CHAPTER II

BRICK-TYPES AND USES
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Different varieties of materials are used for the masonry work in the construction of a building or any type of structure. Brick is one such construction material. Depending upon the availability and cost factors, different varieties of stones like Laterite, Granite, Quartzite, Dolerite, Basalt and other varieties of stones can be used for the said purpose. The cost of transportation of such stones is very high and because of this, these stones are found to be used in the construction work in the areas which are very near to the quarry. In other places usually bricks are used as the primary construction material. There are other substitutes to brick like the stabilised mud block, cement bricks etc., but the ease with which the brick can be manufactured and the simple procedure involved in manufacturing the brick, has made the brick the most popular of all available alternatives. With little experience and effort, even a layman can take up the work of manufacturing bricks. Procurement of suitable quality soil is the only basic difficulty in the manufacturing of bricks.

Red clay soil is considered to be ideal for brick making. This type of soil is available in plenty in and
around the twin talukas of Hubli and Dharwad except the south of Hubli and East of Dharwad where only black cotton soil is found. The old houses in the villages and in the cities of Hubli-Dharwad talukas are made of both burnt and unburnt bricks. Coal ash is not necessary for the manufacturing of unburnt bricks. A thick paste of red clay soil is put in moulds and from the mould they are directly laid on levelled open land, where it is left for 6 to 8 days for sun-drying.

Bricks are made in different sizes. The villagers of the area used to manufacture bricks using the soil of their paddy fields, for their own use in the past. These bricks, which were manufactured for their own use, were of the size of 18" x 12" x 9". Thick paste of red clay soil was put in wooden moulds and they were emptied on the open level land for sun-drying for 6-8 days.

QUALITY ENDURES

Soil can be used for construction of buildings without converting the soil into bricks. A mixture of soil, molasses, calcium and straw particles and water is made and is kept for 8-10 days and the construction work is done by taking big lumps of soil made from the above said mixture in the form of paste. But the construction with the help of such soil lumps and unburnt bricks lacks durability. Their load bearing strength is not much. Burnt bricks stand on a higher
footing even when compared to stones. "Stone used in building perishes gradually in the acid atmosphere of the cities, but well burned brick made even by primitive methods of the early manufacturers remains unharmed and even improves in hardness by exposure. Brick then is a material of unchallenged durability and unsurpassed usefulness in building industry." ¹

Bricks have a long history. "Brick which has been used since the 4th millennium B.C. was the chief building material in the ancient near east. Employed throughout the middle ages, brick gained popularity in northern Europe; it is widely used in the 20th century often for non-bearing walls in steel frame construction." ²

The brick has advantages in other respects too. "Brick compares favourably with stone as a structural material for its fire and weather resisting qualities and for the ease of production, transportation and laying.³

Encyclopaedia Britannica defines brick as "a small rectangular block, usually of fired clay used in the construction of foundations, walls, piers, buttresses, and arches of buildings and other structures and in the constructions of ducts, flues, linings and chimneys of furnaces." ⁴

It is said that bricks and brick construction were taken to the new world by the earliest European settlers.
Encyclopaedia Britannica contains particulars about the beginning of the brick era as follows:

"Mud brick, dried in the sun, was one of the first building materials. It is conceivable that on the Nile, Euphrates or Tigris rivers, following floods, the deposited mud or silt cracked and formed cakes that could be shaped into crude building units to build huts for protection from the weather. In the ancient city of Ur in Mesopotamia (Modern Iraq) the first true arch of sun-backed brick was made about 4000 B.C., In Ur the potters discovered the principle of the closed kiln in which heat could be controlled."\(^5\)

It is said that the Romans gave much importance to burned bricks. "The Egyptians and the Greeks used bricks to only a limited extent, as they had access to plentiful of stone and marble. The Romans manufactured burned bricks in enormous quantities and gave them an important role as a basic structural material for both simple and sumptuous buildings all through the Roman Empire."\(^6\)

Good bricks are said to be more durable than stones. "Good bricks are practically indestructible by fire or atmospheric action and are more durable than stone."\(^7\)

During the 19th century hand-made bricks were replaced by machine-made bricks. "At the beginning of the 19th century mechanical processes began to be patented and by
the latter half of the century had almost entirely replaced the ancient hand-fashioned methods.\textsuperscript{8}

The use of bricks which was started in the early 4000 B.C. is in use even today. That itself demonstrates the superiority of bricks over other materials. Much change has not taken place in the process of brick manufacturing over the years. "Basically the process of making bricks has not changed since the first fired bricks were produced some thousands of years ago."\textsuperscript{9} Hubli-Dharwad talukas are not an exception to this phenomenon.

COMPARISON WITH GRANITE/LATERITE STONES (COST COMPARISON)

In areas near the stone quarries, usually the stone works out cheaper when compared to bricks. But in other areas the brick will be cheaper than the stones as the cost of transportation of the stones will be very high because of the heavy weight. Stone masonry work will be cheap only because it requires less cement and sand. This can be understood from table 1.

