

Special Bricks and Siding Boards for
Facing Wooden Construction

木造建築に使用する乾式れんが外装工法

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Summary:

This paper reports the new method to face wooden walls with special thin bricks without using mortar that will increase use of bricks for houses.

This dry construction is easy, quick and less-expensive. It is water-proof, fireproof, free from corrosion or cracks and heat insulating. It is also ideal method for seismic areas.

本論文は、薄型れんがで木造壁を外装する新工法と、そのために開発された特殊れんが及びサイディング・ボードを紹介するものである。この新工法により、家屋用れんがの需要の増大がみこまれる。

このモルタル不要の工法は、簡便で工期も短くコストも安い。防水性・耐火性にすぐれ、腐食やひび割れの心配もなく断熱性もよい。又、耐震構造としてもすぐれている。

1. Introduction

The brick construction always attracts people and wooden houses faced by thin bricks which are similar to brick houses visually are increasing. However, compared with the remarkable improvement of the concrete or metal curtain wall constructions, the development of new brick masonry methods was rather slow.

The purpose of this paper is to introduce the new method to face wooden walls with special thin bricks without mortar. As specially shaped bricks are hung onto metal rails on the alminum siding boards nailed to the wooden walls, it is very easy dry construction.

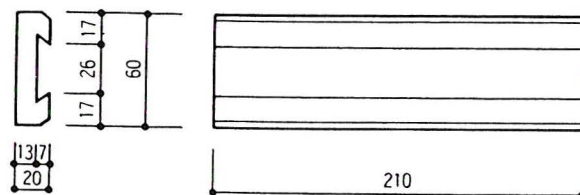
2. Characteristics of The New Hanging Method

- a. This method is suitable to face wooden walls or steel frame constructions.
- b. As bricks are hung on the metal rails on the alminum sheets, it does not require skilled brcik-layers.
- c. It is free from corrosion or cracks. As brciks are secured on the rails, it is an ideal method for the seismic areas.
- d. It is heat insulating. The ribbed alminum siding absorbs expansion or shrinkage by heat and it secures bearing strength against the outer or inner pressure.
- e. It is waterproof and fireproof. For better fireproof, it is recommended to combine slag plaster boards.

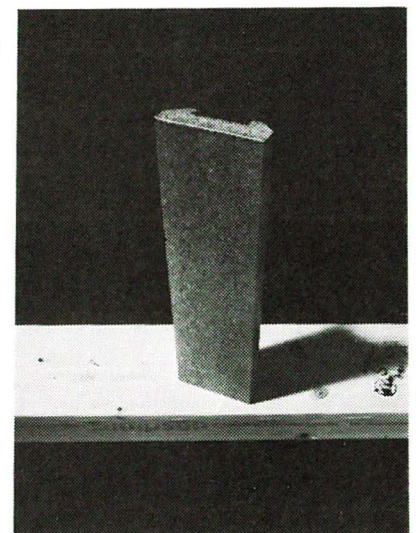
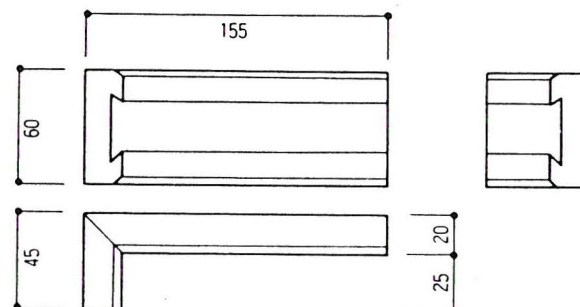
3. Materials Used in The Hanging Method

Fig. 1

Shape and measurement of the brick (cm)



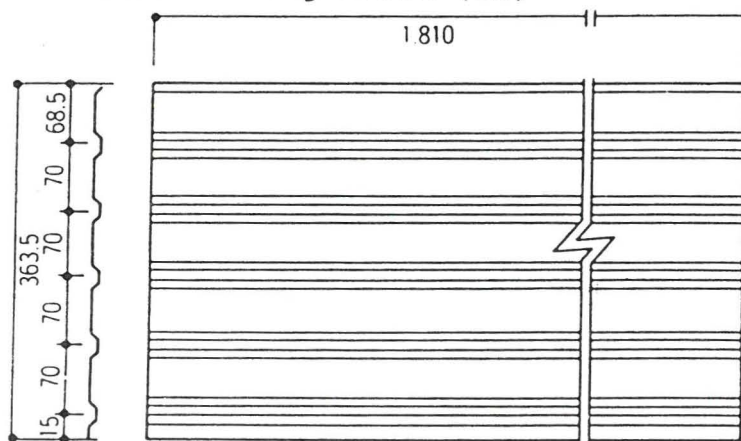
Corner brick



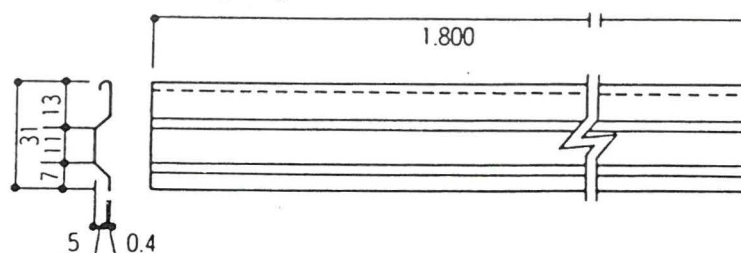
Photograph no.1

Fig. 2

Size of alminum siding board (cm)



