LASER beam path. Therefore these are generally used for military weapon development and space research.

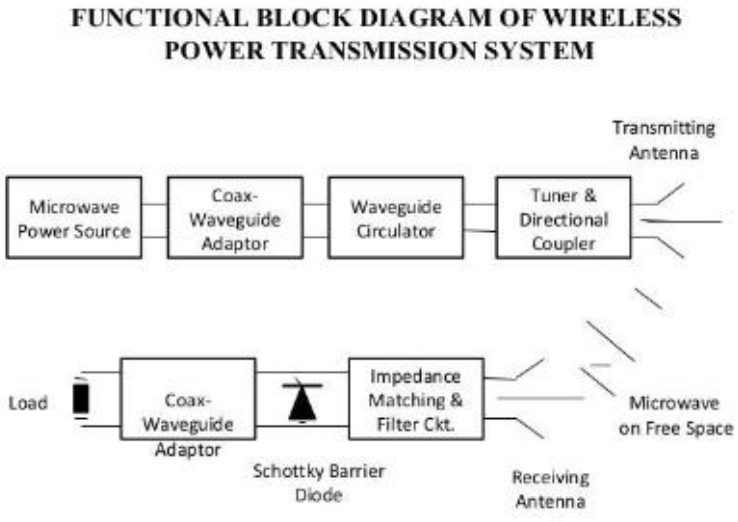


Figure Functional block diagram of WPT

COMPARISON BETWEEN WPT METHODS

Table 2 comparison between wpt methods

WPT METHODS	SEPERATION DISTANCE	POWER	EFFICIENCY
Inductive coupling	Few mm	Few watts	Low
Magnetic resonance couping	Few meter	Few Kilo Watts	High
Microwave WPT	Upto 100KM	Upto 100 MW	High
LASER	Few meter but with high intensity	Upto 100 MW	Low

ADVANTAGES AND DISADVANTAGES

ADVANTAGE

- It gives the human comfort as there is no chording or wiring problem, so mobility is easier.
- There is no problem of power failure and extensive heating.
- Cost of overall system decreases due to no uses of wires.
- Overall efficiency increases due to decrease in the power loss.
- It offers no corrosion as there is no exposure to the atmosphere which is Ecofriendly.
- It offers ranges of power levels and separation distance between coils.
- It offers convenient, reliability, high efficiency, low cost at the same time.

DISADVANTAGE

- WPT methods use the electromagnetic radiation for power transfer and the main effect of electromagnetic wave is its biological impact which harms human beings and animal.
- Biological impact of inductive coupling and resonance coupling is far less than compared to microwave power transmission technique
- There is also a limitation of separation distance and power capacity.
- Interference of microwave with other communication system.
- Initial cost is very high for implementing WPT system

14.2.4 Industrial Temperature Controller

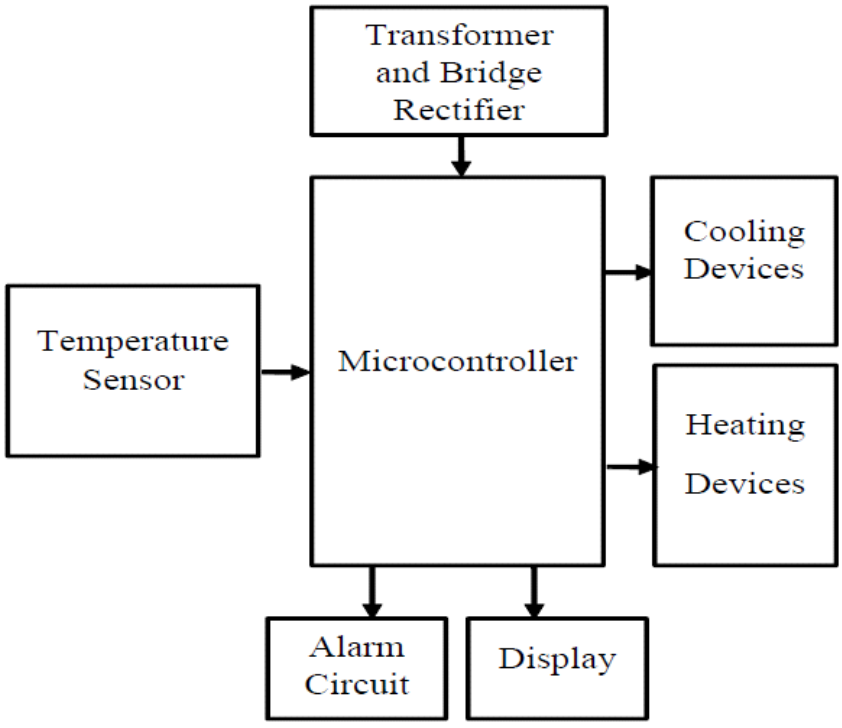
Introduction

Several heating and cooling function exist in almost every industry for example textile miles, pharmaceuticals, power station and so on. Smart control of temperature is an important task for smooth running of industries. Each part of industry has particular temperature requirement which is to be acquired during production hour. In defines that in industries, it is very crucial to monitor and control temperature precisely. The effective solution for this problem is to develop a data logger. Earlier it was completed manually using the thermometer and manometer. Since 1990 another progress in data logging took place as people to begin to produce PC based data logging system. A single chip embedded temperature controller design programmed in a single programmable system on chip: mixed array logic consists of analog, digital and digital communication block within in it. The compressed design allows the user to select any type of control function through its computer-generated instrument program. This design can be straight connected to PCs. The web based distributed measurement and control with programmable single-wire digital temperature sensor

DS18B20, an embedded system is used as field processing unit. With application mode of B/S. a remote temperature measurement and control system is designed by embedded in. In case of variable temperature requirement, manufacturing operator can also select multiple options for controlling temperature with displaying necessary information in the display. Number control applications have been already developed in electrical engineering for controlling the automatic system. Microcontroller can be also used to control light smoothly.

Concept of Temperature Control Technique

To increase the production of an industry, smooth control of temperature is the key function.5 Different industry has its own individual temperature requirement for specific role. Conventionally, industrial temperature measurement instrument thermometer is used to measure the temperature. After observing temperature reading, operator controls temperature manually. Sometimes controlling is not appropriate because of time consuming human operated control of cooling device and heating device. As a result, efficiency of temperature control fails and production is hampered in industries. Besides that, thermostat is used to select temperature which is not efficient because of erosion of metal and losing to strength of metal for successive using. Consequently, analog system loses its own linearity function since it is mechanically designed temperature control device. The temperature can be controlled more efficiently using interface between temperature sensors LM35 which produce linear voltage signal with rising temperature and microcontroller which takes response fraction of millisecond to response. Microcontroller takes signal from temperature sensor and compare with pre-set value of temperature then take decision when heating device or cooling device

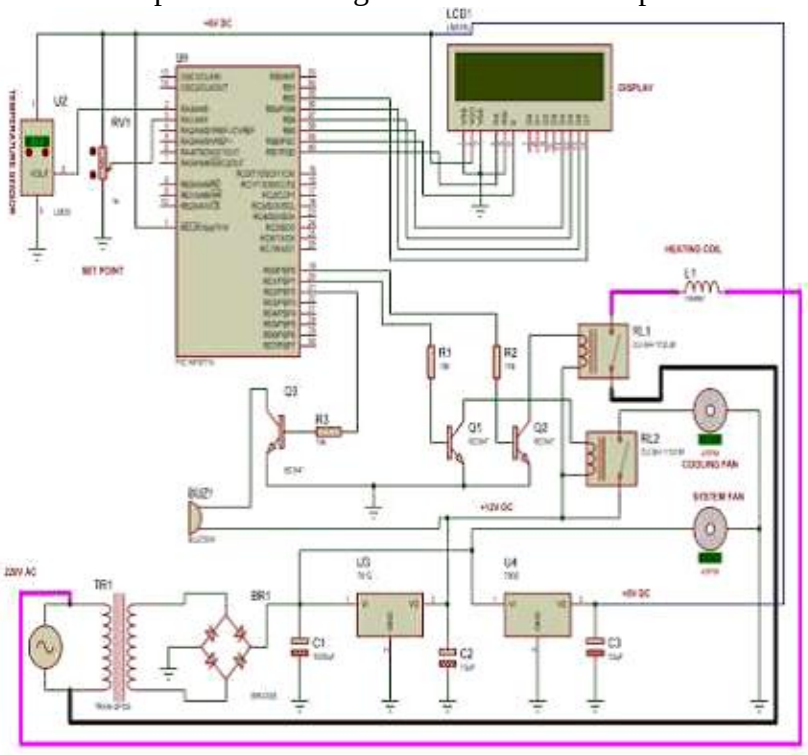


The pseudo code for control the overall heating and cooling system can be written as:
When asking temperature > real-time temperature
Heating element = 1 for (asking temperature + 1 Degree Celsius)
Cooling element = 0 for 1 minute
When asking temperature < real time temperature
Cooling element = 1 for (real-time temperature – 1 Degree Celsius)

