

Study of off-site construction Technique - Bathroom Pods

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Abstract: Many construction projects suffer from time and cost overruns due to several of factors. Although the long introduced off-site construction has promised to solve and improve the current construction methods and scenario in our country, but has not gained enough popularity yet. Continuity of resources is a main issue for mass housing construction projects which are highly repetitive in nature. Therefore resources are being deployed repeatedly for the similar or identical tasks. In order to eradicate delays in mobilizing resources from one location to other, an efficient resource planning is required.

Index Terms: Bathroom pods, design, innovation, maintenance, offsite, performance.

I. INTRODUCTION

Offsite construction, such as bathroom pods, is completed in a factory, it capitalizes on the ability to move product in controlled manufacturing conditions, and on tight inventory control and project schedules. It can have minimum site impact if delivered carefully and strategically. Projects incorporated into site construction with tight deadlines and those built in secure environments, those where weather may impede construction, and those needing repetitive interior structures, offsite construction are useful. This paper focuses on the interspersing of bathroom pods into traditional construction methods.

On construction projects, many elements are repetitive with consistent quality and finishes are highly sought after for a successful project. Bathrooms built offsite will offer fewer defects. Offsite construction method allows the manufacturer the ability to research and implement aesthetic and functional innovations to better improve the quality of the bathroom pod. Using offsite construction lowers costs by reducing construction time, improving quality, and eliminating the bathroom defects list. With traditional building, a multitude of trades need to be organized to realize the bathroom design and this requires a high degree of supervision and management on site to ensure correct sequencing and quality of work from plumbers, electricians, tilers, floor layers, sealant applicators, decorators, glaziers, carpenters, and other specialists.

II. LITERATURE REVIEW

1. Imtiaz Ali Bhatti, Samiullah Sohu, Mouzzam Ali Lohar, Sarang Khan Sariyo, "Replacement of In-situ Bathrooms with POD Bathrooms to Save Time & Money with in construction of fast track projects" (2017)

Success of any project is strongly interrelated with its context and industry. This study is based on the construction 3-star hotel project of Premier inn hotel Dubai, UAE. The project team were faced challenge to deliver a 389-bed room hotel within 14 months including holy month of Ramzan and two summers where working hours are restricted. Originally the hotel was designed using traditional construction method which included in- situ bathrooms which are usually challenging and costly due to many trades are in a confined space then the project team decided to replace the in-situ bathrooms with POD bathrooms. Objective of study was to produce high production and high quality product with less time and cost to meet the requirements.

2. Wei Pan, Alistair G. F. Gibb, "Maintenance performance evaluation of offsite and in situ bathrooms" (2010)

Offsite construction the innovative technique employed in the contemporary UK construction sector. Building maintenance accounts for over 5% of the UK's gross domestic product where bathrooms are regarded as a critical area, with high risks and defects. The importance of maintenance has been largely underestimated and research into this area appears to be limited. This study aims to address this knowledge gap by investigating the maintenance performance of offsite and in situ bathrooms.

3. Mark D Taylor, Amy Fisher, Sam C Wamuziri, "A comparison of modern methods of bathroom construction: a project case study" (2009)

The case study in this paper examines the site based application of two modern methods of offsite construction applied to the construction of high specification bathrooms for the construction of a prestigious city centre hotel development. The two methods are bathroom pods and a pre-finished 'kit' of parts to be assembled on site. The requirement of client was high specification of finishes and fittings. It was deemed that an offsite manufactured solution would provide assurance in relation to the programme, quality and cost of the construction.

III. DETAILS

Bath pods are prefabricated bathrooms and washrooms, Three-dimensional self-supporting element of structure which are prefabricated offsite, with a floor base frame, walls and ceiling then delivered to the site, complete with all architectural fittings and fixtures.

