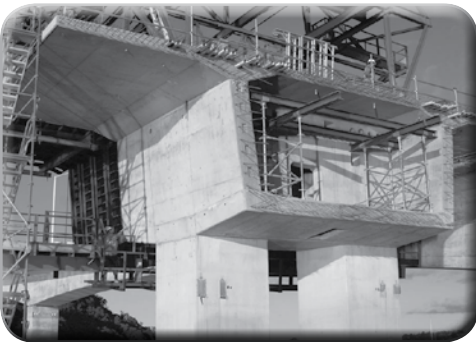




Shotcrete



A Natural Pozzolan for High Performance Concrete



Microsilica 600

## MICROSILICA 600 – for Shotcrete

Shotcrete has a wide range of applications. These include swimming pool construction, feature sculpting, landscape development, erosion protection, channel lining, ground support in tunnel and mine operations, strengthening and repairing existing structures, building complex shapes such as skateboard parks and earth retaining structures etc.

Shotcrete is also used to provide fireproofing and chemical protection of structural steel members and can reduce construction difficulties in confined spaces. There are two basic types of shotcrete: dry-mix and wet-mix.

Dry-mix shotcrete is blown in an air stream to the nozzle where water is introduced. Low water-cement ratios are the norm as no lubrication is required for transporting the concrete. Shotcreting can be stopped immediately, with no wastage, as the water only comes into contact with the concrete materials at the nozzle. This makes dry-mix shotcreting ideal for low volume, intermittent application, such as repair work. With Microsilica 600, the rebound is reduced to manageable levels (5-10%).

Wet-mix shotcrete must be workable enough to be pumped to the nozzle and generally requires modern admixtures to maintain a low w/c. It can be placed at very high rates with low dust and with modern admixtures, including Microsilica 600, can be placed rapidly with low rebound (2-5%).

The presence of Microsilica 600 in shotcrete concrete will increase internal cohesion, reducing rebound and improve short and long term durability.

If fibres - synthetic or steel - are incorporated in the shotcrete mix, Microsilica 600 will improve bonding properties between the fibre and cement paste. Higher bond will provide better control over early age cracking and increased toughness.

### Benefits of Microsilica 600 Shotcrete

Incorporating Microsilica 600 in the shotcrete concrete mix will:

#### **Eliminate formwork**

- Shortened construction period
- Reduced labour

#### **Lower rebound**

- Reduced waste and cost

#### **Improve build**

- Eliminate cold joints
- Increase placement rate

#### **High performance concrete characteristics**

- Excellent performance in harsh environments
- Reduced water penetration

#### **Improve finishability**

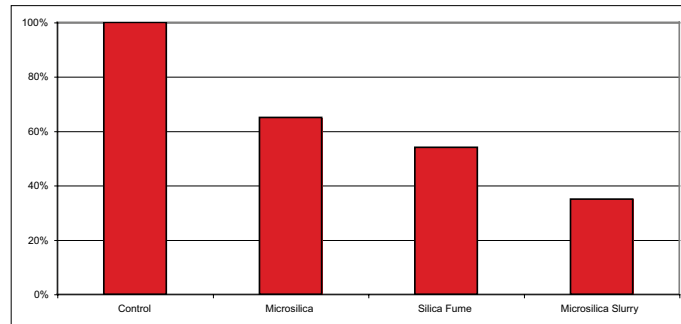
- High quality finish texture



**Figure 1.** Shotcrete with Microsilica 600 has high build, low rebound and high performance.

## Rebound

The addition of Microsilica 600 makes shotcrete more cohesive which reduces rebound and allows the application of thicker layers.



**Figure 2.** Percentage reduction in rebound for walls. Results show rebound values for a standard 30MPa, 10mm max aggregate concrete mix. Silica fume/MS600 at 10% cement replacement.

## Toughness

The inclusion of steel fibres in the concrete mix significantly improves ductility, toughness, flexural strength and fatigue resistance.

Steel fibres can also reduce or eliminate the use of steel mesh when used as secondary reinforcement.



**Figure 3.** In place shotcrete performance depends on the operators skill.

## MICROSILICA 600 APPLICATIONS & INFORMATION

Other Microsilica 600 applications for specialist concretes and high performance concrete are detailed in the following brochures:

- Industrial & Commercial Floors
- Chemical Resistant Concrete
- High Strength Concrete
- Waterproof Concrete
- Marine Concrete

Reference should also be made to the operational and safety requirements in the following documents:

- Health & Safety Data Sheet
- Concrete Mixing Instructions
- Concrete Placement & Finishing Procedures
- Plastic Properties of Microsilica 600 Concrete

### Product Note

The information contained in this brochure is offered in good faith and every effort has been made to ensure its accuracy. However, due to differences in conditions, environments and materials no liability is accepted by Microsilica NZ, Golden Bay Cement or their agents for loss or damage, direct or otherwise, resulting from the application of the information contained herein. Microsilica NZ reserves the right to change product specification without prior notice



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