Heating element = 0 for 1 minute

Design of Temperature Control Circuits

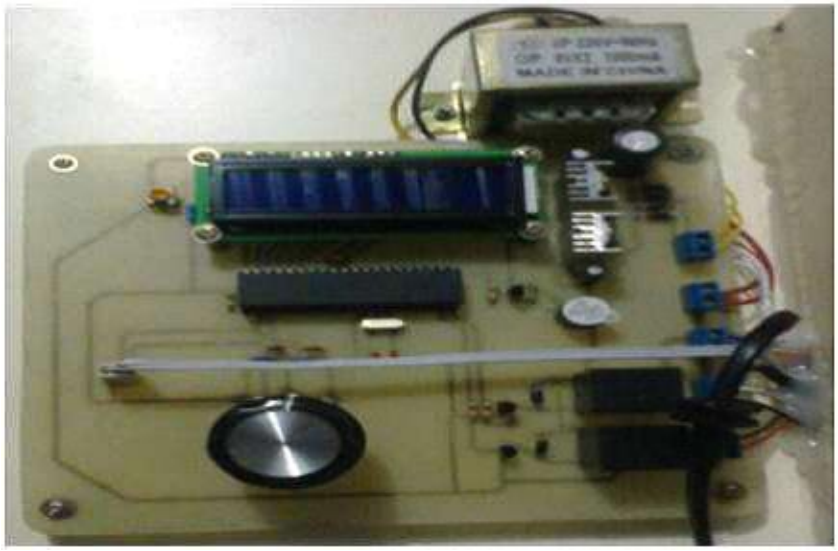
A 220 V AC supply is stepped down to 18V by using potential transformer (TR1). Transformer (TR1) is connected with a bridge rectifier (BR1) to create pulse- setting DC where a capacitor (C1) is used to produce smooth DC. A heater coil (L1) is directly connected to power supply through relay (RL1), when relay "ON" heater would produce heat. Figure shows the complete circuit diagram of industrial temperature control system.



Complete Circuit Diagram of Temperature Control System

Two voltage regulators of 7412 and 7405 are used to get fixed DC voltages for different part of the circuit where U3 (7412) provides 12V and U4 (7405) provides 5V. Furthermore, capacitor C2 and C3 are used to filter output signal in case of presence of any oscillation into the provided DC voltage.

The Buzzer (BUZ1) is connected with 12V DC voltage supply from U3 and the relays RL1 and RL2 are also connected with 12V DC voltage supply from relays RL1 and RL2. The display (LCD1), microcontroller (U1), set point (RV1) and temperature sensor (U3) are connected with 5V voltage DC voltage supply. In temperature controller there are two fans, one is system fan or circulating fan and another is cooling fan which are indicated in Figure. System fan is directly connected with 18V and cooling fan is connected with RL2. When power is supplied to system fan is turned on whereas cooling fan is controlled by the relay (RL2). Microcontroller is connected directly with sensor (U2), set point (RV1) and display (LCD1). Microcontroller is also connected with Buzzer (BUZ1), relay (RL1) and relay (RL2) through a switching device (BJT) and a resistor. Common emitter configuration of transistor (Q1, Q2 and Q3) works as a switching device. Figure shows that printed circuit board with installing all necessary equipment.



Printed Circuit Board to Total System

14.2.5 Accident Alerts in Modern Traffic Signal Control System – Camera Surveillance System

INTRODUCTION

In today's world as the population increases day by day the numbers of vehicle also increases on the road and highways. This result in more accident that leads to the traffic jams and public not get help instantaneously. This problem is due to rider's poor behaviors such as speed driving, drunk driving, riding with no helmet protection, riding without sufficient sleep etc. So road safety is one issue that needs special attention. In most of the accident cases, the victims lose their lives because of unavailability of medical facilities on the right time. The crucial time between the accident and getting victim medical attention can often be the difference between life and death. It is very difficult to know that an accident has occurred and to locate the position where it is happened. To solve problem like these, this accident detection and reporting system is used to save the lives by making the medical facilities arriving on time.

In this we are developed a wireless system using MEMS accelerometer and GPS/GSM for accident detection and reporting. IF any accident occurs, this wireless device will send automated message to Emergency medical services (EMS) and family member giving the exact position of the spot where the crash had occurred. So they can provide proper medical treatment to patients. This system is used to record information related to accident like temperature data, position data etc. So that it can be used to analyze the accident easily and to settle many disputes related to accident such as insurance settlements. This system is also used to detect whether the driver was in drunken state and the vehicle would not start thereafter. The whole system is based on arm controller. This controller is used to co-ordinate all the activities in the system.

SYSTEM OVERVIEW

The main objective of this work is to reduce the human death rate in road accident. The paper proposed a system to give quick assistance to the people who got the accident. The fall detection and reporting system for the vehicle can gain the attention because the system will save the life and give medical treatment on time.

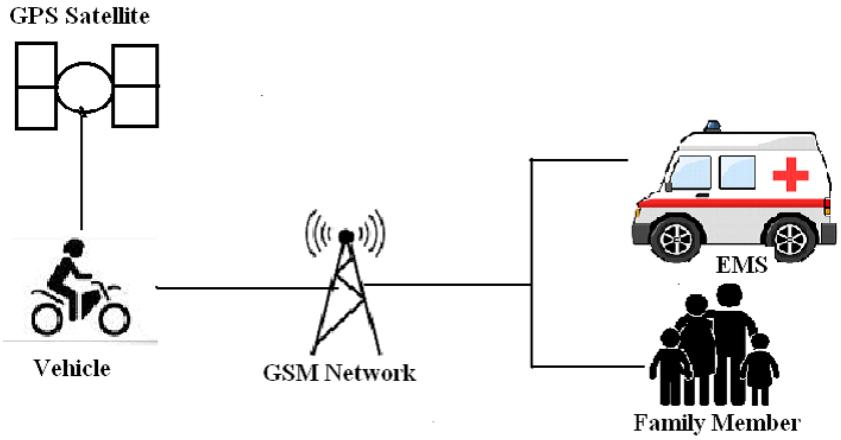
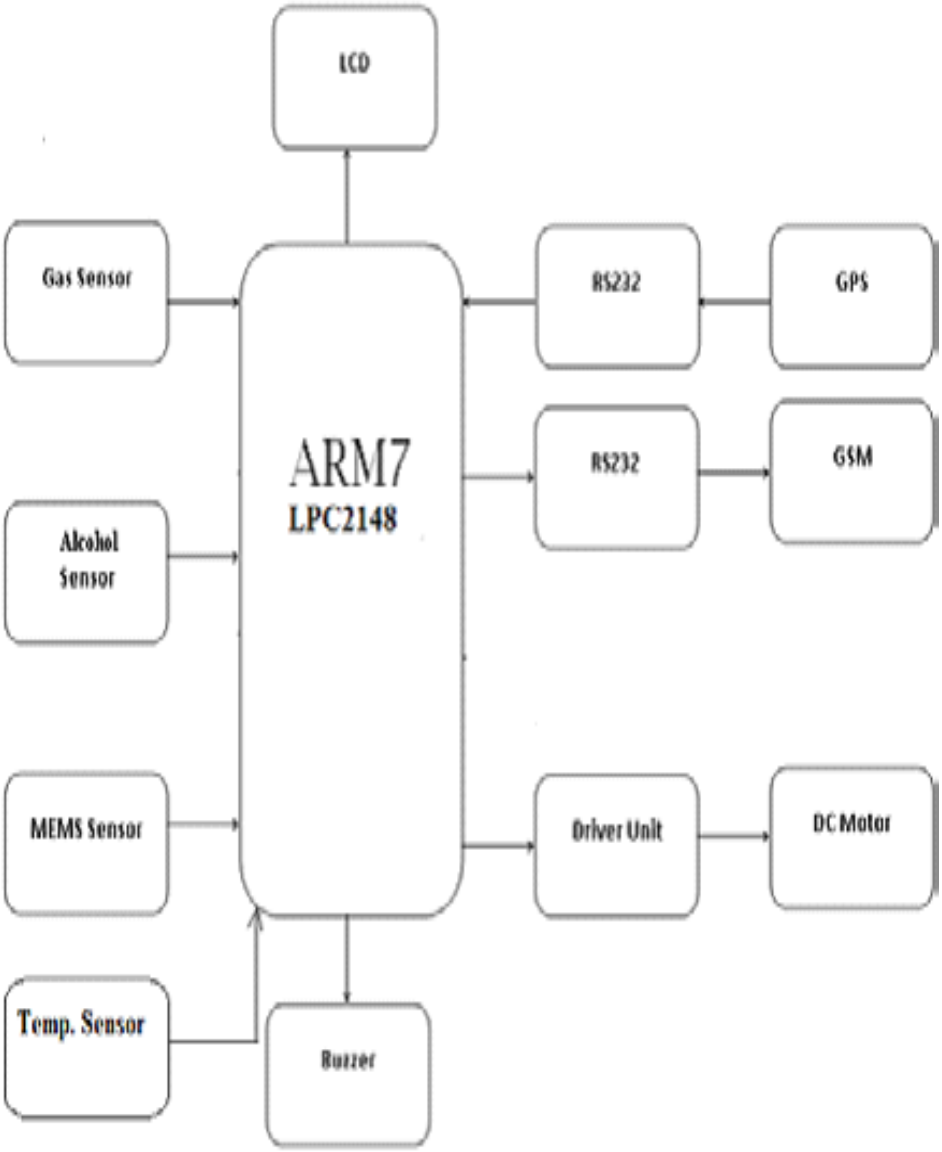