Size of steel hanging rail



4. The Property of Bricks Used in The Hanging Method

The shape and size of the brick is shown in the Fig. 1. The difference of the size is less $+1.5\text{mm} - -2\text{mm}$.

The weight of the brick is 420g. and the bending strength is 33.5kg/cm^2 .

The water absorption is less 4.5%, slightly different by color.

The coefficient of water absorption:

Red bricks	4.3%
Brown bricks	4%
White bricks	4%
Gray bricks	3.5%
Dark brown bricks	3.2%
Yellow bricks	4%

5. The Required Quantity of Materials per Square-meter

Bricks (stretcher bond)	67 bricks
Alminum boards	1.75 sheet
Hanging steel rails	8 rails
Adhesive agent	1.7 tubes
Tapping screws	50
Joint material	8kg

6. The Process of Construction

(1) Marking

Marking for placement of alminum siding boards should be done considering the measument of the projecting part of the brick from top of the alminum board.

(2) Fixing Alminum boards

According to marking, alminum boards are fixed either from top or bottom of the wall by nailing 4 - 6 places.

For vertical connection of alminum boards, cut the edge and pile the upper board upon the lower one adjusting interval from center to center of projection 70mm.

Horizontal connection of alminum boards is abutting joint.

(3) Fixing Steel Rails (Hangers)

Fix steel rails (hangers) on projection of the alminum board with unichrome-plated tapping screws (5 ϕ x9mm) at regular interval of 455mm horizontally and 70mm vertically. Drive screws tightly by 2500rpm screwdriver.

Fig. 4 Tapping screw
(5 ϕ x9mm)

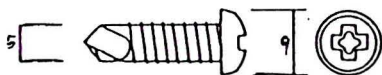
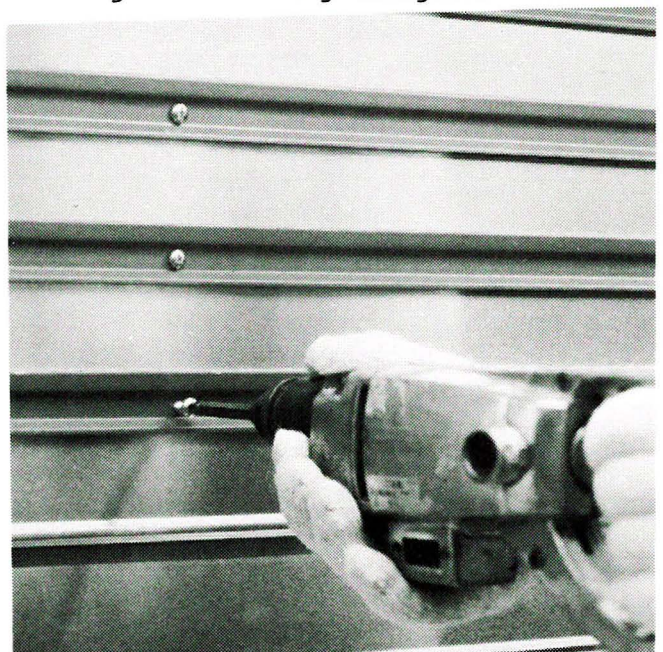


Fig. 3 Fixing hangers

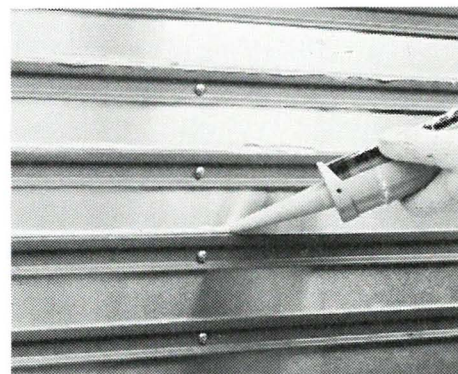


(4) Applying adhesive agent

Apply adhesive agent (reclaimed butyl rubber adhesive) on top of steel rails, 333cc - 500cc per square meter.

Apply adhesive agent at a time for the area where bricks can be fixed within 10 - 20 minutes.

Fig. 5



(5) Fixing bricks

Fix bricks tightly on steel rails, pushing bricks up lightly from bottom of steel rails.

Fix bricks breaking the membrane on the surface of adhesive agent.

