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Study and Analysis of Dry Wall Construction

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Abstract: *Delay in Building Construction Project is one of the most common problems. Delay can be defined as time overrun or extension of time to complete the project. Delay is situation when the actual progress of a construction project slower than the planned schedule or late completion of the projects. The causes of delay in Building Construction Projects are taken from the pass literature review. The literature reviews are summarized and the delay framework is constructed based on literature review a drywall is a high-performance lightweight interior wall system consisting of a GI steel frame, encased in gypsum plasterboard on either side attached with self- drilling drywall screws. The joints are then tapped and finished with gypsum jointing compounds. Drywall can be built three to four times faster than conventional masonry (brick/block) walls. Drywall name implies it is a water free process and hence can be put up much faster. Drywall is easy to put up and need less labour. Drywalls are eight to load. This assume significance in high-rise structures, resulting in not only structural cost saving, but a reduction in the burden of moving up material.*

Keywords *- Dry wall, Gypsum, Masonary, Building Construction*

I. INTRODUCTION

1.1 GENERAL:

Drywall (also known as Plasterboard, Wallboard, Gypsum board, Or Gyprock) is a panel made of gypsum plaster pressed between two thick sheets of paper. It is used to make interior walls and ceilings. Drywall construction became prevalent as a speedier alternative to traditional masonry wall construction, lath and plaster, at all.

1.2 BACKGROUND:

Gypsum plasterboard systems are very fast to erect and provide huge labour saving and flexibility in construction. Globally, gypsum drywall systems are used as a replacement of brick and mortar construction. In the developed world, the building solutions are fairly advanced from a performance point of view as the construction practices have evolved over a period of time. In India the construction practices are evolving and hence the use of advanced building systems focused on performances like fire, acoustics etc. is not very wide spread as yet. Normal drywall is made from gypsum- based plaster. The new drywall will contain the paraffin capsules for almost half the mix. The new drywall will be filled with tiny beads of paraffin that would absorb heat during the day, and release it at night.

It could be the latest thing in green building technology. As the building heats up during the day from sunlight, human activity, computers, appliances, etc. the beads of paraffin in the drywall will turn into a liquid state as they absorb the heat inside the building.

This helps cool the building. Conversely, at night when the beads start to return to a solid it releases the stored heat, keeping the building warmer. It could very well save a building's energy consumption by 40%.Plaster made from gypsum has been used as a construction material for thousands of years. In fact, plaster applied at least 4,000 years ago to walls inside the Great pyramids of Egypt is still in good condition. Today drywall panels are widely utilized in modern construction around the world.

1.3 OBJECTIVES OF STUDY:

1. To study the awareness of dry wall technology.
2. To check feasibility with comparison to masonry wall.
3. To evaluate the market demand of dry wall technology.

1.4 SCOPE OF WORK:

The proposed research is to be carried out in the form of questionnaire survey and this survey is limited up to Aurangabad district. This study will be conducted by collecting the data from the primary sources in the form of questionnaire and review. These primary sources are selected from the stakeholders of the construction industry that directly affects the decision on material selection, working and approval for any construction project, which are: structural engineer, architect, contractor and owner/developer.

1.5 NEED OF STUDY:

In prevailing construction techniques of wall construction following shortcomings have been observed:

1. Speed in construction work: - Present methods and techniques of wall construction needs attention towards the speed and progress of work.
2. Varying quality of construction: - Present/prevailing construction techniques have been found with non-consistent output at quality level which ultimately effects the internal aesthetics of construction.
3. Poor fire resistance: - Wall construction needs more fire resistance
4. Energy Consumption: - Researches and surveys have also concluded that prevailing brick wall construction boned with cementitious material is found less energy efficient. Aurangabad is a one of the major city and one out of five Mahanagarpalika of Maharashtra. and Aurangabad have two major business one is textile business at national level and another one is diamond business at the international level. So this demands the high rise building construction as it is already congested and conventional techniques will consume an ample of time, which cannot be afforded in present era considering the value of time and speed of development. Very old construction, from the time of Britisher is still in existence in some part of Aurangabad city which demands demolition and reconstruction or heavy repairs, maintenance and rehabilitation. Also very less space for the construction work at the construction site, and less material and man power available which implies the favourable constraints for the selection of these technology. and my home town and this is one of the alternative that is still undiscovered for:

1. This type of construction reduces the dead load and that's way increasing the life of the existing structure with reduced load bearing capacity.
2. Faster development - reconstruction of such structures an alternative to the conventional masonry construction to achieve the benefits over it with pace of time “time is money”.
3. Improved performance.
4. Reduced life cycle cost.