Figure 30 System Overview

The system consists of ARM7 micro-controller unit, MEMS accelerometer, GPS device, GSM module, Temperature sensor, gas sensor and Alcohol sensor. An Accelerometer is used to detect the acceleration. It is the main sensor used to detect the accident. Once the accident is detected GPS collect the current position values which include latitude (N or S), longitude (E or W), date and time. The location values are given to microcontroller. Controller gives this information to GSM module. By using GSM module we can send the message to family members or EMS. Here the serial communication interface UART is used for the communication between the microcontroller, GSM and GPS module. The RS232 communication standard is used for the electrical signal characteristics such as voltage levels. This communication enables point to point data transfer. A high performance 16/32 bit microcontroller unit is used to process and store real time signal from the accelerometer and various sensor. Through Temperature sensor we can measure temperature in vehicle and which is display on LCD continuously. Motor stop automatically when alcohol is detected through alcohol sensor. Gas sensor is used for gas leakage detection and red LED blink when gas is detected. All the data of these sensor and GPS data are stored in memory card for analysis of accident cause. The total system is placed inside a vehicle which is not visible to others. We can implement robust package design so that system is safe from water and dust.

HARDWARE DESIGN

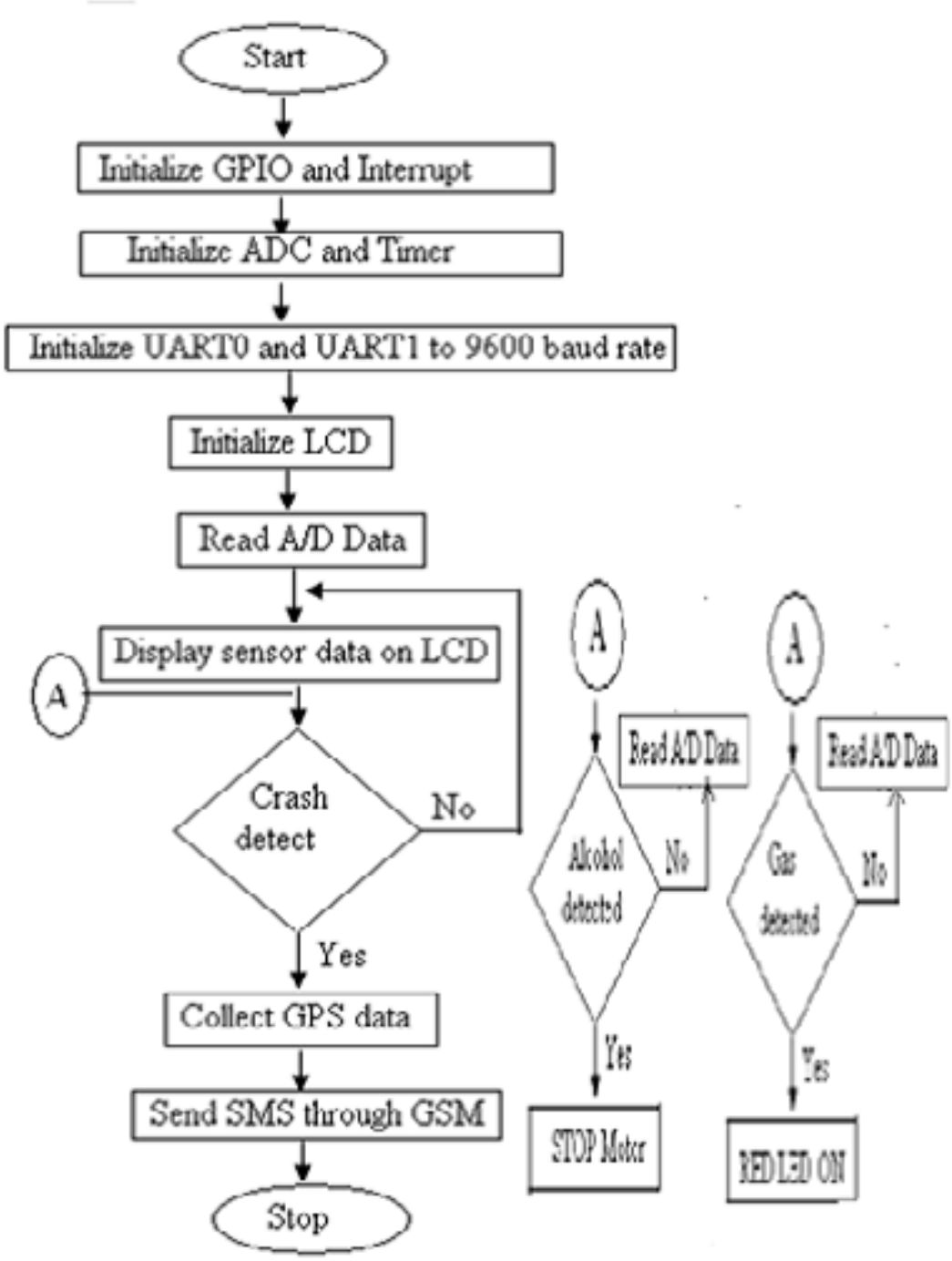
Hardware framework for accident detection and reporting is shown in fig. 2. Hardware consists of ARM, MEMS accelerometer, GSM modem, GPS device, temperature sensor, gas sensor and alcohol sensor.



Basic Block diagram

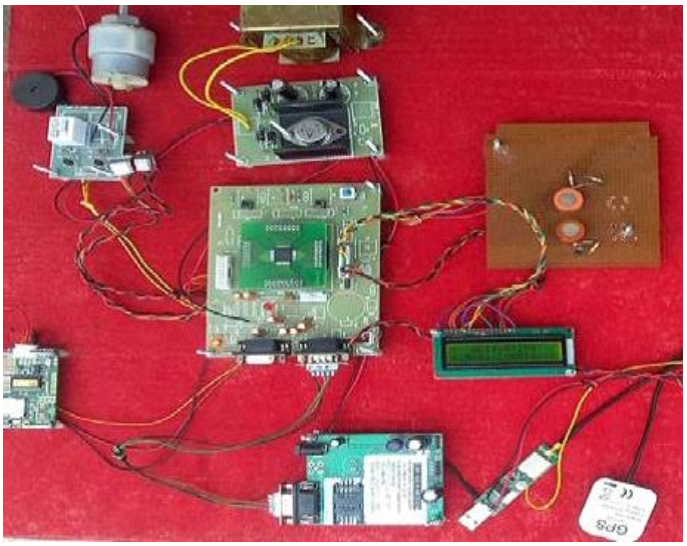
METHODOLOGY

The system design for accident detection and reporting is based on ARM and GPS. When vehicle meets an accident, at that time the accident will be detected by accelerometer. MEMS accelerometer sensor can be used as a crash detector of vehicle during and after crash. At that time vibration sensor is used as alarm application to gain attention of people towards accident spot. According to this project when a vehicle meets with an accident, a Micro electro mechanical system (MEMS) sensor will detects the signal and sends it to ARM controller.



Immediately microcontroller sends the signal to GPS module to collect the current position co-ordinates values which contains longitude (N or S), latitude (E or W), time and date. After that the microcontroller sends the alert message to family member or emergency medical service (EMS) through GSM modem which contains GPS parameter values. Due to this alert message we can provide immediate medical treatment at accident location and victim can get the treatment as fast as possible. If the vehicle meets with a small accident or no serious injuries to people then we can send a message we are safe by pressing switch manually in order to save the valuable time of emergency medical service. Through Temperature sensor we can measure temperature in vehicle and which is display on LCD continuously. Motor stops automatically when alcohol is detected.

Figure 33 Working Model



WORKING MODEL

An innovative wireless system using Accelerometer and GPS tracking system has been developed for vehicle accident detection and reporting. This vehicle accident detection and reporting systems provide crucial information to emergency responders in the earliest possible time. The crucial time between the accident and getting victim medical attention can often be the difference between life and death. This system provides better safety rather than no safety.

CHAPTER 15: SMART AND / OR SUSTAINABLE FEATURES OF CHAPTER 8 AND 13 DESIGNS, IMPACT ON SOCIETY.

"Sustainable development is development that meets the needs of the present, without compromising the ability of future generations to meet their own needs."
The concept of sustainable development can be interpreted in many ways, but at its core is an approach to development that looks to balance different, and often competing, needs against an awareness of the environmental, social and economic limitations we face as a society.

