

3D Printing by Construction and Other Wastes for Making Affordable Buildings

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Abstract— 3D printing is an innovative technology helps us to print i.e. print the object what we make on the computer. Products made by this technology will be economical due to many reasons such as no wastage and no storage requires. By making products economical, we can finally make or design a low cost house which will finally helpful in Governmental or any other low cost housing scheme.

Keywords: 3D Printing, Affordable Buildings, Ornamental Elements

I. INTRODUCTION

3D printing is an additive technology in which objects are built up in a great many very thin layers. The first commercial 3D printer was based on a technique called stereo lithography. This was invented by Charles Hull in 1984.

The basic process consists of scanning an object to get the 3D printed product, making the 3D object from the scanned data digitally clearly showing different components of it and selecting the materials needed for each of the components, slicing it digitally layer by layer showing different components clearly and printing the layers one above another.

II. SCOPE

As 3D printing technology can print or make the virtual object made on the computer and we can make anything virtually its application in unlimited In the conventional printers we are using ink to print but here, we can use any material also the materials which are treated as waste materials.

III. USE IN AFFORDABLE CONSTRUCTION

A. Bricks:

A brick is a primary element in a basic construction so the availability and the economy of the brick wall construction affects the final cost of the building. A brick made of construction waste can be produced and even for lighter construction hollow bricks can be made.

As the final product is in our hand we can make it like the suggested shapes as per Fig.1. The tongue and groove arrangement helps in bonding and it may be suitable for designing an earthquake resistant building as per site conditions.

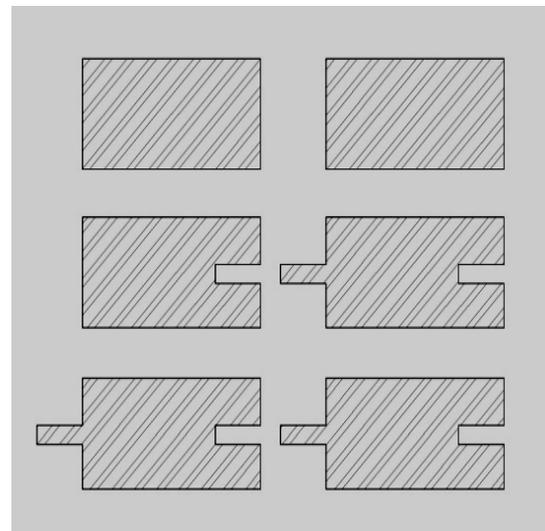


Fig. 1 Various Shapes of Bricks

B. Pavements:

At this stage, it is very difficult to say the limitation of this printing process that how bigger can this printer print or make. Still there is a possibility to make small components of bigger pavements having the same tongue and groove type arrangement. If requires either for the flexibility, rigidity or for the strength, materials like epoxy resins, fibres etc can be added.

C. Ornamental Elements:

Beauty of a building is not a priority while making an affordable building, but still is the requirement of a normal person. In the conventional design and making process, due to wastages the cost of the final product is higher. In 3D printing process we are making as per the sizes and we are also utilizing the waste material, so the final product cost is comparatively very less. Later on finishing work may be done as per the requirement.

D. Monolithic Structures and deck slabs:

The continuity in the whole structure is an essential part of a monolithic structure, and where it is maintained it's an example of a perfect structure. For joint less structure continuous printing or making is required. We can add plastic like substance to achieve this goal.

E. Plumbing and Electrical fixtures:

Plastic waste is collected and can be remoulded for the various fixtures according to their shapes and sizes. This process can also being done without taking the help of 3D printing process but this process has its own advantages such as: no need of storing various components having different sizes and complex shape can be made which may not be available in the market.

IV. CONCLUDING REMARKS

Apart from the above possible components we can make many other building components by using 3D printing technology and also utilizing construction and other waste properly. This will reduce the waste as well as we are getting a product by recycling process and it is ultimately beneficial to the environment. If the said process is being done on large scale it will be economical and due to that we can construct affordable buildings.

REFERENCES

- [1] Internet blogs and URLs on current research.

