CHAPTER II
DESIGN OF STUDY

Gujarat has abundant natural resources and manpower with industrial culture. The entrepreneurship of Gujarat is best known to the world. Gujarat is gifted with a long coastline. It has 1600 kms coastline and 40 intermediate and minor ports including one major port. Government of Gujarat has declared in its vision 2010 a planning policy of the state that it will give special attention towards coastal and marine based development. One of the objectives of this long term industrial development programme is to develop coastal and marine area as ‘SILVER CORRIDOR’. A systematic policy and planned development of coastal area has a great potential to make Gujarat ‘The Window to the World’ with sea ports as entry points of economic development. Due to unique coastline features of Gujarat, various marine based activities have a high potential of development. Among them due to locational and physical unique advantages the ship breaking industry has emerged as most significant one.

In Gulf of Khambhat (Cambay), west coast of Bhavnagar district is most suitable for ship breaking activity. Therefore, the world’s largest ship breaking yard has developed on this coast at Alang and Sosiya. The geographical location and coastal characteristics of this region have played a basic and crucial role for development of ship breaking industry. The flat terrain, combination of rocky and muddy coastal bed with gentle gradient towards sea, high tidal range and suitable
draught (depth of water) are favourable geographical features for ship breaking activity. Geographers have not paid attention to study this unique industry from the locational and physical aspects. The present study is an attempt to understand and highlight this aspect of coastal geomorphic features and their role in the promotion of ship breaking industry.

Ship breaking industry of Alang-Sosiya has a significant share in the economic development of the region and contribute revenue to the state exchequer and also to the nation. The study also analyses share of the industry in national steel production as 95 percent of the dismantled material of the ship is recycled.

Thus, the objective of the research is to analyse and understand the geographical and coastal characteristics of the location and the region that has promoted the development of ship breaking industry. The study also evaluates the economic advantages of ship breaking industry at regional and national level.

The following are the main objectives of the present study:

1. To highlight the significance of the location of ship breaking activity at Alang-Sosiya in the light of geomorphic features of Saurashtra coast, especially of Gulf of Kambhat (Cambay).

2. To analyse the bathymetric conditions of Gulf of Kambhat and understand the pattern of tides, waves and tidal currents that promote ship breaking activity.
3. To understand the economic recovery of re-rollable scrap and other items and their contribution to steel and allied industries and to overall national economy.

4. To evaluate the economic value and to analyse the distribution pattern of recovered items from ship breaking activity at Alang.

5. To understand the nature, distribution and development of associated industries based on ship breaking activity in the region.

6. To analyze the social, economic and dynamic characteristics of manpower engaged in this activity.

7. To understand the impact of ship breaking activity at Alang on micro and meso level environment.

8. To understand the issue related to industrial safety, security, health and government policies and measures.

Location

Bhavnagar district is situated in the south-east corner of the Saurashtra peninsular region of Gujarat. It lies between 21°18' and 22°18' north latitude and between 71°15' and 72°18' east longitude. The district is bounded by Surendranagar and Ahmedabad districts on the north, Rajkot and Amreli district on the west, Arabian Sea and part of Amreli district on the south and Gulf of Khambhat (Cambay) on the east. Bhavnagar district has nearly 144 km long coast broken by many creeks (Fig. 2.1).
Bhavnagar was known as Gohlwad during pre-independence period. It was ruled by the various lineage of Gohil Rajputs who came to Saurashtra from Rajasthan in the later half of the 13th century. The royalty of state can be found by the development activities such as their own railwayline to Talaya, establishment of Sir T. Hospital, laying underground drainage system, water filtration plant and good educational institutions in the state.

Bhavnagar is the 5th largest district in the state having 11 talukas with a population of 2,469,630 as per 2001 census.

Alang falls in to Talaja taluka of Bhavnagar district having a population of 18,475 as per 2001 census. It is on Bhavnagar-Veraval coastal highway and in southern part of the district. Alang is 55 km from the district headquarters of Bhavnagar. Alang has got the status of classified town/census town as per the 2001 census.

The study area

The Alang-Sosiya ship breaking yard which is covered by the port limits of Talaja (Admiralty Chart-208) and is situated adjacent to Alang light house. The yard is nearly 10 km long along the coast. Its latitudinal location extends from 21°25'-21°29' north and longitudinal location from 72°15'-72°16' east. There are in all 183 plots of 50 meters coastal length and varies in width from 30 meters to 120 meters placed parallel to the coast. The larger width plots are 10 in number for breaking very large cargo containers and ultra large cargo containers (VLCCS
and ULCCS). Amongst total 183 plots, 92 are in Alang yard and 91 in Sosiya yard. The ship breaking area of Alang and Sosiya are 2,19,617 sqmts and 1,69,575 sqmts respectively (GMB 2005) (Fig. 2.2). Alang ship breaking yard has the natural advantages of high tidal range, a gentle gradient from shore towards sea and a firm ground to hold the ships in position during dismantling stage.

The yard is linked with Bhavnagar-Veraval coastal highway by an all weather two lane asphalt road, through Trapaj (about 10 km) and also through Sanodar village (about 23 km). The nearest railway station is Bhavnagar which is at a distance of 55 kms and in turn is linked with Ahmedabad by broadguage. The nearest airport and all weather port is Bhavnagar.