SR. NO.	NAME OF DESIGN	PERIOD	AMOUNT EXPENDITURE (RS.)	BENEFIT
PART – I				
1.	**Bus Stop**	**1.5 - 2months**	**21,092**	In this section we give a design of bus stop that make more comfortable journey of villager to provide them shade and waiting arrangement for their bus. While designing this bus stop we also keep view of its electricity city and maintenance cost in our mind for that purpose we provide solar penal on the roof of the bus stand that make it free from any energy cost.
2.	**Public Toilet**	**2-3 months**	**2,13,909**	Rural Development is the process of improving the quality of life and economic well-being of people living in rural areas, often relatively isolated and sparsely populated areas.
3.	**Entrance Gate**	**1 month**	**2,34,703**	Entrance gate is structure constructed at the entrance of the village. This gate is used for many purposes like for security reason, for appearance, for giving information to road users etc.
4.	**Library**	**2 – 3 months**	**2,34,703**	In Mandir village there is no public library so, people need to travel around 7km to 8km in search of book this consume lots of time and also increase the cost of travel to reduce this trouble we introduce this design for the benefit of people.
5.	**Public Medical Store**	**1 month**	**78,237**	In Mandir village there is no medical store so people travel around 4 to 5 kM in search of medicine so according to feed back given by the villager we design this medical store

				for their convenient.
6.	**Garden**	**4 – 6 weeks**	**2,29,021**	By providing a safe place for kids to play and parents to bring their little ones, cities can enjoy more beautiful areas surrounding the parks. Residents get a safe place for physical activity in addition to elevated property values in the immediate vicinity.
PART – II				
7.	**Panchayat Office**	**3 – 5 months**	**3,81,608**	In our allocated village the Panchayat office is not in a good condition and the Talati asked us to redesign the Panchayat with modern technology.
8.	**Widening of road**	**5 -6 months**	**10,00,000**	In the Mandir village there are short roads and villagers are demanding for widening of roads for better public and transportation movement.
9.	**Solid Waste Management At Dumping Ground**	**2 – 4 months**	**5,00,000**	Currently the villagers are dumping their solid waste at outer part of the village and burn it at a specific location. By that air pollution will increase and waste collection is not done regularly so that solid waste management system should be there in the village for cleanliness and safe environment.
10.	**Community Hall**	**3 – 6 months**	**6,28,470**	Partying and participating, in any event, is enjoyable. But organizing a successful event is no small feat to achieve.
11.	**Lake side Development**	**3 – 4 months**	**2,00,000**	Mandir village is between two beautiful lakes so by developing the lake side for good Aesthetics view.
12.	**Rain water Harvesting**	**4 – 5 months**	**4,00,000**	To conserve water we have proposed rain water harvesting in the village.

CHAPTER 16: Survey By Interviewing With Talati And Sarpanch.

Gujarat Technological University, Ahmedabad, Gujarat

Vishwakarma Yojana: Phase VIII
Survey with Interviewing

SURVEY BY INTERVIEWING WITH TALATI AND/OR SARPANCH

Vishwakarma Yojana: Phase VIII

ALLOCATED VILLAGE SURVEY

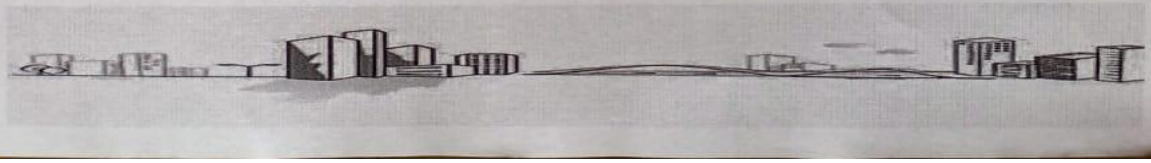
An approach towards "Rurbanisation for Village Development"

CHAPTER- 16

Sr.	Questions	Yes/ No	Remarks
1	What are the sources of income in village?	Yes	Agriculture & Fishery
2	What are the chances of employment in village?	Yes	Small Scale Industry
3	What are the special technical facilities in village?		
4	Is any debt on village dwellers?	NO	
5	Are village people getting agricultural help?	Yes	From Agriculture University
6	Is women health awareness Program organized in village?	Yes	
7	Are women having opportunity to work and income?	Yes	
8	Child girl education is appreciated in village?	Yes	
9	Facility of vaccination to child is available in village?	Yes	
10	Are village people aware about child vaccination and done to each and every child as per norms?	Yes	
11	Women help line number information is provided to village people?	Yes	
12	Is water scarcity in village? How many days per year?	No	
13	Is village under any debt?	No	
14	Is any serious issue due to debt from bank or any person happened in village?	No	
15	Is any suicide like incident observed in village due to government policy, debt or threatening?	No	
16	Is any death of patient occurred due to unavailability of medical facility in village?	No	
17	How many disabled (physically challenged) is observed in village? Provide list with Male/female/girl/boy with age and type of disability and reason of disability.		
18	Is village improvement is observed in comparative scenario from past to present?	Yes	
19	Is any unavoidable difficulty village people are facing? Any natural calamity is there?	No	
20	Life Living standard of girls and women is appreciated and uplifted in village?	Yes	

Nodal officer and students can add more questions. This is a sample. Having Minimum requirement.

Administration queries/ Difficulties:
GTU VY Section
Contact No – 079-23267588
Email ID: rurban@gtu.edu.in



CHAPTER 17: IRRIGATION /AGRICULTURE ACTIVITIES ANDAGRO-INDUSTRY, ALTERNATE TECHNICS AND SOLUTION

Farming methods have evolved massively over the years, from basic, hand-held tools to the modern, sophisticated machinery we use today. Farmers are now embracing modernity, which has enabled them to achieve the highest potential in whichever farming activity they choose to undertake.

Technological advancements have permeated every industry across the world and agriculture is no exception. Nowadays, technology is significantly helping growers and farmers in several ways, including precise forecasting, data-driven decision making, and more. The changes have also resulted in a positive impact on the bottom line of most farmers and ultimately led to improved accesses to food products, at reasonable prices. Let's delve into the specific ways in which technology has revolutionized agriculture.

1. Online resources:

The proliferation of internet technology has dramatically offered farmers unprecedented access to a wealth of valuable resources and tools to make farming easier. Notably, the internet has innumerable production and planning tools to help them forecast future crops.

Additionally, the World Wide Web provides several farming forums that let them exchange ideas seek advice and participate in insightful discussions. These forums offer robust support groups that can help farmers without ever setting foot on the farm.

2. GPS:

A few decades ago, the idea of tractors driving themselves on the farm was implausible. However, the entry of GPS technology has completely changed everything. GPS provides precise location information at any point near or on the earth's surface. So, farming machines integrated with GPS receivers can recognize their position within the farm and adapt their operation to maximize their efficiency at that location.

Now, tractors equipped with GPS technology coupled with automatic steering systems are used to improve the placement of seeds on the farm, thereby reducing wastes and costs. Additionally, GPS guided drones are increasingly being used to perform tasks such as crop spraying, livestock monitoring and 3D mapping.

The applications of GPS are many and transcend their usage in tractors. For example, farmers can use a GPS receiver to detect preselected positions in a farm field for soil sample collection. The selected soil samples are then analyzed to generate a fertility map in a geographic information system (GIS). Using the map, farmers can accurately prescribe the quantity of fertilizer required for each sampled section of the farm field. After that, the farmer can use Variable-rate technology (VRT) fertilizer applicators to distribute the precise number of fertilizers in the area.

3. Sensors:

Sensors, like GPS technology, are increasingly being used by farmers to comprehend their crops at a micro level, reduce environmental impacts, and conserve resources. Most of the sensing technologies used in precision agriculture provide critical data that helps farmers to adapt their approaches to the changing environmental factors. Location sensors use GPS satellites signals to ascertain longitude, latitude and altitude.

To effectively triangulate a position, a farmer should have a minimum of three satellites. Optical sensors are also used in precision agriculture to aggregate and process plant color and soil reflectance data. More precisely, they are used to determine the organic matter, moisture content and clay content in the soil.

Generally, sensors can monitor everything from soil temperature to humidity levels in grain silos. Also, they can offer very critical knowledge of soil health. And importantly, sensor technology helps farmers to use their irrigation waters more efficiently, minimizing on wastage, and lowering costs.

4. Mobile devices:

As technology improves every day, mobile technology also has advanced, as evidenced by the number of apps popping up. This development has significantly impacted every sphere of life with agriculture too benefiting from the progress.

The actual game changes have been mobile applications. They have altered the lives of farmers and agricultural field holders, for the better. Famers have access to several mobile apps that can help them to collect information on their field farms, check the weather, and receive relevant updates.

With farmers getting insightful details from mobile apps, they are smoothly transitioning from handling fields to creating farm maps and facilitating the use of drones. The software behind the apps put them in the drivers' seat when managing everything from strategy formulation to tracking progress.