From table 1 it is clear that the stone (Laterite/Granite) works out cheaper when compared to bricks. Labour and curing charges are the same but the requirement of cement and sand is more in case of bricks. But this will be more than compensated by the saving of transportation cost of
Cost comparison of brick masonry with stone masonry work

<table>
<thead>
<tr>
<th></th>
<th>Laterite/Granite Rs.</th>
<th>Bricks Rs.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cement 6 bags @ 110/-</td>
<td>660.00</td>
<td>1045.00</td>
</tr>
<tr>
<td>9.5 bags @ 110/-</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sand (lump sum)</td>
<td>40.00</td>
<td>45.00</td>
</tr>
<tr>
<td>Labour for 230 m² @ 17.25</td>
<td>517.50</td>
<td>517.50</td>
</tr>
<tr>
<td>per m²</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Curing (lump sum)</td>
<td>20.00</td>
<td>20.00</td>
</tr>
<tr>
<td>Total</td>
<td>Rs. 1237.50</td>
<td>1627.50</td>
</tr>
</tbody>
</table>

stones to distant places. Other reasons for the popularity of bricks are listed below.

a. Natural stones are not available every where.

b. The cost of transportation of stones will be very high and therefore the total cost will be more as the saving in the consumption of cement, sand etc., will be eaten up by the cost of transportation of stones to distant places.

c. Quarrying of stones, marbles etc require huge capital investment in heavy machinery and it involves highly
advanced technology. This is not within the reach of ordinary people.
d. Brick manufacturing process is very simple and is very familiar to the people in the villages.
e. Majority of the brick manufacturers get soil and water free of cost as they are available in their own land. As the process involved is extremely simple, availability of the labour force will not be a problem. Family members themselves can manage the labour requirements of their respective units. Even child labour is used without any adverse effects on such labourers.
f. Even the masons find it easy to work with the bricks as they are not heavy and they can be cut according to the size required.
g. Burned bricks are found to be more durable than stones.
h. Bricks can withstand the effect of corrosion better than stones.

BRICKS : TYPES

Different types of bricks are used for different purposes. The common bricks are mainly used in construction of residential, commercial and other buildings. They are also used in the construction of compound walls, water tanks, swimming pools, piers, buttresses, arches etc. The Great wall of China is built by using both burned and unburned bricks.
These common bricks are also used in the construction of ducts, flues, linings and chimneys of furnaces. They are very useful in coba work on the RCC roofs. Bricks were used in the construction of granary and the great bath of Harappa and Mahenjodaro. Common bricks are laid on underground telephone cables to protect the cables from damages at the time of digging of the earth for future repairs etc.

There are other special types of bricks used for special purposes as explained below:

**Calcium silicate Bricks:** These are the bricks made from sand with high silica content and good quality low magnesia. They can have the same compressive strength (10 to 55 MN/M$^2$) as those of fired clay bricks. But economical production of such bricks will be possible only when they are manufactured in large quantities. The production requires the use of high capital cost machinery.

**Fire bricks:** These are the bricks used in the construction of open hearths, steel furnaces for iron and other furnaces and stoves. They withstand very high temperature like 3000°F (1650°C). It is said "the rocks could not be heated once in such furnaces (industrial furnace) without disintegration but the fire bricks may be heated or cooled again and again, and still retain their form"
and properties. Thus the fire bricks are the bricks specially designed for use in industrial furnaces and stoves.

Facing bricks: These are the coloured bricks specially textured to give attractive appearance to the exposed brick work. They are used for decoration purpose.

Engineering bricks: These are the hard strong bricks suitable for heavy duty applications such as power stations.

Chrome-Magnesite (Cr₂O₃-MgO) Bricks: It is used in modern shops for construction of walls and roof of furnaces. The New Encyclopaedia Britannica gives the following particulars about this brick: "In modern shops the walls and roofs of the furnaces are made of Chrome-Magnesite (Cr₂O₃-MgO) bricks each of which has a thin steel casing. This steel oxidises in use and functions as mortar to seal the bricks in place. The hearth requires frequent repairs but will last 3000 to 6000 heats. The roof will last between 500 to 1000 heats."

OTHER NEW SUBSTITUTES FOR BRICKS

a. Stabilised mud blocks:

They are produced by using mud, cement/line in proper combinations. The mixture is pressed into blocks either by hand-operated machines or power-driven machines. Burning is
not necessary for manufacturing these blocks. Curing is to be done for 8 to 10 days using water. The compressive strength of these mud blocks are superior to those of ordinary mud bricks (1 to 40 MN/m²) depending upon the machine used for pressing the blocks. Manufacture of these mud blocks is fuel saving as the process never involves burning and this contributes towards minimisation of air pollution too.

b. Hollow and solid cement and clay blocks:

Cement and clay hollow and solid blocks are developing very fast as new substitutes for bricks. Costwise, these new substitutes work out cheaper when compared to bricks and stones. But the production of such blocks require heavy outlay in terms of plant, machinery etc. They also require care, skill and involve advanced technology. Because of these reasons the production of such blocks is not within the reach of ordinary entrepreneurs. Clay hollow blocks developed by Mangala Clay Hollow Block Company of Mangalore are having special advantages like automatic air conditioning effect in the building etc. They have developed not only the hollow clay blocks for construction of walls of the buildings but they have also developed hollow blocks which can be used for roofing. Such hollow block roofing saves almost 40 per cent of the cost of roofing when compared to RCC roofing. Such roofs consume less cement and steel.
Inspite of the development of new substitutes and the availability of other materials for construction work, brick has continued to have the same popularity even today. This is mainly because of the ease with which the brick can be manufactured and the simplicity of the process of brick-making. The brick is preferred by the masons because the working with bricks seems to be easy for them. The old saying 'old is gold' holds true even today, and specially so with manmade traditional bricks.
REFERENCES

3. Ibid., p.939.
5. Ibid., p.243.
7. Ibid., p.270.
8. Ibid., p.270.

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