II. DRY WALL

2.1 HISTORICAL PERSPECTIVE

Gypsum has been known for centuries and is one of the oldest building materials in the world. The earliest use of gypsum discovered was in Anatolia around 6000 B.C. Later, in about 3700 B.C., gypsum was used on the interiors of the great pyramids in Egypt. One of the early uses of gypsum in building construction appears to have occurred in 3700 B.C. when the Egyptians used gypsum blocks and plaster applied over woven straw lath in the building of the pyramid of Cheops. As a testimony to the strength and durability of gypsum, some of this construction is still intact and viewable, including walls decorated with murals composed of tinted plaster. For centuries now, gypsum has played a crucial role in construction. American settlers recognized gypsum‟s potential use as plaster and as a soil amendment. Modern gypsum board has as its predecessor a product called “Sackett Board,” a composite material that was made of layers of thin plaster placed between four plies of wool felt paper. Sackett Board was patented in 1894 by Augustine Sackett, the man generally considered to be the grandfather of the gypsum board manufacturing industry.

Today, the United States‟ principal interior wall material is gypsum wallboard. Often also referred to as drywall, rock, plasterboard, gyp-board, or by the trade names Sheetrock or Gyp-roc, gypsum drywall is a sheet of gypsum with a paper facing and backing. The wallboard is approximately 92% gypsum (calcium sulphate Dehydrate $CaSO_4 \cdot 2H_2O$), 7% paper, and 1% impurities and additives. Gypsum is found in every continent of the world and is one of the most widely used minerals.

2.2 SCENARIO:

2.2.1 WORLD MARKET SCENARIO

Although use of gypsum wallboard increased worldwide, only industrialized nations, such as the United States, used gypsum primarily for wallboard products. In developing countries especially in the Middle East and Asia, most gypsum was used in the production of cement or as a plaster product. Estimated world production capacity for gypsum wallboard in 2001 exceeded 60 billion square feet or about 5.6 billion square meters at more than 250 plants worldwide. Almost one-half of this capacity was in the United States. Asia mainly China and Western Europe each accounted for about one- fifth. Construction or expansion of dozens of

wallboard plants is underway in many countries throughout the world. The use of synthetic gypsum by United States and other industrialized nations has increased.

2.2.2 MARKET SCENARIO IN UNITED STATES

Gypsum is omnipresent in modern construction in United States. Nearly Every house constructed or renovated in the past 40 years has incorporated gypsum board on most of its walls and ceilings. Hotels, office buildings, schools, and even detention facilities are full of gypsum board, gypsum panels, and gypsum plaster. In the United States, most gypsum is used to manufacture wallboard and plaster for homes, offices and commercial buildings. According to a study carried out by Mineral Information Institute (MII) in 2001, an average new American home contains more than 7.31 metric tons of gypsum or, in other terms, more than 6,144 square feet or 571 square meters of gypsum wallboard.

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III. METHODOLOGY

First phase of the work includes finalization of the scope and objective of the study. After this, literature related to feasibility of Dry Technology was determined. Now, based on the various aspects of feasibility of Dry wall Technology questionnaire was prepared for carrying out the survey analysis. The questionnaire is to be circulated amongst the various architects, site engineer, structural engineer, developer and contractors and consultancies to get their opinions regarding the feasibility of Dry wall Technology in construction projects in Aurangabad region. Later, information through different set of questionnaires is to be collected and shall be analysed according to the aim of study. The working methodology comprises of following identifiable tasks to be performed:

1. Collect the data of available (possible) all the feasibility parameters.
2. Prepare questionnaire to carry survey for check feasibility, awareness and market demand of the Dry wall Technology from view point of architects, site engineer, structural engineer, developer and contractors and consultancies from construction industry.
3. Analyse and discuss the results..

3.1 QUESTIONNAIRE DESIGN

Data are to be gathered through a questionnaire. The causes of 25 feasibility criteria. Here, design of questionnaire is discussed as how it is prepared.

1. SECTION A: INTRODUCTION ABOUT DRY WALL

This section contains the basic information about the dry wall technology, as it may seem a new concept or theory for many of the selected respondents in targeted area. The main objective of providing this section is to provide the basic knowledge about this system to the respondents before filling the questionnaire or before giving their opinions.

2. SECTION B: SAMPLE COPY FOR FILLING QUESTIONNERY

For ease of the respondents an example has been stated in this particular section that how exactly the respondents have to fill the questionnaire form. Which will be helpful to respondent as the guidance, as well as to researcher with ease in analysis due to uniformity.