5. Smart farming:

When all the above technologies are merged, the resulting product will be a smart farming system, often referred to as precision agriculture. Smart farming involves the implementation of contemporary Information and Communication Technologies (ICT) into agriculture, resulting in what is referred to as the Third Green Revolution.

The revolution is slowly taking over the agricultural sector through the joint application of ICT solutions such as the Internet of Things (IoT), GPS, robotics, sensors and actuators, Big Data, Unmanned Aerial Vehicles (UAVs, drones), precision equipment, plus much more.

Using irrigation as an example, we can demonstrate how different technologies are combined to offer smart farming. Before watering the farm field, a farmer can mount a sensor on an irrigator to assess the moisture level of the soil. The information obtained is then used to vary the quantity of water required.

Farmers can use drones to assess plant health and enable them to take any corrective measures, where applicable. Similarly, smart farming techniques allow farmers to monitor the individual needs of their animals better and regulate their nutrition correspondingly, thereby averting disease and improving their health.

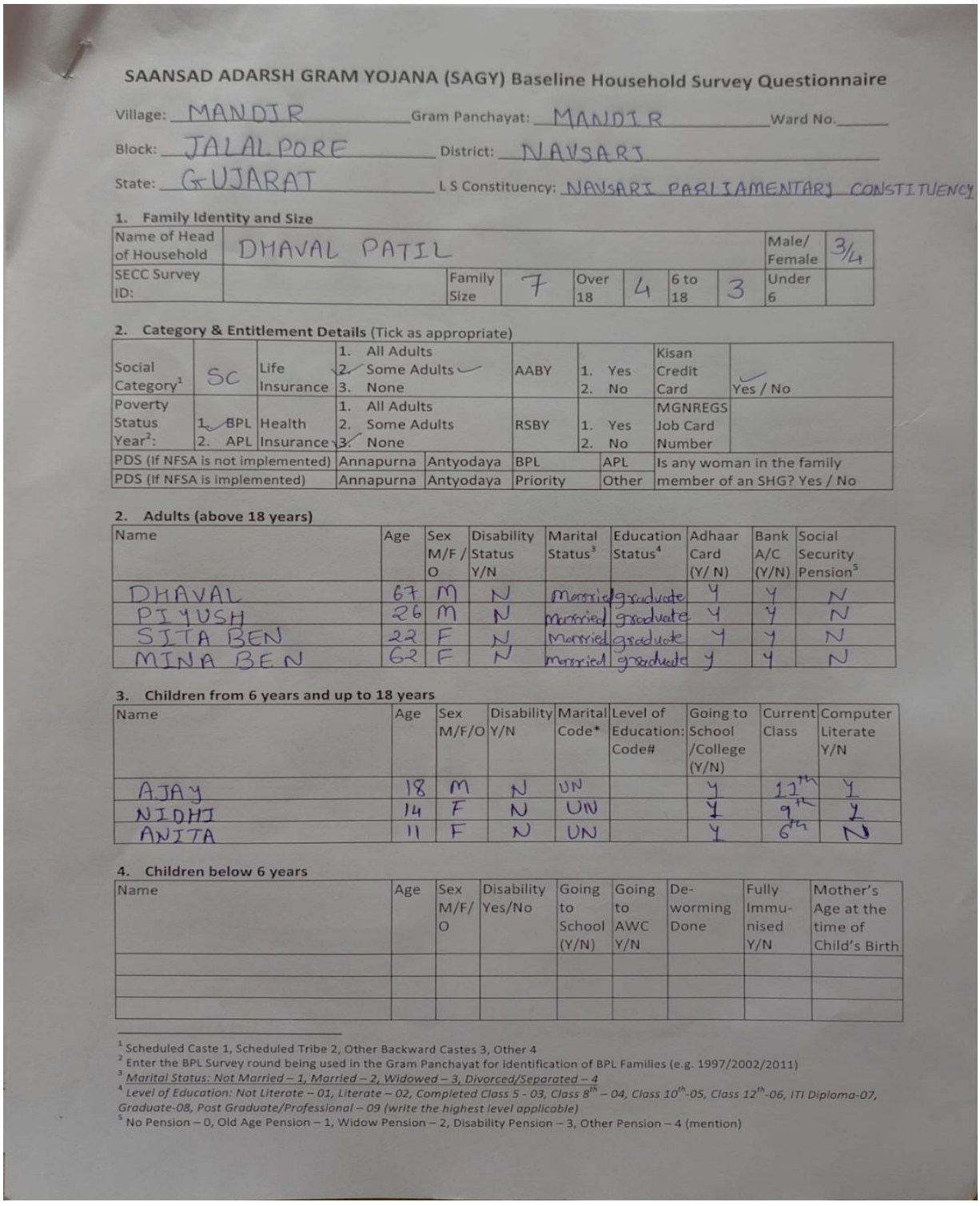
Smart farming provides farmers with limitless potential to deliver a more sustainable and productive output based on field-generated data. Also, it gives farmers an added value through better and timely decision-making.

Undoubtedly, technology is significantly altering the way we live and work. The adoption of various technologies in agriculture has brought several disruptions in the industry, with specific emphasis on agricultural jobs. Increasingly, agricultural technician jobs are now on demand to cater to the needs of the changing times.

Chapter 18: Social Activities – Any Activates Planned by Students

Due to ongoing Corona Virus, we didn't get any permission from sarpanch and Talati to gather any villagers for any social activities.

Chapter 19: Mandir Village SAGY Questionnaire Survey form



SAANSAD ADARSH GRAM YOJANA (SAGY) Baseline Household Survey Questionnaire

Village: MANDIR Gram Panchayat: MANDIR Ward No.

Block: JALALPORE District: NAVSARI

State: GUJARAT L S Constituency: NAVSARI PARLIAMENTARY CONSTITUENCY

1. Family Identity and Size

Name of Head of Household	DHAVAL PATIL							Male/ Female	3/4
SECC Survey ID:		Family Size	7	Over 18	4	6 to 18	3	Under 6	

2. Category & Entitlement Details (Tick as appropriate)

Social Category[1]	SC	Life Insurance	1. All Adults 2. Some Adults ✓ 3. None	AABY	1. Yes 2. No	Kisan Credit Card	Yes / No
Poverty Status Year[2]:	1. BPL 2. APL	Health Insurance	1. All Adults 2. Some Adults 3. None	RSBY	1. Yes 2. No	MGNREGS Job Card Number	
PDS (If NFSA is not implemented)	Annapurna	Antyodaya	BPL	APL	Is any woman in the family member of an SHG? Yes / No		
PDS (If NFSA is implemented)	Annapurna	Antyodaya	Priority	Other			

2. Adults (above 18 years)

Name	Age	Sex M/F / O	Disability Status Y/N	Marital Status[3]	Education Status[4]	Adhaar Card (Y/ N)	Bank A/C (Y/N)	Social Security Pension[5]
DHAVAL	67	M	N	Married	graduate	Y	Y	N
PIYUSH	26	M	N	Married	graduate	Y	Y	N
SITA BEN	22	F	N	Married	graduate	Y	Y	N
MINA BEN	62	F	N	Married	graduate	Y	Y	N

3. Children from 6 years and up to 18 years

Name	Age	Sex M/F/O	Disability Y/N	Marital Code*	Level of Education: Code#	Going to School /College (Y/N)	Current Class	Computer Literate Y/N
AJAY	18	M	N	UN		Y	11th	Y
NIDHI	14	F	N	UN		Y	9th	Y
ANITA	11	F	N	UN		Y	6th	N

4. Children below 6 years

Name	Age	Sex M/F/ O	Disability Yes/No	Going to School (Y/N)	Going to AWC Y/N	De-worming Done	Fully Immu-nised Y/N	Mother's Age at the time of Child's Birth

[1] Scheduled Caste 1, Scheduled Tribe 2, Other Backward Castes 3, Other 4

[2] Enter the BPL Survey round being used in the Gram Panchayat for identification of BPL Families (e.g. 1997/2002/2011)

[3] *Marital Status: Not Married – 1, Married – 2, Widowed – 3, Divorced/Separated – 4*

[4] *Level of Education: Not Literate – 01, Literate – 02, Completed Class 5 - 03, Class 8th – 04, Class 10th-05, Class 12th-06, ITI Diploma-07, Graduate-08, Post Graduate/Professional – 09 (write the highest level applicable)*

[5] No Pension – 0, Old Age Pension – 1, Widow Pension – 2, Disability Pension – 3, Other Pension – 4 (mention)

Saansad Adarsh Gram Yojana (SAGY) Panchayat Details Survey Questionnaire

(Note: Please aggregate information from village level questionnaires wherever relevant)

I. Basic Information

a. Gram Panchayat: MANDIR

b. Block: _____

c. District: NAVSARI

d. State: GUJARAT

e. Lok Sabha Constituency: NAVSARI

f. Number of Wards in the Gram Panchayat: _____

g. Number of Villages in the Gram Panchayat: 1

h. Names of Villages:

