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Contractor and developer letter

## THE BUSINESS CASE FOR TRASS CEMENT IN NATURAL STONE INSTALLATION.



### Introduction

Natural stone is often specified by architects, interior designers and landscape architects because of its attractive “organic” look and, in the case of local stone (sandstone, slate and travertine) its relatively low cost. However, natural stone installations in internal “wet” areas (bathrooms and showers) and external areas often develop problems known as “mineral bleeding” or efflorescence seen as white deposits around the joints. Once these appear, , expensive remedial and/or restoration work is required, or even the replacement of the stone, which is likely to develop the same problems again in the future if installed using the same method.

### The Problem

It is not uncommon to be told that this problem is a “natural phenomenon” with stone and cannot be avoided. Efflorescence is indeed a natural phenomenon but it rarely comes from the stone itself. It is usually caused by the exposure of the laying course material or “mortar bed” to water. So what causes this?

Mortar beds are made from a mix of sand and cement, normally in a 3:1 ratio. Cement is made from limestone and so all mortar beds contain a quantity of lime commonly known as calcium oxide (CaO). Calcium oxide is water-soluble and dissolves to form calcium hydroxide, Ca(OH)<sub>2</sub>, which migrates to the surface of the stone where it reacts with the carbon dioxide (CO<sub>2</sub>) in the atmosphere to form calcium carbonate, CaCO<sub>3</sub>. The calcium carbonate, which is not soluble, forms a white deposit on the surface of the

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stone referred to as mineral bleeding or efflorescence. In summary, the problem comes not normally from the stone, but from the mortar bed beneath.

### **The Solution**

There are two logical solutions to this problem:

- a) Use a typical sand/cement mortar bed but prevent the water from getting to it;
- b) Change the composition of the mortar bed so that when calcium hydroxide is formed it does not migrate to the surface to form calcium carbonate.

Solution a) requires that the mortar bed is made as dry as possible when laying the stone (some water is required to bind the sand and cement) and then the use of surface sealers, penetrative sealers and waterproof grouting compounds to prevent any surface water from getting through to the mortar bed. In reality, these solutions are unlikely to be permanently effective and will require additional applications at periodic intervals. In external areas where moisture can come up from underneath, they are even less likely to be effective, if at all.

The more practical approach is to change the composition of the mortar bed to ensure that when calcium hydroxide is formed it does not migrate to the surface to form calcium carbonate. One solution is to mix a bonding additive with the water used in the mortar bed but this is not only expensive, it is virtually impossible to control that mix in a construction environment. If an incorrect mix is used, the expensive bonding agent will have no benefit whatsoever.

So we are left with the mortar bed materials themselves, the sand and cement, and this is where TRASS mortar, used instead of normal cement, provides the solution. TRASS mortar contains pulverized fly ash (PFA) which has been used for many years elsewhere in the world to solve the problem of efflorescence. Mixed correctly, it reacts with the calcium hydroxide and prevents it from migrating to the surface where it can cause efflorescence or mineral bleeding.

### **The Business Case**

The cost of TCM's TRASS mortar is only THB 200 per m<sup>2</sup> more than a typical sand cement mortar bed. The figures below show that this represents an increase in cost per m<sup>2</sup> of approximately 13% for a local stone installation and 6% for an imported stone installation.



**TYPICAL LOCAL STONE INSTALLATION COST per m2**

Material (e.g. sandstone, travertine), per m2	THB 1,200	THB 1,200
Mortar bed	THB 50	THB 250
Tile glue and grout	THB 100	THB 100
Labour	THB 200	THB 200
<b>Total Installation Cost</b>	<b>THB 1,550</b>	<b>THB 1,750</b>
Additional percentage cost of TRASS installation		13%

**TYPICAL IMPORTED STONE INSTALLATION COST per m2**

Material (e.g. sandstone, travertine), per m2	THB 3,000	THB 3,000
Mortar bed	THB 50	THB 250
Tile glue and grout	THB 100	THB 100
Labour	THB 200	THB 200
<b>Total Installation Cost</b>	<b>THB 3,350</b>	<b>THB 3,550</b>
Additional percentage cost of TRASS installation		6%

In terms of the overall cost of construction, the business case for TCM TRASS mortar is even more compelling. As an example, consider a 150 m2 property in which there is 25 m2 of natural stone, and for which the developer has budgeted an overall construction cost of THB 35,000 per m2 or THB 5.25M. The additional cost of TCM TRASS mortar is THB 5,000 or 0.1% (excluding contractor's profit and VAT)! Only an additional THB 5,000 to ensure that the stone installation will not fail!

If there still some doubt as to whether an additional THB 200 per m2 is a worthwhile investment, contractors and developers should be aware that efflorescence is unlikely to appear for 3-6 weeks after the installation. So just when you think the defects are all complete, you're likely to see that hard white stuff leaking out of the joints between the stone. Yes, you can attack it with acid and get most of it off, but it will keep coming for the next 3-9 months which most developers and buyers will not accept. At that point you'll have to consider restoring and protecting the stone, or even replacing it at an even greater cost, not to mention the collateral damage that will be caused to an otherwise finished area.

But for only an additional THB 200 per m2, TCM TRASS mortar can prevent these problems and the associated remedial costs

We hope to count you soon to our satisfied customers by using TRASS in your actual and coming up projects.

With best regards

Andreas Ruthe  
Managing Director  
TCM Asia Co., Ltd.