TIN CONSTRUCTION

AUTHOR –
CHITRESH SHARMA
(chitreshsharma140@gmail.com)
+91 8962643787
CO- AUTHOR-
GAURAV DESHMUKH
BALJEET KAUR
B.ARCH 3RD SEM 2ND YEAR
AMITY SCHOOL OF ARCHITECTURE AND PLANNING
AMITY UNIVERSITY, MADHYA PRADESH

ABSTRACT-

The development of civilisation has relied heavily on the discovery of metals. Prehistoric man used metals to build tools and weapons and as our knowledge of metallurgy has developed, metals have played an essential role in the advancement of agriculture, transport, arts and craft, construction– forging the path to today's modern society. Tin was one of the first metals known to man. Tin can building in New Mexico originated in the early 1980s as a response to the massive amounts of trash being discarded and the wasteful nature of common building practices .Tin can construction was an attempt to utilize a readily available resource that was normally sent to landfills canters. Our aspiration is to do construction with tin or we can say cans with tin coating. A tin can wall is a wall constructed from tin can, which are not a common building source. The cans can be laid in concrete, stacked vertically on top of each other, and crushed or cut and flattened to be used as shingles. They can also be used for furniture. We are desiderating to use such material in skyscraper and in foundation of residence as well.

Keywords:

- Tin cans, durable, waste, shingles, land fills, soft, malleable, furniture.

I. INTRODUCTION-

Since the invention, tin cans have been a popular way to preserve food products that otherwise would quickly go bad. Tin cans are in some ways responsible for changing cheaper materials, but they are still often called tin cans. Tin cans were invented in England by merchant Peter Durand, who received a patent for it in 1810. The first canning factory opened in England in 1813. Tin cans are used to store foods such as fruits and vegetables in an airtight container that helps preserve them for long periods of time. Cans are no longer made entirely of tin. For much of the 20th century, cans were made primarily of tinplate steel. In the 1960s, aluminium cans were introduced and, because they can be made more cheaply, replaced tin cans. Can sizes are standard in the United States. There are various sizes, from small

cans containing one serving of a food item to large cans intended for distribution to schools, restaurants, and so forth. Outside

the United States, can sizes are different because they are based on the metric system. Americans, who live in a 'tin can civilisation', use more than 200 million cans each day. The world consumes an average of 8-10kg of this metal per capita (according to TATA).

II. REVIEW OF LITERATURE:

The first experimental house completed near Taos, New Mexico was made using empty steel beer and soft drink cans. The house was built using curved walls because they have more strength, resulting in pie-shaped interior rooms. There is a lawn on the roof below the overhang at the top of the structure. Re-cycled paper pulp is used to cover the ceiling of the interior. Later homes were built without curved walls after the designer found the cans would support much more weight than they would have to bear.

Another experimental house made of empty steel beer and soft drink can constructed near Taos, New Mexico. This house will be plastered with adobe(kind of clay) like the other homes in the area, but will have cost up to 20% less, according to Architect Michael Reynolds the rounded walls are load bearing and are made with building blocks of eight cans. The flat walls are not load bearing and are built with single cans laid horizontally, in the mortar.

III. PREPARING A TIN CAN WALL

A “traditional” tin can wall is made by horizontally stacking tin cans in a concrete matrix. The cans are laid side by side and in alternating rows, similar to bricks. This is done simply and efficiently, using batches of concrete between the cans. The consistency of the concrete must be relatively thick, so as to hold its form and the tin cans in place. A surprisingly large number of cans are required for this method of construction. Another method involves clubbing of 8 cans with metal wire, two cans are flattened and placed between the upright and horizontal cans to act as weather stripping and to prevent air flow through the walls.

IV. STRENGTH AND USE

Tin can walls are not considered load-bearing using this building method, although two-story circular dome structures have been built. The basic rule is that it can support considerable weight but should not be used to hold up much more than its own form and shape. It would not be wise to attach a heavy timber roof to a tin can wall without support beams or frames. The basic function for can walls is in-fill (filling in the space between support beams or the main structure) and the division of space. They work excellent to separate a living room from a bedroom, and are also used as insulating walls from the outside. An earthship tin can wall is both an efficient and economical building method. They are mainly composed of aluminium and cement, and can withstand the test of time. They are made from few materials (the coating method can be more complex than building the wall itself). They use recycled materials and require little or no skill to build.