Demographic Information

Number of Households 830 Total Population 3556 Male 1776 Female 1780

SC HHs 45 ST HHs 1185 OBC HHs 13 Other HHs 2313

I. Access to Infrastructure / Facilities / Services

	Infrastructure Facilities / Services	Located within the GP Yes (Y)/No (N)	If located elsewhere (N), distance from the GP office
a.	ANM/ Health Sub Centre	Y	
b.	Nearest Primary Health Centre (PHC)	Y	
c.	Nearest Community Health Centre (CHC)	Y	
d.	Nearest Post Office	Y	
e.	Nearest Bank Branch (Any)	Y	
f.	Nearest Bank with CBS Facility	N	1.2 Km
g.	Nearest ATM	Y	
h.	Nearest Primary School	Y	
i.	Nearest Middle School	Y	
j.	Nearest Secondary School	Y	
k.	Nearest Higher Secondary School / +2 College	Y	
l.	Nearest Graduate College	N	2 Km
m	Nearest ITI / Polytechnic Centre	N	1 Km
n	Kisan Seva Kendra	N	

1

Saansad Adarsh Gram Yojana (SAGY) Panchayat Details Survey Questionnaire

(Note: Please aggregate information from village level questionnaires wherever relevant)

IX. Parameters relating to Households & Institutions

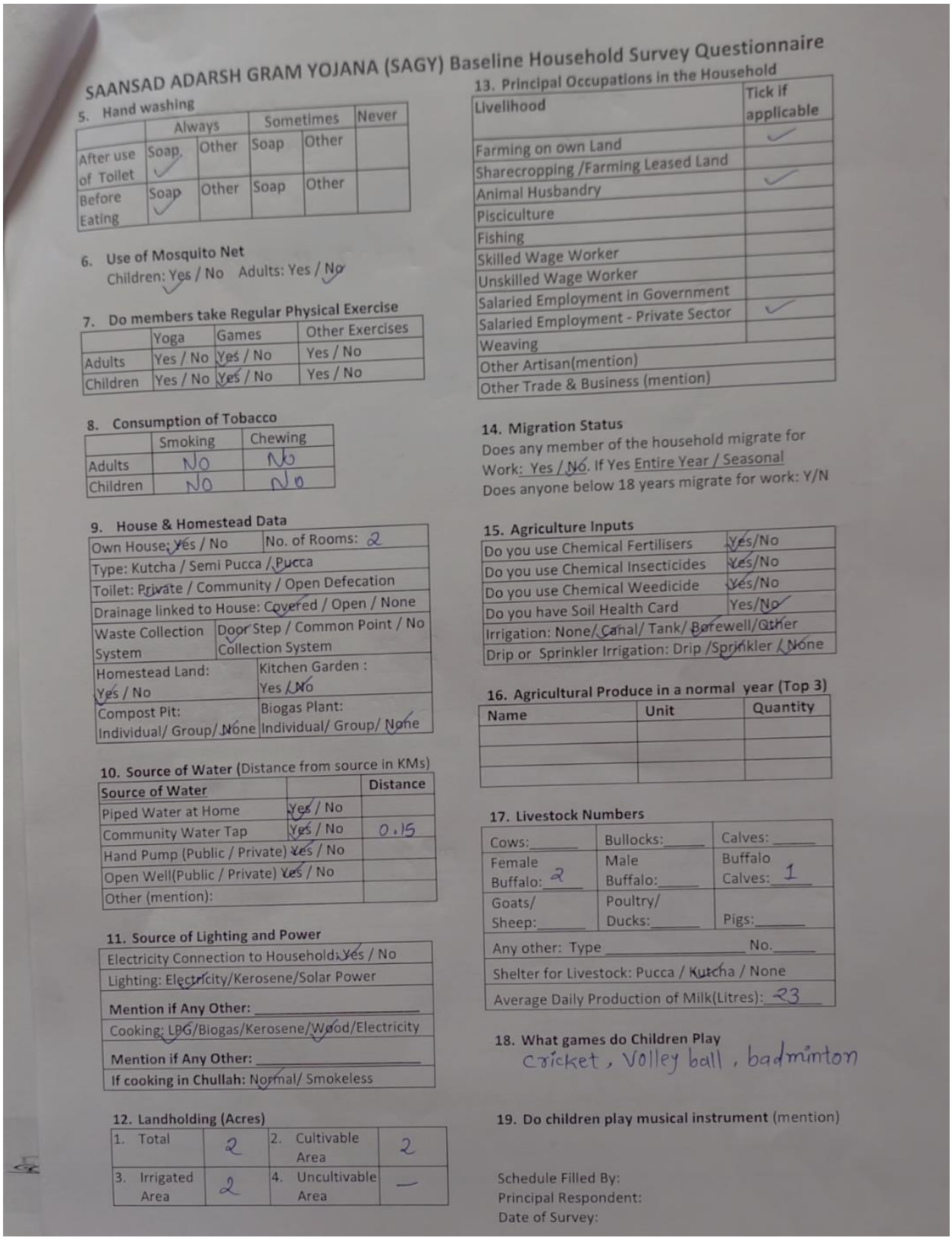
		Number
a)	Number of eligible Households for pension (old age, widow, disability)	
b)	Number of Households receiving pension (old age, widow, disability)	
c)	Number of eligible Households who are not receiving pension	
d)	Number of Households eligible for Ration Card	
e)	Number of eligible HHs having ration cards	
f)	Number of households covered under RSBY (Rashtriya Swasthya Bima Yojana)	
g)	Number of HHs covered under AABY (Aam Aadmi Bima Yojana)	
h)	Number of active Job Card holders under MGNREGA	
i)	Number of Job Card holders who completed 100 days of work during 2013-14	
j)	Number of shops selling alcohol	
k)	Number of BPL families	
l)	Number of landless households	
m)	Number of IAY beneficiaries	
n)	Number of FRA[2] beneficiaries	
o)	Number of Community Sanitary Complexes	
p)	Number of Households headed by single women	
q)	Number of Households headed by physically handicapped persons	
r)	Total number of Persons with Disability in the village	
s)	Number of SHGs	
t)	Number of active SHGs	
u)	Number of SHG Federations	
v)	Number of Youth Clubs	
w)	Number of Bharat Nirman Volunteers	

Name and Signature of Surveyor and Respondent'

1. HASMATALI 2. SHUBHAM 3. NEEL Surveyor	PRI Respondent (Preferably Gram Panchayat Chairperson)	Official Respondent (Preferably seniormost Government official in the Gram Panchayat)	Date of Survey

[2] The Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006

4



SAANSAD ADARSH GRAM YOJANA (SAGY) Baseline Household Survey Questionnaire

5. Hand washing

	Always		Sometimes		Never
After use of Toilet	Soap ✓	Other	Soap	Other	
Before Eating	Soap ✓	Other	Soap	Other	

6. Use of Mosquito Net
Children: Yes / No Adults: Yes / No

7. Do members take Regular Physical Exercise

	Yoga	Games	Other Exercises
Adults	Yes / No	Yes / No	Yes / No
Children	Yes / No	Yes / No	Yes / No

8. Consumption of Tobacco

	Smoking	Chewing
Adults	No	No
Children	No	No

9. House & Homestead Data

Own House: Yes / No	No. of Rooms: 2
Type: Kutcha / Semi Pucca / Pucca	
Toilet: Private / Community / Open Defecation	
Drainage linked to House: Covered / Open / None	
Waste Collection System	Door Step / Common Point / No Collection System
Homestead Land: Yes / No	Kitchen Garden : Yes / No
Compost Pit: Individual/ Group/ None	Biogas Plant: Individual/ Group/ None

10. Source of Water (Distance from source in KMs)

Source of Water		Distance
Piped Water at Home	Yes / No	
Community Water Tap	Yes / No	0.15
Hand Pump (Public / Private)	Yes / No	
Open Well(Public / Private)	Yes / No	
Other (mention):		

11. Source of Lighting and Power

Electricity Connection to Household: Yes / No
Lighting: Electricity/Kerosene/Solar Power
Mention if Any Other: _____
Cooking: LPG/Biogas/Kerosene/Wood/Electricity
Mention if Any Other: _____
If cooking in Chullah: Normal/ Smokeless

12. Landholding (Acres)

1. Total	2	2. Cultivable Area	2
3. Irrigated Area	2	4. Uncultivable Area	—

13. Principal Occupations in the Household

Livelihood	Tick if applicable
Farming on own Land	✓
Sharecropping /Farming Leased Land	
Animal Husbandry	✓
Pisciculture	
Fishing	
Skilled Wage Worker	
Unskilled Wage Worker	
Salaried Employment in Government	
Salaried Employment - Private Sector	✓
Weaving	
Other Artisan(mention)	
Other Trade & Business (mention)	

14. Migration Status
Does any member of the household migrate for Work: Yes / No. If Yes Entire Year / Seasonal
Does anyone below 18 years migrate for work: Y/N