Fig. 6

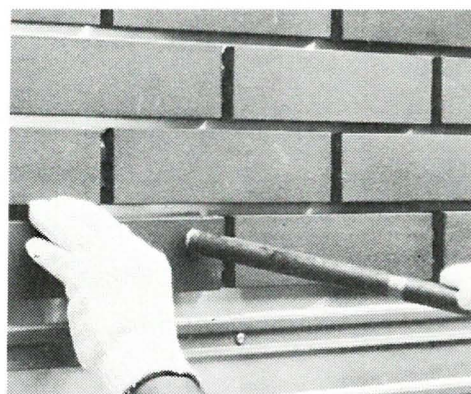
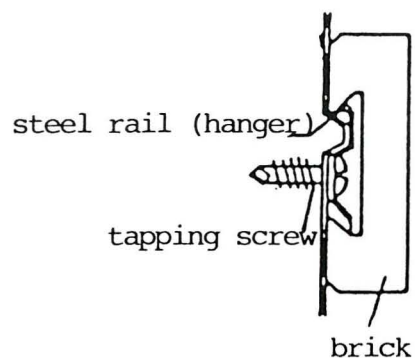
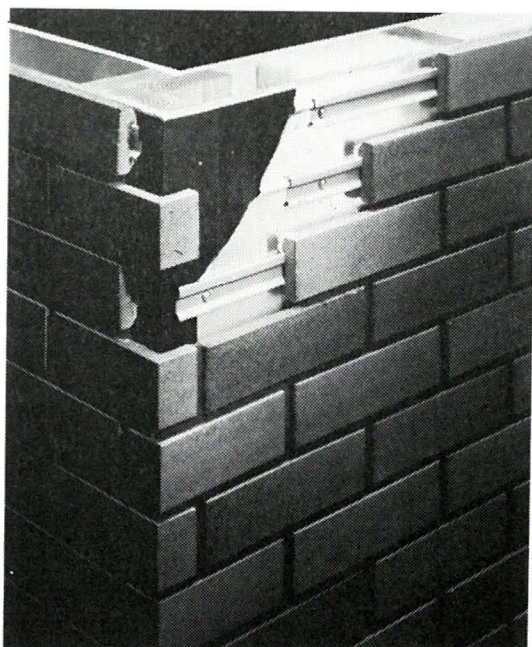


Fig. 7 Deatil of works



(6) Joint finishing and cleaning

Finish joints with special joint compound making flush joints or pointed joints.

After cleaning with wet sponge, push joints lightly with pointing trowel.

After joint finishing, apply calking compound around the opening.

Fig. 8 Joint finishing



Fig. 9. Finished wall

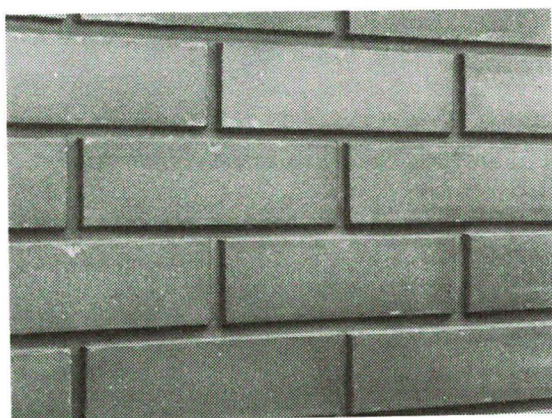
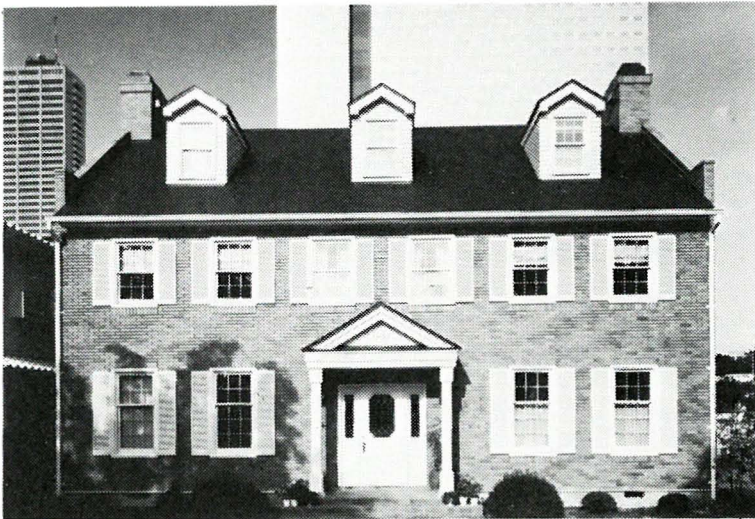


Fig. 10 Example of the house by the new hanging method



7. Conclusion

The brick has a long history as the building material and has been one of the most popular material. However, because of difficulty in laying them, the use for housing was limited.

By the newly developed, easy hanging method, the use and demand of bricks for housing will greatly increase.

It is satisfactory both for the users and manufacturers.

