Chapter IV

## Building Products

### Plastering Machines

In order to obtain maximum efficiency and economy when applying plaster with a machine, it is necessary to plan the job and to know what corrective measures to take when the machine is not functioning properly. Following are suggestions for efficient application of plaster with a machine. Most machines pump the plaster by one of two means; either a Moyno pump or cylinder pump. The information below is applicable to both except when noted.

### Mixers for use with Plastering Machines

1. It is very important that the mixer be kept clean. If set plaster builds up on the blades and falls off it will clog the spray nozzle.

2. The mixer should be large enough to keep the plastering machine supplied. If spraying as much as two cubic feet of mortar per minute a 6 cubic foot mixer will be necessary. This will allow three minutes for mixing each batch.

3. A mixer with rubber blades that wipe the drum clean is preferable. While the initial cost is more, the savings in prevention of build-up of set plaster resulting in clogged nozzle can easily pay for the difference in a short time.

4. Mixer should run at 35 to 40 revolutions per minute in order to obtain thorough mixing in a short period of time. If mixer is of ample capacity to keep up with the plastering machine and still do a good mixing job at a slower speed, 25 to 30 rpm is satisfactory.

### Mixing Plaster for Use in Machine

In mixing mortar for machine application it is very important that it be lump free to prevent clogging the nozzle.

1. Add water to mixer using slightly less than the total amount required.

2. Add plaster and allow to mix until lump free.

3. Slowly add aggregate.

4. Add additional water to obtain proper consistency.

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### Consistency of Mortar

Contol of consistency within fairly close limits is necessary for best results. It should be stiff enough that it will not sag on the wall and be difficult to darby, yet it must not be too stiff. Too stiff mix results in high pressure which in some cases means reduced capacity and in the case of Moyno Pump machines causes excessive

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Consistency of Mortar (Cont'd.)

maintenance due to wear on rotor and stator. Consistency for most machines should be slightly softer than the consistency used for hand application. One company states that in 80% of the cases where best results were not obtained with their machine (Moyno Pump type), too stiff a mix was being used.

Plaster for Machine Application

At each of our plants we have special formulas for machine (gun) application plaster. In some areas it is referred to as gun application while in others it is machine application. At each plant it is available either glass fibered or unfibered. Bestwall glass fibered machine (gun) plaster works well in all types machines while other fibers, used by competition, continually cause trouble due to balling up and clogging the nozzle. In many instances where an architect has specified fiber plaster and plaster was to be machine applied, only Bestwall was considered because it was the fibered plaster which could be applied without trouble and machine delays. Generally plasters for machine application have low water carrying capacity, contain an air entraining agent to reduce hose pressure and have moderate or medium plasticity. These plasters are suitable for hand application, but usually are not quite as rich working as regular hand application formulas.

Aggregates

All above information refers to neat plaster. Very little Lite-Mix is sold for machine application. However, in one or two instances where Lite-Mix was used we did furnish a special formula. Generally the perlite necessary for a good ready mixed plaster for hand application is considered too abrasive for machine application and results in more pump wear. This is true of competition's ready mixed plaster as well as our Lite-Mix. As a result a softer, less abrasive perlite is generally purchased and mixing is done on the job. Pump wear due to abrasive perlite is more of a problem with Moyno Pump machines than with Cylinder type machines.

Plaster mortar containing perlite aggregate usually comes out of the nozzle at very near the same consistency as when dumped in the hopper of the machine.

Vermiculite mortar stiffens considerably while going through a machine, hence a softer mix (thinner consistency) must be used to get the desired consistency out of the nozzle. Generally vermiculite plaster mortar pumps good in all type machines provided proper proportions are used, consistency is right and a good machine application plaster is used.

Sand mortar also comes out of a machine at about the same consistency as when put in the machine. Sand should be a good grade of plastering sand and must not contain any large particles which will not pass through the nozzle. Use of excessive sand aggregate will result in the sand settling out and it will not pump. Generally, the proportions of all aggregates recommended for hand application are satisfactory for machine application. Better results and less machine wear are usually obtained with sand-plaster mortars when used in the cylinder type machines. However, sanded mortars can be pumped through the Moyno Pump machines.

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## Factors Affecting Hose Pressure

Using a plaster especially formulated for machine application and maintaining proper mortar consistency are necessary to keep hose pressure at a minimum, but there are also several other important factors.

1. Hose length - Pressure varies nearly directly with length of hose used. A pump (cylinder or Moyno) will develop approximately twice as much pressure with a 60' hose as it will with 30' of the same hose.

2. Hose size - Diameter of hose is definitely a factor. If pressure for 60' of 2" hose is 90 psi, pressure required for 60' of 1½" hose would be about 165 psi.

3. Effect of height - In addition to pressure developed with an length of hose, about one-half pound per sq. inch must be added for every foot the plaster is elevated. For example, if the machine is on the ground and the hose is run up to second floor, which is 30' above ground, there will be an extra 15 psi hose pressure..

4. Proportion of Aggregate - A rich mix (2 to 1) will usually result in more pressure than a leaner mix (3 to 1). The richer mix will usually have to be slightly thinner than the lean one in order to get same capacity from the machine.

5. Mortars containing vermiculite aggregate normally pump with considerably less pressure than those containing either perlite or sand.

Remember, high hose pressure results in lower capacity and more machine wear. Bestwall gun plasters are formulated to pump with as low pressure as possible and at the same time work good under the tools after being sprayed on the wall or ceiling.

## Spraying Acoustical Plaster

Bestwall Light Acoustical plaster was formulated especially for machine application, It works well in all type machines. Hose pressure is not normally a problem with this type plaster as it pumps easily with a low pressure.

## The Nozzle

The nozzle of all plaster machines are basically the same. The mortar goes through an orifice, most have several interchangeable orifices varying in diameter from 1/4" to 5/8". Compressed air is fed to the nozzle. The amount of air, consistency and type of mix, volume of mix and size of orifice determine the spray pattern. The nozzle operates by emitting a globule of mortar, then air, then mortar. Low frequency of this cycle results in large globules of mortar while high frequency results in very small globules.

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To lower frequency:
(1) Use lower air pressure
(2) Use larger orifice
(3) If air stem is adjustable, use greater distance from air stem to orifice.

To increase frequency, resulting in finer spray pattern, reverse above procedure.

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## PLASTERING MACHINES

### What To Do When Trouble Occurs With Machine Application

| Trouble | Cause or Remedy |
|---|---|
| Plaster volume is too low | Too much hose being used or pump worn |
| Nozzle clogged with lumps | Buildup of fibers, set plaster or foreign matters. |
| Plaster rebounds from wall in operator's face | Lower air pressure, If spray pattern is lost use larger orfice. |
| Hose pressure too high | Mix too stiff, hose too long or small diameter, fittings clogged or aggregate being used requires too high pressure to pump. |
| Plaster comes out in stream when browning | Increase air pressure. If this does not remedy trouble, use smaller orifice, or use thinner consistency mortar. |
| Nozzle spray too narrow | The air pressure is too low or orifice too large for plaster volume. |
| Aggregate tends to separate out | Using too much aggregate. Happens more frequently when using sand aggregate. |
| Plaster slumps on wall | Usually due either to too thin a mix or too much aggregate. |