V. CHARACTERISTICS

Accordingly this includes information on the characteristics and common uses of tin and identifies typical problems associated with the material along with common causes of its deterioration. hence the following characteristics are-

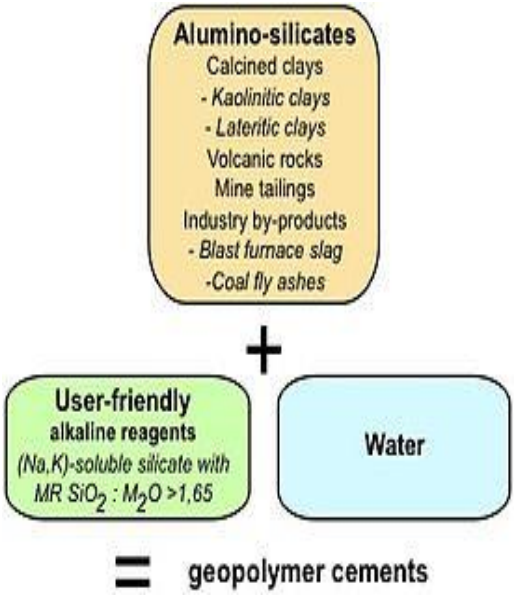
- Silvery white metal
- Non- magnetic
- Fairly resistant to corrosion
- Non- combustible
- Light weight
- Durable
- Soft
- Ductile
- Malleable
- Low maintenance

VI. GEO-POLYMER

Geopolymers are a type of inorganic polymer that can be formed at room temperature by using industrial waste or by-products as source materials to form a solid binder that looks like and performs a similar function to OPC. Geopolymer binder can be used in applications to fully or partially replace OPC with environmental and technical benefits, including an 80 - 90% reduction in CO2 emissions and

improved resistance to fire and aggressive chemicals.

Geopolymer cement is an innovative material and a real alternative to conventional Portland cement for use in transportation infrastructure, construction and offshore applications. It relies on minimally processed natural materials or industrial by-products to significantly reduce its carbon footprint, while also being very resistant to many of the durability issues that can plague conventional concretes.



VII. ALTERNATIVE METHODS

The other tin can wall method that will be briefly described is a system developed by a German artist named Michael Hönes.[3] He has led community rebuilding efforts in Lesotho, Africa using tin cans to create housing and opportunities for Aids orphans and foster mothers. Known as the TCV (a.k.a. Tin-Can Villages) project, Hönes has created buildings using tin cans, masonite, paint, and wire. The roof is made out of corrugated metal shingles. In this method the cans are stacked vertically, one on top of the other in rows that are placed side by side and secured with wire. They are left exposed and are arranged in a decorative manner. The structures require no foundation, and are said to be able to withstand the Lesotho storms. A site for the first village in Maseru has been secured and the funding has been sourced. What is lacking is building permits (as of July 2004). The TCV organization, headed by Hönes, has been prefabricating tin can walls so that when the permits pass about one building a week can be constructed. So far the TCV organization's efforts have been concentrated on storehouses, offices, a large weaving workshop for the women of the Elelloang Basali Weavers group in Teyateyaneng, and a

solar-powered restaurant[4] that cooks with solar ovens. Michael Hönes also focuses on tin can furniture and has created a stove out of tin cans that uses one-third less wood than what the poor people of the area commonly use, thereby diminishing the firewood crisis in Lesotho.

		Compressive strength (Mpa)			
Sr. No		Before exposure	3 hrs at 400 °C	3 hrs at 550 °C	3 hrs at 800 °C
1	Std OPC mortar	40.8	55	0 (broken due to spalling)	-
2	Geopolymer mortar (same as sample. no 10 in TABLE 3)	55.6	42.4	33.9	20.0

VIII. CONCLUSION

Hence the conclusion behind the research is to construct a building in cheap and low cost, this would decrease the pollution which created by or involve such material like tin can and geopolymer through this construction we could the lead the new era would be known as waste tin construction .