IV. FIGURES AND TABLES

Table 4.1: Percentage of Response

	Questionnaire sent	**Questionnaire received**	**Response %**
CONSULTANTS	25	17	68.00
ARCHITECT	25	20	80.00
CONTRACTOR	25	19	76.00
BUILDER/OWNER	25	21	84.00
TOTAL	100	77	77

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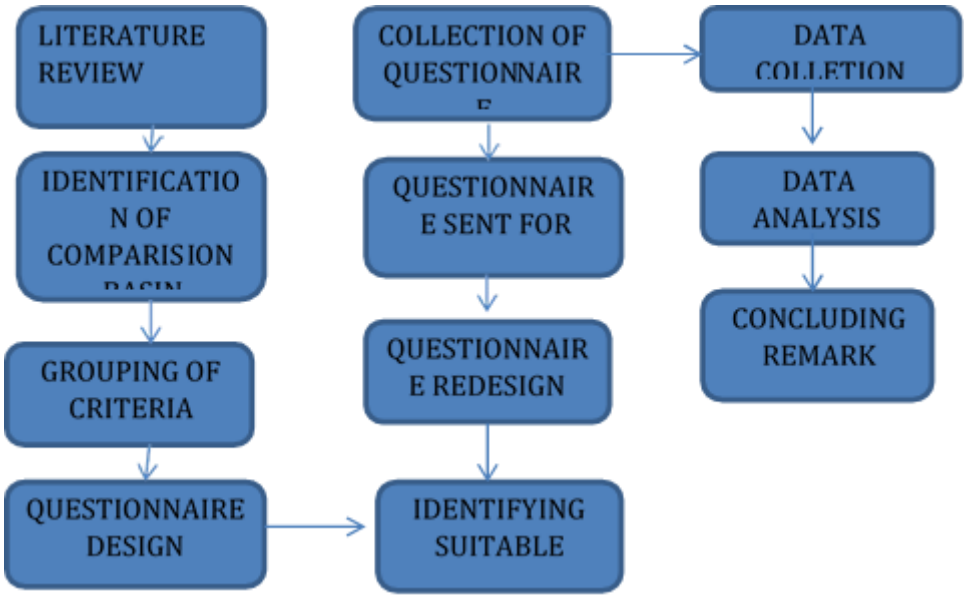
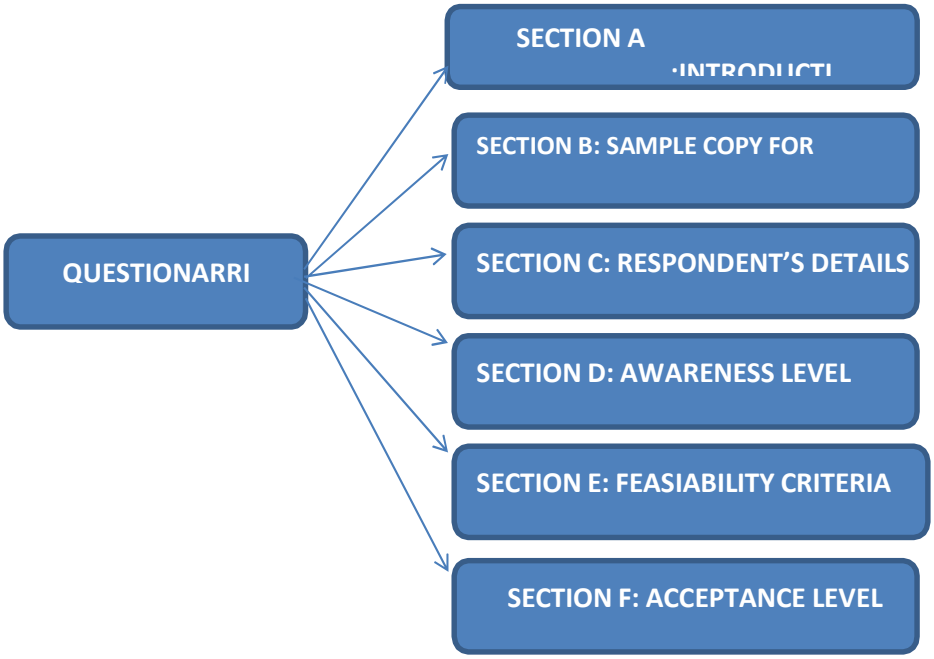


4.1: FLOW CHART FOR RESEARCH METHODOLOGY



4.2: Sample Copy for Filling Questionnaire

Parameter	**Masonry Wall**		**Dry Wall**	
USASE	External and Internal	yes	Internal partition wall	
WEIGHT (3mt. wall height)	200 kg/m^2	yes	32kg/m^2 84% lighter	
FIRE RESISTANCE	Non rated		More than 1 hr and can be increased	yes
ACOUSTICS PERFORMANCE	36dB		45dB with Rockwool insulation can further increased	yes

V. CONCLUSION

1. Observation of previous and present flood heights and inundated areas.
2. Statistical, hydrological and hydraulic analyses.
3. Mapping flooded areas and flood heights for future flood scenarios.
4. Long-term land use planning and regulation, Engineering land and construction of structures to control or withstand flooding

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