Modified clay material as an alternative for wall covering

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Abstract. With the development of building material technology nowadays, the options to do the job would be easier and quicker. Modified Clay Material (MCM) is the material with amazing appearance. The quality of MCM products made from mixing of the inherent colours of Modified Clay. The study was conducted through descriptive method to know how the application and the use of Modified Clay Material (MCM) as an alternative material for wall covering. The result of this study show that this material is able to recreate the unique features and characteristics of natural stone, woods, bricks, metal & leather.

Keywords: efficiency, sustainable material, quality of work, wall covering.

1. Introduction

Building designs are now more complex than they were ten or twenty years ago, and the regulatory requirements have become more demanding. As now more sustainable materials were demanding as the component of building. These product advantages have direct benefits for building owners.

One of the materials was MCM or Modified Clay Material is an amalgamation of clay and sands through an unfired patent manufacturing technology. PHOMI® products are modified soil made through a technology breakthrough with the base materials being constituted and bonded together by using low heat temperature in its manufacturing process.

The result of PHOMI® are materials which are unique in features, shaped, textures, and color and could be in characteristic of natural stone, woods, bricks, metal and leather. MCM PHOMI® offers most varied collection of natural, durable, and aesthetically designed materials in many shaped. Best suited for external cladding, interior works, comprising of ceiling, flooring and furniture covering.

The MCM PHOMI® products come with a base thickness of only 2,5mm. The MCM PHOMI® products could be used for [1] [2]:

- External cladding
- Internal wall covering
- Ceiling
- Flooring
- Furniture covering
- Landscaping
- Outdoor area
2. Methodology
The methodology is a technique to collect and analyse the data. This study use the case study method to take sample of landed house building in Jakarta - Indonesia that uses MCM as building material for façade wall covering, also find out comparisons of using MCM material compared with conventional materials. The data collecting use observation method; to observe how to install the MCM material work in the projects, to find out the pros and cons the use of materials. The data collected from the literature and catalogue, will be analysed and discussed.

3. Result and Discussion
The method of installation for MCM material almost the same as installing the thin layer at façade area (nonstructural system). The MCM material were not suggested to be uses as structural system due to the safety standard
The area which would be covered must be already cleaned, flatten surface, and during the work could be protected. The MCM PHOMI® products could be installed by 2 methods,
- Dry system, by using fixture and fastener, must provide the support frame and platform first
- Wet system, by using adhesives, mortar, and silicone sealer, right on the surface of the area covered

And after installation it is recommended to apply a clear coating layer on the surface of MCM PHOMI® to make it dust free, easy to clean and the fixate does not damages it’s surface. The MCM PHOMI® products had advantages and disadvantages (see table 1).

| Advantages                                      | Disadvantages                                      |
|------------------------------------------------|---------------------------------------------------|
| Durable to outside weather                     | More expensive compared to exposed brick          |
| Long lasting products                           | High labor cost (needs trained workers)           |
| Sustainable materials                           | The area must be cleaned, dirt free               |
| Fire Retardant                                  | Need to apply coating for protection              |
| Categorizes as 'green material'                 |                                                   |
| Recyclable                                      |                                                   |
| Light weight                                    |                                                   |
| Maintenance free                                |                                                   |
| Portable / easy to handle                       |                                                   |
| Easy to install                                 |                                                   |
| Available in different natural textures         |                                                   |
| Moisture free                                   |                                                   |
| Absorbs and desorbs humid                       |                                                   |
Table 2. Comparison between MCM PHOMI® and conventional exposed bricks.

| Criteria                  | MCM PHOMI®                          | Exposed bricks                     |
|---------------------------|--------------------------------------|------------------------------------|
| Dimension                 | Varieties in many, thickness 2.5mm   | Standard size 20 x 5 cm, 2cm thickness |
| Weight                    | Approx. 100 gram / pc                | Approx. 1.6 kg / pc                |
| Durability                | Weather resistance                   | Need maintenance                   |
| Installation time         | Approx. 5m2 / day                    | Approx. 3 m2 / day                 |
| Color variety             | Verities in many colors              | Standard color of brick            |
| Time to dry using mortar  | Approx. 30 minutes                   | Approx. 90 minutes                 |
| Water absorption          | None                                 | Absorbs water                      |
| Flexibility               | Could be bend at the edges           | Cannot be bend, must cut           |
| Fire resistant            | Kelas A SNI                          | Kelas A SNI                        |
| Thermal conductivity      | Approx. 0.18 KWh/m²                  | Approx. 0.02 KWh/m²                |

The methods of work with MCM PHOMI® for wall covering are described as follows:

1. Measure the location will be installed with MCM PHOMI® materials. Prepare the area and install protection during the work (especially at an outdoor area). Check how tall and wide the area field that would use the MCM PHOMI®, so we could make the pattern with minimum waste.

2. Clean the job site making it ready for the installation of MCM PHOMI®

![Figure 2](image_url)

Figure 2. Clean the surface before installation of MCM PHOMI®

Source: personal documentation, 2019

If necessary, apply waterproof layer on the plaster wall, clean the area to be installed. It will give more protection behind the wall which applied by MCM material, due to water absorption from outside to inner area.
3. Apply thin mortar layer at the surface of the area to be installed.

![Figure 3. Mortar adhesive thin layer before application of MCM PHOMI®](image1)

Source: personal documentation, 2019

4. Installed MCM PHOMI® at the area after the mortar adhesive applied in half dry condition.

![Figure 4. Application MCM PHOMI® above half dry mortar adhesive thin layer.](image2)

Source: personal documentation, 2019

5. Let it dry and wipe clean the surface.

6. Fill the gap with sealant or adhesive grout.

![Figure 5. Flexi tile ® filling grout.](image3)

Source: Flexi tile documentation 2018
7. Again clean the surface.

![Figure 6. Flexi Tile® cleaning process. Source: Flexi tile documentation, 2018](image)

8. Apply clear coating to protect the surface, better use water based coating, not solvent based coating.

![Figure 7. Clear coat to protect MCM PHOMI® surface after installation. Source: Propan catalogue, personal documentation 2019](image)

9. The result (after the coat already in dry condition).

![Figure 8. MCM PHOMI® after installed Source: personal documentation, 2019](image)
4. Conclusion
The use of MCM PHOMI® would make covering the existing or new wall easier and eventually will make the job quicker and will reduce the price, because we only need to 2 materials; MCM material and adhesives.
The result would be good aesthetically and had long term used if installed right.

5. References
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