15. Agriculture Inputs

Do you use Chemical Fertilisers	Yes/No
Do you use Chemical Insecticides	Yes/No
Do you use Chemical Weedicide	Yes/No
Do you have Soil Health Card	Yes/No
Irrigation: None/ Canal/ Tank/ Borewell/ Other	
Drip or Sprinkler Irrigation: Drip /Sprinkler / None	

16. Agricultural Produce in a normal year (Top 3)

Name	Unit	Quantity

17. Livestock Numbers

Cows:_____	Bullocks:_____	Calves:_____
Female Buffalo: 2	Male Buffalo:_____	Buffalo Calves: 1
Goats/ Sheep:_____	Poultry/ Ducks:_____	Pigs:_____
Any other: Type _____		No._____
Shelter for Livestock: Pucca / Kutcha / None		
Average Daily Production of Milk(Litres): 23		

18. What games do Children Play
cricket, Volley ball, badminton

19. Do children play musical instrument (mention)

Schedule Filled By:
Principal Respondent:
Date of Survey:

Saansad Adarsh Gram Yojana (SAGY) Panchayat Details Survey Questionnaire

(Note: Please aggregate information from village level questionnaires wherever relevant)

	Infrastructure Facilities / Services	Located within the GP Yes (Y)/No (N)	If located elsewhere (N), distance from the GP office
o	Agriculture Credit Cooperative Society		
p	Nearest Agro Service Centre	N	3 km
p	MSP based Government Procurement Centre	N	5 km
q	Milk Cooperative /Collection Centre	Y	
r	Veterinary Care Centre	N	2.7 km
s	Ayurveda Centre	N	
t	E – Seva Kendra	N	
u	Bus Stop	Y	
v	Railway Station	N	2 km
w	Library	N	
x	Common Service Centre	N	

IV. Sports Facilities in the Gram Panchayat

a. Number of Play Grounds in the GP: Total 1 Public 1 Private _____

b. Mini Stadium : N Yes(Y) /No (N) *(Playground with equipment and sitting arrangement)*

V. Education, ICDS

a. Number of Angan Wadi Centres: _____

b. Number of villages without Angan Wadi Centres _____

Names of such villages: _____

_____

c. Schools (Number)

Primary Private: 1 Primary Govt.: 1

Middle Private: 1 Middle Govt.: 1

Secondary Private: 1 Secondary Govt.: 1

Higher Secondary Private: 1 Higher Secondary Govt: _____

VI. Public Distribution System

	Item	Private Contractor	Women's SHG	Gram Panchayat	Cooperative	Other (Mention)	Location in GP (mention Location)	If outside GP, Location & distance from GP HQrs)
a.	Cereal (Rice/ Wheat/ Millets)							
b.	Kerosene							
c.	Other (mention)							

2

SAANSAD ADARSH GRAM YOJANA (SAGY) Village Details Survey Questionnaire

viii. Land Category		Area in Acres		Land Category	Area in Acres		Irrigation Structure	No.
a.	Cultivable Land		d.	Pasture / Grazing Land		g.	Check Dam	
b.	Irrigated Land		e.	Forests/ Plnatations		h.	Wells/Bore Wells	
c.	Un-irrigated Land		f.	Other Common Land		I	Tanks /Ponds	

ix. Entitlement Related Parameters		
1	Number of active Job Card holders under MGNREGA	
2	Number of active Job Card holders who have completed 100 days of work	
3	Number of shops selling alcohol	
4	Number of BPL families	
5	Number of landless households	
6	Number of IAY beneficiaries	
7	Number of FRA beneficiaries	
8	Number of common sanitation complexes	
9	Number of SHGs	
10	Number of active SHGs	
11	Existence of SHG Federation in the Village (Yes / No)	
12	Number of Youth Clubs	
13	Number of Bharat Nirman Volunteers	

Name and Signature of Surveyor and Respondent'

1. HASMATALI 2. SHUBHAM 3. NEEL Surveyor	PRI Respondent (Preferably a ward member from a ward that is fully or partially covered under the Village)	Official Respondent (Preferably seniormost Government official in the Gram Panchayat)	Date of Survey

3

SAANSAD ADARSH GRAM YOJANA (SAGY) Village Details Survey Questionnaire

This questionnaire should be filled for each of the villages in the selected Gram Panchayat[1]

I. Basic Information

a. Village: MANDIR

b. Ward Number: _____

c. Gram Panchayat: MANDIR

d. Block: _____

e. District: NAVSARI

f. State: GUJARAT

g. Lok Sabha Constituency: NAVSARI

h. Number of Habitations / Hamlets in the Gram Panchayat: _____

i. Names of Habitations / Hamlets:

Demographic Information

Number of Households_____ Total Population_____ Male _____ Female _____

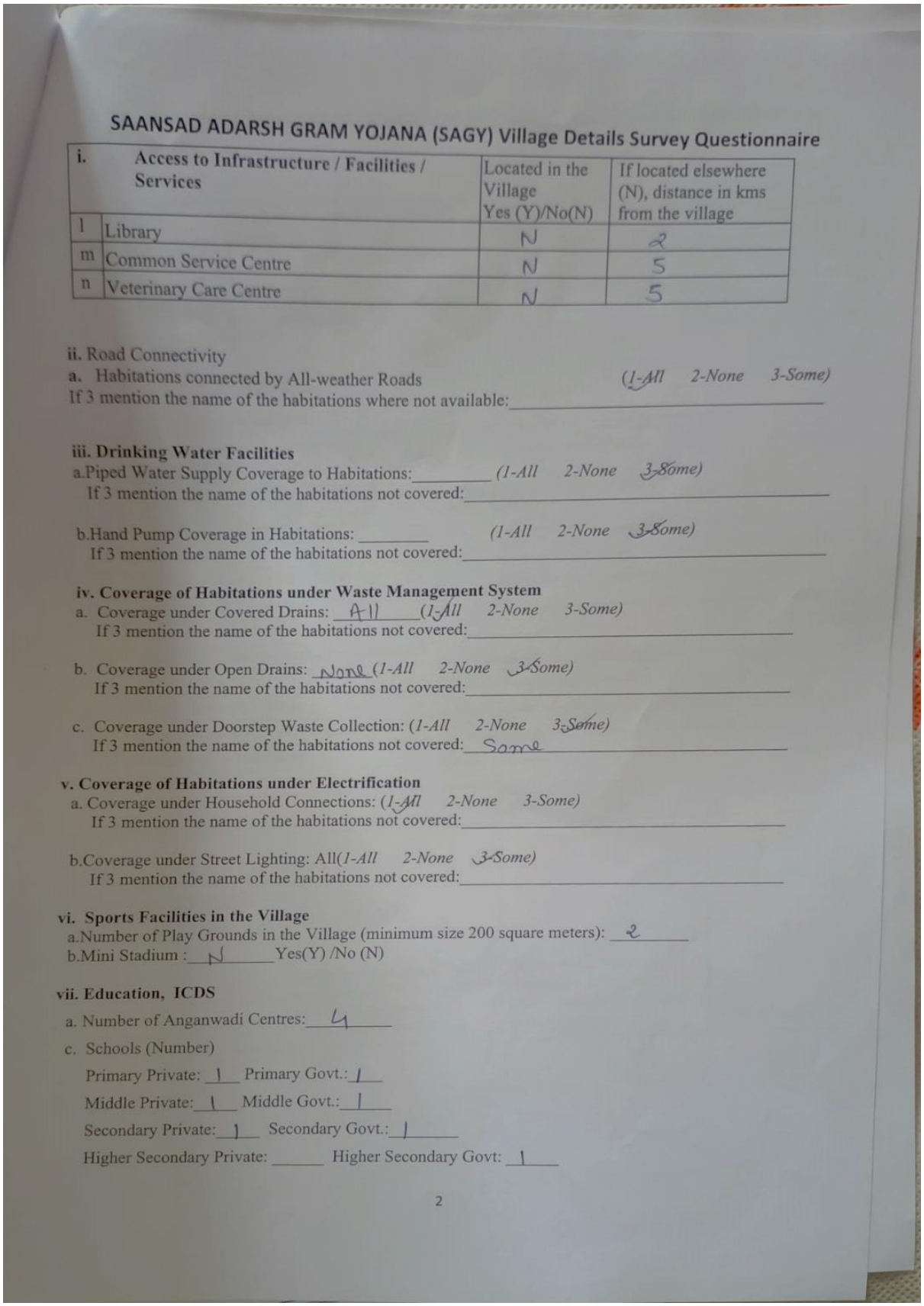
SC HHs_____ ST HHs_____ OBC HHs_____ Other HHs_____

II. Access to Infrastructure/Amenities etc.

i.	Access to Infrastructure / Facilities / Services	Located in the Village Yes (Y)/No(N)	If located elsewhere (N), distance in kms from the village
a.	Nearest Primary School	Y	
b.	Nearest Middle School	Y	
c.	Nearest Secondary School	Y	
d.	Kisan Seva Kendra		
e.	Milk Cooperative /Collection Centre	Y	
g.	Health Sub Centre	Y	
h.	Bank	Y	
i.	ATM	Y	
j.	Bus Stop	Y	
k.	Railway Station	N	4km