Components of Bath pods-

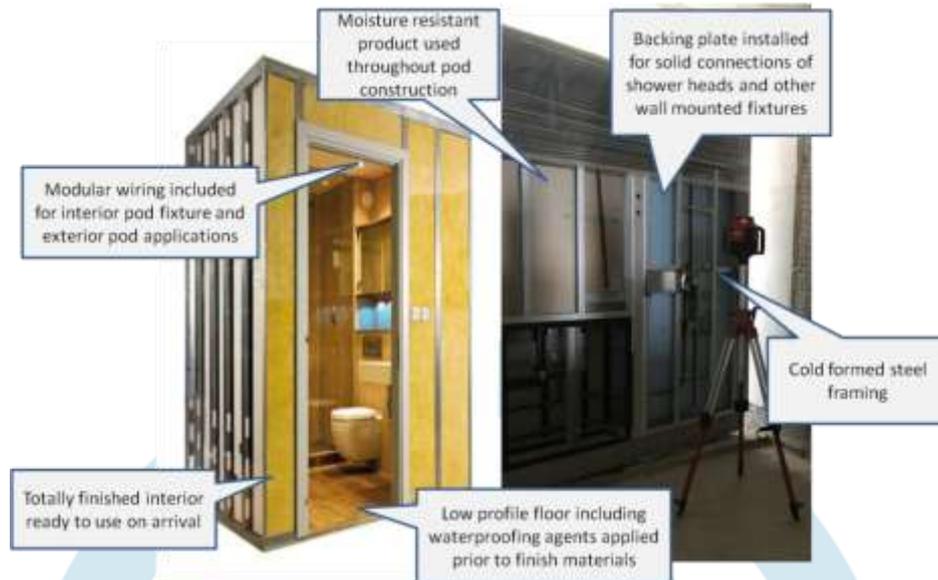


Fig No. 1: Components of Bath Pod

Processes involved in construction-

Methodology adopted for construction of Bath pod varies from manufacturer to manufacturer. The methodology and processes we have studied is as mentioned below.

1. Design

Customer specified designs are computerized in a three dimensional model.

2. Manufacturing of units

Wall frames are manufactured in-house from rolled galvanized steel 'C' section, Steel walls are double lined with 11 mm OSB3 (Oriented strand board type 3) and 12.5 mm moisture resistant plaster board.

Self-tapping screws are used to fix both layers of sheet material to the inside of the frame,

Bath pods are fitted with GRP composite ceiling panel which enhances appearance and durability of units. Various construction activities involved are as follows:

- Slab casting
 - Concrete M50
 - 6mm,12mm diameter bars
 1. Level surface with floater m/c
 2. De-shutter mould after 24 hours
 3. Invert by lifting machine
 4. Curing (7-8 days)
 5. Stacking (25 days)
- Flooring
 - Crack checking
 - Waterproofing
 - Tiling
 - Cleaning
 - Gap filling
- Framing and assembling of parts
- Dado and Plumbing
- Electrical
- Painting
- Testing, Cleaning and Packaging

3. Delivered to site carefully

The finished units are delivered to site by truck or tractor to job site on the project timeline. Delivery logistics are carefully planned according to the schedule of the project.

Site based cranes are used to hoist the units into the building structure.

4. Installation

Units are positioned onto special rollers into its final position. Three rollers are needed two fixed placed near back, corners and one steering roller placed at front in central position. When the pods are in its final position, rollers are removed.

Installation process involves-

- Cleaning
- Marking location as per drawing
- Levelling of surface and adjustment by packers
- Shifting pod by rollers
- Fixing it within marked position
- Plumb checking
- Levelling and slope checking internally
- Gap filling by grout
- Finishing of external walls and connections

IV. ADVANTAGES

After the text edit has been completed, the paper is ready for the template. Duplicate the template file by using the Save As command, and use the naming convention prescribed by your conference for the name of your paper. In this newly created file, highlight all of the contents and import your prepared text file. You are now ready to style your paper; use the scroll down window on the left of the MS Word Formatting toolbar.

Reduction of onsite building time by up to 80% compared to the construction of a traditional bathroom. (or kitchen).

Your costs become savings: once the budget has been defined and the estimate has been approved, the cost will not change, allowing the client to optimize the investment.

Turn-key products, ready to install.

One supplier for design, production, delivery, installation and after-sales service.

High quality, guaranteed by stringent testing and the industrialization of a handcrafted approach which makes it possible to create a tailor-made product, industrially produced but finished down to the smallest detail by a team of highly specialized artisans.

The possibility of creating a unique customized bathroom pod.

V. CONCLUSION

Off-site construction is gaining popularity because of time saving, cost saving and improving Quality. The rise is still lower than the desired; the industry would have liked to have seen. By widely displaying the impact that new off-site technology can have into the wider world, many companies are making innovation and improvement in off-site construction resulting in ease of construction by achieving Time, Cost, Quality and Safety at same time. Companies have been able to promote these new methods to the boardroom with more confidence. The major benefit of off-site industry to the wider masses involved in construction impacting its growth for the better.

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