Data Base and Methods

This study is based on both primary and secondary data. The primary data is collected, from workers of the yard as well as plot owners called ship breakers, through questionnaires. The necessary and useful information is collected through secondary data also. The important sources of secondary data include the offices of the Gujarat Maritime Board, Department of Customs and Excise, INDEXT B, Saurashtra Chambers of Commers, Gujarat Shipbreakers’ Association, Bhavnagar Industrial Development Authorities, Library of Bhavnagar University and Red Cross Hospital. The other sources of data include the published and unpublished reports, thesis and articles published in various research journals, popular journals and daily newspapers. The various hypothesis related to the aspects of levels of
education, duration of stay, income, savings, mode of money transfer etc. were tested by Chi-Square test and intervariable relations are interpreted and established. To show the migration of workers from other states choropleth and flow diagrams are prepared with the help of GIS software. The land-use map of Alang-Sosiya ship breaking yard is also prepared on computer with drawing software.

An outline of the Thesis

The present study focuses its attention on two important aspects of a ship breaking activity that is taking place on the Saurashtra coast. Firstly, the study identified and analyzes the coastal geomorphic characteristics which support the activity and secondly it evaluates the economic importance of ship breaking activity in India. The present research work is organized into nine chapters.

The second chapter presents the objectives, the methodology and database of the present study. It also describes the study area in detail. The primary data collection is carried out through field survey, questionnaire sample survey and field mapping and secondary data are collected through various government and non-government organizations. Simple statistical method namely Chi-square test has been suitably used along with cartographic techniques for data analysis.

The third chapter focuses on Geo-Environmental features of the study area. The major features like physiography, drainage, hydrogeology, coastal geomorphology, shoreline morphology, and bathymetry are discussed in length in this chapter. Gujarat is one of the important coastal states of India having the
The longest coastline of the country. Two Gulfs of Arabian Sea, Gulf of Kutch and Gulf of Khambhat (Cambay) have distinct geomorphic characteristics. The geomorphic, lithological and tectonic features of the coastal areas together with the complex tide dominated behaviour of the gulf water has provided uniqueness to this coastal segment.

The fourth chapter indicates the economic implications of ship breaking industry. Iron and steel industry is considered as the most basic industry for development. Amongst the various methods of procuring steel, re-rolling units play an important role in recycling of steel. There are four principal sources of re-rollable scrap supply in the country namely imports, indigenous heavy capital scrap, indigenous heavy prompt or process scrap and scraps recovered by breaking ships. Re-rolling mills buy steel scrap in bulk quantities from ship breaking units.

The fifth chapter indicates inter industrial linkages. In the Bhavnagar district the industrial development is confined to only three talukas, namely Bhavnagar, Sihor and Mahuva. After the development of ship breaking industry at Alang in 1993, various ancillary industries have flourished in Bhavnagar district. Steel re-rolling mills, oxygen plants, transport sector are some of the major activities dependent on ship breaking. Main activity of cutting ships at Alang is carried out by LPG operated gas cutter. Ships are broken into small fragments by gas cutting. In this process LPG and oxygen are used. To fulfil the requirement of oxygen cylinders, numbers of oxygen plants are established along the Trapaj-Bhavnagar highway. In the historical past Bhavnagar was famous centre of a re-
rolling of steel. After the development of ship breaking industry at Alang, nearly 80 re-rolling mills have been established in Bhavnagar and Sihor, a town 20 km away from Bhavnagar. This chapter analyzes the growth of such ancillary industries in Bhavnagar district and also other districts of Gujarat.

The sixth chapter is based on the study profile of human resources in the industry. The study reveals that the migrant workers are more efficient compared to local workers in the yard. As a result of that 90 percent of the population in the ship breaking yard is migrant workers from central and eastern states of India. Eighty Six percent of total workers of Alang have migrated from Uttar Pradesh, Bihar, Orissa and Jharkhand states because of very less employment opportunities in their respective states. Alang has provided good economic opportunities even to unskilled and illiterate workers. The migrant workers are saving nearly 65 percent of their earning to send to their native places.

The seventh chapter focuses on the environmental aspects of ship breaking industry. There are toxic risks involved in ship breaking. Asbestos, Polychlorinated Biphenyls (PCBs), lead and other heavy metals and dioxin are among a long list of substances contained in one form or the other found in ships which are sold after breaking International Law prohibits the export of hazardous waste from OECD countries to non-OECD countries. The Asian yards too have come in for severe criticism, as have national and local authorities that condone their working practices. This chapter analyses the impact of ship breaking industry on physical, chemical, biological and atmospheric characteristics. Effect of ship
breaking onshore and offshore condition is also highlighted in this chapter. As ship breaking is a dangerous and risky business, many problems are also associated with this industry. In India the import of toxic ships-for scrap is not allowed but most of the ships dismantled today were built in the 1970. That is to say prior to the banning of many hazardous materials. On the Asian beaches these toxic substances are released into the environment.

The final chapter includes the significant findings and conclusions derived from the analytical research of the ship breaking industry of Alang-Sosia ship breaking yard. Some recommendations are also made to make the activity more safe and 'clean'.