[1] While filling this the surveyor must collect the information from the Ward Member/s and relevant government officials

1



SAANSAD ADARSH GRAM YOJANA (SAGY) Village Details Survey Questionnaire

i.	Access to Infrastructure / Facilities / Services	Located in the Village Yes (Y)/No(N)	If located elsewhere (N), distance in kms from the village
l	Library	N	2
m	Common Service Centre	N	5
n	Veterinary Care Centre	N	5

ii. Road Connectivity

a. Habitations connected by All-weather Roads *(1-All 2-None 3-Some)*

If 3 mention the name of the habitations where not available:_____

iii. Drinking Water Facilities

a.Piped Water Supply Coverage to Habitations:_____ *(1-All 2-None 3-Some)*

If 3 mention the name of the habitations not covered:_____

b.Hand Pump Coverage in Habitations: _____ *(1-All 2-None 3-Some)*

If 3 mention the name of the habitations not covered:_____

iv. Coverage of Habitations under Waste Management System

a. Coverage under Covered Drains: All *(1-All 2-None 3-Some)*

If 3 mention the name of the habitations not covered:_____

b. Coverage under Open Drains: None *(1-All 2-None 3-Some)*

If 3 mention the name of the habitations not covered:_____

c. Coverage under Doorstep Waste Collection: *(1-All 2-None 3-Some)*

If 3 mention the name of the habitations not covered: Some

v. Coverage of Habitations under Electrification

a. Coverage under Household Connections: *(1-All 2-None 3-Some)*

If 3 mention the name of the habitations not covered:_____

b.Coverage under Street Lighting: All*(1-All 2-None 3-Some)*

If 3 mention the name of the habitations not covered:_____

vi. Sports Facilities in the Village

a.Number of Play Grounds in the Village (minimum size 200 square meters): 2

b.Mini Stadium : N Yes(Y) /No (N)

vii. Education, ICDS

a. Number of Anganwadi Centres: 4

c. Schools (Number)

Primary Private: 1 Primary Govt.: 1

Middle Private: 1 Middle Govt.: 1

Secondary Private: 1 Secondary Govt.: 1

Higher Secondary Private: _____ Higher Secondary Govt: 1

2

Chapter 20: TDO-DDO-Collector email sending Soft copy

Mandir Village Report
Under Vishwakarma Yojana
organised By GTU Inbox

S SIDDIQUI Hasmatali 3:03 PM
to TDONAVSARI, DDO_NAV

Respected Sir/Madam
We are students of S.S. Agrawal Institute of Engineering and Technology, Navsari affiliated to Gujarat Technological University(GTU) has been assigned to Vishwakarma Yojana-vy in which students survey the various village and design various amenities to deliver it to them making them ideal for living a better life as per requirement & village problem statement.

As a part of Vishwakarma Yojana's guidelines, we have been asked to inform all the respected officers about our project in which we will shortly notify about Mandir Village Profile of issues for development and our design work for them which is in attachment.

PDF MANDIR VILLAGE (1)..pdf

CHAPTER 21: COMPREHENSIVE REPORT FOR THE ENTIRE VILLAGE

A village represents a community where a group of different classes with different problems live in the same place having common interests who frequently interact socially, economically, and politically. The class-based and the problem-based approach have not identified the village community. Sustainable rural development is vital to the economic, social, and environmental viability of nations. It is essential for poverty eradication since global poverty is overwhelmingly rural. The manifestation of poverty goes beyond the urban-rural divide it has sub regional and regional contexts.

A village is a place, or a destination where there are old houses which are made up of mud are there are hurts, but nowadays the communities have developed, and there is the sturdy house is made up of bricks. But how about modern would be the village, but there are a cattle present in the town where everyone owns some cows and various other animals for their daily needs, and sometimes they also use them for farming like cows are used for milk and where bulls are used in the farm for doing heavy work. It is also saying that people living in the village help each other and understands everyone's problem and provides a solution to each other. The life of the people living in the village is very hard as they must work a lot for earning daily needs not also the money, they must farm their food and must do their household works and have to look after the cattle.

The concept of smartness is popular in respect and honour of human development regardless of a rural or urban area, literate or illiterate in all the countries and India is not omission to it. Like many developing countries, India too is a rural-dominated country. The ideas of "Smart Village" will also attend to multiple challenges such as unplanned urbanization, under-development of villages, migration for economic pursuance, improved standard of living, etc. Smart Village enabling the provision of good education, healthcare, access to clean water, sanitation, and nutrition, the growth of productive enterprises to boost incomes and enhanced security, gender equality, and democratic engagement.

The need for reducing poverty and to develop the general standard of living in rural areas around the world is enormous. Ideas for new approaches have to be created, developed, and implemented in a big way. Design thinking and methods combined with innovation in practice and management as a design inspired innovation - could mostly be such a concept to particularly provide for rural people to empower themselves and kind of improve their living conditions in a very big way.

On the actual other hands, it is important to learn from the sustainable lifestyle practices being followed in rural villages and extrapolate them to the urban setting. Rural development is important not only for the majority of the population residing in rural areas but also for the overall economic expansion of the nation.

Rural development is considered to be of noticeable importance in the country today than in the olden days in the process of the evolution of the nation. It is a strategy that tries to obtain

improved and productivity, higher socio-economic equality and ambition, and stability in social and economic development.

The primary task is to decrease the famine that exists in roughly about 70 percent of the ruralpopulation and to make sufficient and healthy food available. The secondary task is to ensure the availability of clothing and footwear, a clean environment and house, medical attention, recreational provision, education, transport, and communication

- To improve productivity and wages of rural people
- To guarantee increased and quick employment possibilities
- To demolish unemployment and bring a notable decline in underemployment
- To guarantee an increase in the standard of living of the underprivileged population
- To provide the basic needs: elementary educations, healthcare, clean drinking water, rural roads, etc.

An understanding of how to prevent illness through good hygiene and sanitation practices. Local schools with sufficient learning equipment. Children who have benefited from education programs (project dependent). Increased their take-home income because of participation in our livelihoods programs another important objective for us is that our volunteers complete their programs and develop a life-long passion for community development work.

The innovation and entrepreneurial imperatives – with close links to each other – are obvious and probably the most important ingredients in any society today – rich and poor – to find new opportunities and new solutions for a better life for all. Entrepreneurs exploit new ideas, solutions, innovations, and businesses in society or other ways to create value for themselves and their families. And no-where is the ‘entrepreneurial revolution’ so present than in Eastern Asia. Here the unemployment rate is already high and the young generation is growing rapidly, especially in India.

Rural development is the process of improving the quality of life and economic well-being of people living in rural areas. According to the 2011 Census, 68.84% of the population lives in villages. The backwardness of the rural sector would be a major impediment to the overall progress of the economy. India is predominately an agricultural country and farming is their main occupation. According to the 2011 Agricultural Census of India, an estimated 61.5% dependent on agriculture. Technical developments in the field of agriculture have increased the gap between the rich and poor, as the better-off farmers adopted modern farm technology to a greater extent than the small farmers.

The All-India Rural Credit Review Committee in its report warned “If the fruits of development continue to be denied to the large sections of the rural community, while prosperity accrues to some, the tensions social and economic may not only upset the process of orderly and peaceful change in the rural economy but even frustrate the national afford to set up agricultural production.’’ Report of the All-India Rural Credit Committee, New Delhi, 2003 has rightly pointed out that a purely agricultural country remains backward even in respect of agriculture.

Most of the labour force in India depends on agriculture, not because it is remunerative but because there are no alternative employment opportunities. This is a major cause of the backwardness of Indian agriculture. A part of the labour force now engaged in agriculture needs to be shifted to non-agricultural occupations. Until the 1970s, rural development was synonymous with agricultural development and hence focused on increasing agricultural production. Today, Inclusive rural development is a more specific concept than the concept of rural development of earlier, in broader terms, inclusive rural development is about improving the quality of life of all rural people. More specifically, inclusive rural development covers three different but interrelated dimensions: Economic dimension, social dimension, and Political dimension. The economic dimension encompasses providing both capacity and opportunities for the poor and low-income households, in particular, to benefit from economic growth. The social dimension supports the social development of poor and low-income households, promotes gender equality and women's empowerment, and provides social safety nets for vulnerable groups. The political dimension improves the opportunities for the poor and low in come people in rural areas to effectively and equally participate in the political processes at the village level.

The village plays an important role in maintaining the ecological balance as it is a place which is covered by greenery which overcomes the green cover which is less in the cities, and it is a shelter for various animals. Everyone loves their village as they enjoy living in that village and they also like the environment which is present in the town. The village is a very peaceful place where there is very little noise which makes a suitable environment for old people. The overall goal of our Village Development work is that people in poor rural villages have access to their most basic needs, improved education and health, and a means of sustaining their livelihoods and increasing their standard of living. More specifically, they have access to clean, safe drinking water within or near their homes, Sufficient lighting in their homes and a safe and adequate shelter that withstands the elements.