

# CONTOUR CRAFTING

*A step towards rapid construction*

<sup>1st</sup> Ms. Ateka Nulwala, <sup>2nd</sup> Ar. Ashish Sharma  
<sup>1st</sup> Student, <sup>2nd</sup> Associate professor  
<sup>1st</sup> Amity School of Architecture and Planning  
<sup>1st</sup> Amity University, Gwalior, Madhya Pradesh

**Abstract:** Building construction has always been a laborious job of all time. From casting a foundation to the construction of facade it takes years of construction. To simplify this tedious task, Dr. Behrokh Khoshnevis have come up with CONTOUR CRAFTING technology. Contour crafting is an upcoming technology that uses hi-tech automated machines to build up free form structures by repeatedly laying down layers of material such as concrete. This research aims to provide detailed information of contour crafting technology and to foster it in our future construction technology.

**IndexTerms - Contour Crafting, Future Construction, Automated Machines**

## I. INTRODUCTION

Contour crafting (CC) is a layered fabrication technology used to build houses, buildings, towers, etc. that uses a computer automated crane or gantry to build rapidly and steadily with considerably very less manual labor. CC is the newly emerged construction technology delved by Dr. Behrokh Khoshnevis of the University of California. He decided to accustom this technology for a quick construction of homes in areas affected by natural disasters like earthquakes that has devastated many countries.

After the years of research, they have been able to come up with 3d printing technology that has the capability of constructing any 3d shape or objects in a matter of time. In this technology, any 3d plan or model is printed into a real object. This technology is one of the most innovative developments in various industrial fields, mostly in Construction Industry.

CC is a self-automated construction technology that uses 3d printers which are able to print intact houses in very less time. With the help of this technology, one can built whole structure like houses, apartments or different colonies including its sub components, each with very distinctive conventional designs in one go.

## II. BENEFITS OF CONTOUR CRAFTING

Contour crafting can be a revolutionary invention in the construction industry. It can also be very beneficial and mass market product if used appropriately and efficiently with proper approach towards the upcoming demands. In developing countries like India, it could create a bigger market for forthcoming industries and will help in development of the city, state and country. This technology creates an improved platform for employment and could also bring down inflation rate of the country up to a greater extent. Contour crafting has a potential to bring a better transformation in the construction field if used judiciously.

## III. FEATURES OF CONTOUR CRAFTING

### 3.1 Construction time

The production rate of CC is very high as it takes very less amount of time to construct any structure. For example, a normal house construction takes almost a month or two excluding all the interior decoration where with the help of contour crafting we can build a house within 24 to 28 hours. Hence, due to very less construction time the production rate increases prominently.

### 3.2 Construction rate

In CC, cost of construction decreases efficiently as it very less man power and limited amount of material that is required. Due to all the automated features, it avoids the wastage of all the materials that is used in construction. The installation of equipment is one time investment and then it benefits by reducing the cost of construction. Normally cost of construction of a house of single storey by typical means is Rs. 2000 sq.ft with built up area of 1000 sq.ft which sums up to Rs 2000000 in total, where as in CC it merely costs Rs. 360000. Thus, it has great potential in economic sector as well.

### 3.3 Architectural adaptability

The major problem faced during the time of construction i.e. implementation of the design properly without any faults during construction. Contour crafting can create any form or structure provided by the designer or architect of the building

as it uses 3d printers which has automated features and commands to give an accurate and precise outcome of the given design.

### 3.4 Impact of environment

Environmentalists, nowadays has a major concern of release of gases like Carbon dioxide and Nitrogen during the construction that majorly affects the environment. In CC, 3d printer uses recycled industrial wastes to bind the constituent of the building which does not harm the environment and also provides the stability to the structure without any wastage of material.

### 3.5 Stability and quality of construction

As it is fully automated mechanism, it doesn't make any errors or defaults at the time of construction. It requires well aware supervising personnel to manage the commands of the machine and supervise the overall construction. This excludes the chance of confusion or blunder during the time of construction.

## IV. DEMERITS OF CONTOUR CRAFTING

Though CC has many appreciable features but there are some drawbacks of this technology. It creates quite a good opportunity for the educated class of the country but it declines the opportunities for the labor class as it is fully automated and could only be operated by well aware professionals. Also, strength of the structure by this type of construction is quite less as compared to normal concrete construction.

## V. IMPLEMENTATION OF CONTOUR CRAFTING

Contour crafting is implemented recently in few parts of the world.

In China, Winsun Decoration Design Engineering built 10 houses by the use of 3d printers and contour crafting technology with the help recycled industrial waste materials within 24 hours.

In New York, Adam Kushner, architect/contractor has started the use of contour crafting technology with the help of 3d printers in his estate.

Also, NASA, in USA has tied up with University of Southern California to build bots similar to 3d printers which would help in the construction of roads, landing pads, radiation proof walls, etc. on the lunar surface.

## VI. CONCLUSION

Contour crafting has a major beneficiary uses in the construction technology and promises to have great future once used prominently all over the world. It also has much innovative approach towards creating nations significantly. It has proved to be a great asset being in developing stage. Majorly in developing countries, it could help in uprising and development of the country. Hence, contour crafting technology should be used worldwide so as to have better future.

## VII. REFERENCES:

- [1]Nobil, T. 2016. Contour Crafting: A Potential Revolution In The Construction Industry. International Journal of Research in Advent Technology,(E-ISSN: 2321-9637)
- [2] Research by Dr. Behrokh Khoshnevis, University of Southern California