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CTI FIELD REPORT 66-2 2 (R-84)

SUBJECT: TILING AND GROUTING SHOWERS - HI-RISE CONSTRUCTION - STEEL STUDS

- **INTRODUCTION**

- A. Water damage in the shower area on hi-rise construction costs the building owners a tremendous amount of money yearly.
- B. The Ceramic Tile Institute has investigated the water damage problem in many of these projects and we have considered the damage to be unnecessary. The damage could have been prevented by good construction practices.
- C. The purpose of this field report is to review some of these problems and to outline what must be done to prevent the water damage.
- D. The type of construction that will be covered in this field report is with the use of steel studs, metal lath, scratch coat and tile set in the conventional manner.

- **PROBLEMS**

- A. We have noted a reluctance on the part of the architects and specifications writers to show and call for waterproof paper over the steel stud shower areas. The Ceramic Tile Institute has taken the stand that it is needed to prevent leakage around the shower and in addition, to help the mortar cure out to full strength. We have found that the Metal Lath Association and other Associations in the lathing industry feel that the waterproof paper is not necessary and so advise the architects and specifications writers.
- B. On one hi-rise building on the U.C.L.A. campus, we were fortunate enough to be able to see first-hand why the waterproof paper is necessary. While the showers were being used, the plaster on the corridor side of the shower walls had been removed. This allowed us to look at the back side of the tile installation. Instead of 15 lb. felt, the waterproofing material on this job was clear polyethylene sheeting. When the heat from the shower and the cool air from the air conditioned corridor met, it formed condensation on the shower side of the polyethylene sheeting. We were able to see the water droplets form and run down the polyethylene sheeting in streams of water.
- C. In a large Los Angeles hi-rise building, they have eliminated the waterproof paper in the type of installation we are discussing. The metal lath is brought out over the top of the shower membrane but when this wall is scratched, it creates a condition where the surfaces that will collect condensation are behind the membrane and will run into the stud cavity. If there is not enough condensation to cause leaks, there will be enough to allow moisture to collect where it is not wanted. This moisture causes mildew and odors in surrounding closets and rooms.
- D. One problem the Ceramic Tile Institute has been helping to overcome is the improper placement of the waterproof membrane where it laps up on the walls. We were successful in having this corrected on several jobs during construction. However, several improper membrane installations in one project caused considerable water damage.

It is not correct to apply the waterproof paper, lath and scratch coat in order to support the waterproof membrane. Although this is easier to do in construction procedure, it is not correct and will certainly cause leaks.

Metal webbing must be put between the steel studs to support the waterproof membrane. The waterproof paper on the walls must be brought down shingle fashion followed with the application of the reinforcing wire, scratch coat and mortar installation.

- STEEL STUDS

- A. It might be well to start off asking a series of questions about steel studs:
Steel Studs? What size needed?
What Are They? How far apart should they be spaced
How adequate? to support the tile installation?
- B.
- C. At the meeting of building officials, steel studs were the topic of conversation. There are steel studs on the market held in contempt, and referred to as tin can studs. If building officials and industry leaders are not satisfied with how adequate they are, what should be our attitude if they support our tile?
- D. We were called in to examine an installation in a hospital where cracks had occurred horizontally throughout the tile installation. We found that this job was installed over a new light-weight stud spaced two feet on center with rib- lath applied horizontally over the steel studs. The cracks followed the weakened plane joint created in the mortar by the ribs of the lath.
- E. Another job was noted where the steel studs, supporting the wall of a shower three foot wide, consisted of four vertical 3/4 inch furring channels. These fastened into a concrete curb at the bottom and were tied eight foot above at the ceiling. There was one horizontal 3/4 inch channel cross piece in the approximate center of the vertical channels. The placement of the vertical channels were one on each side three inches back from the corners with the other two between.
- F. Changes in construction methods are constant and we have much help in the construction industry to see that they remain adequate. The tile industry must be sure that the total installation will perform. Keeping abreast of these changes is an industry problem that all can help with. When methods being used on your projects are questionable, they should be brought to light and corrected, if necessary.
- G. The Ceramic Tile Institute recommends that the steel studs used for tile backing be at least 3 1/4 inch wide prefabricated stud as used in non-load bearing partitions. It can be pressed metal or welded fabrication. The pressed metal may be cold formed No. 18 gauge channel shapes with either solid or perforated webs. The welded fabrication studs must also be No. 18 gauge steel. All studs are to be coated with a rust inhibitive material.
- H. The steel studs should be spaced 12 inches on center and a partition stiffener positioned horizontally approximately four feet high. Studs may also be placed 16 inches on center and an intermediate furring channel secured to the stiffener between studs.
- I. The Ceramic Tile Institute has arrived at its recommendation from job site observation and consultation with other building industry people.

- SETTING BED FOR WALL TILE

- A. The Technical Committee of the Ceramic Tile Institute has discussed a phenomena that we feel may contribute to problems in these showers. We have noted that setting beds, which are not relieved by cutting through to the scratch coat, may tend to bow out in the center toward the tile side.
- B. The cutting of the setting bed has long been a requirement in our tile specifications and we think it will prevent the bowing.
- C. The finished installation should have the setting bed cut full length vertically down the corners and seventeen to twenty-four inches in both directions throughout the balance of the installation.

- SHOWER FLOOR MEMBRANE

- A. In 1957 through the workings of the Ceramic Tile Institute a requirement was made to pre-slope the floor structure prior to the installation of the waterproof membrane. It is gratifying to note that a good job is being done on most of the structures prior to the installation of the pan. This should be a solid form of backing such as concrete and should not be done with plywood or materials that will spring or bend. We have also noted that roof decks and balconies are being constructed in the

same manner which starts the installation off on a proper foundation and allows accumulated water to run down the weep holes.

- B. Where the shower membrane extends up on the wall, steel webbing should be placed between the steel studs to act as a backing for the membrane.
 - C. The Ceramic Tile Institute has researched and tested many materials for waterproof shower floor membranes. We feel the best membrane is three layers of 15 lb. asphalt impregnated roofing felt, hot mopped with asphalt between each layer on the basis of twenty pounds of asphalt per layer per square. Corners are carefully fitted, adequately lapped and reinforced with glass fiber webbing.
- CAULKING
 - A. Where curbs and walls meet and where tile is butted to dissimilar materials such as marble baffles, a good elastomeric caulking material should be used instead of hard portland cement grout.
- CONCLUSION
 - A. We must have adequate and correctly spaced steel studs.
 - B. We must have a good waterproof membrane, three layers of 15 lb. tarred felt over a sloped base, with the pan up on the sidewalls supported with backing.
 - C. 15 lb. tarred felt or polyethylene sheeting must be placed over steel studs and brought down shingle fashion over the -top of the waterproof membrane.
 - D. An adequate scratch coat must be applied that will leave room for a smooth even setting bed 1/2 to 3/4 inch thick.
 - E. The setting bed should be scored vertically down each corner and seventeen to twenty-four inches in each direction throughout the rest of the installation.
 - F. Use elastomeric caulking where curbs and walls meet and where tile butts to marble or other dissimilar materials.