



METASTAR™ REDUCES ACID ATTACK

MetaStar is a high quality pozzolanic material which is blended with Portland cement in order to improve the durability of concrete and mortars.

Crystals of calcium hydroxide constitute up to 20% of the volume of cured Portland cement paste. These crystals are rapidly dissolved by acids both organic and inorganic to give a weakened, porous structure. If the pH of the pore solution falls below about 6.5, an additional form of acid attack takes place. The calcium silicate hydrate phases themselves may decompose, to give a softened matrix which is easily abraded or washed away. As a result there is increased susceptibility to other degradation processes such as freeze-thaw cracking and re-bar corrosion.

It has been shown by Collin-Fevre¹ that 10% replacement of PC by Metakaolin markedly increases the resistance of concrete to attack by mineral and organic acids (at pH 4.5) as shown in Figures 1 and 2. This is of particular interest in agricultural applications (silage clamps), floors in food factories and breweries, industrial sites, etc.

Larger-scale trials have been reported by RMC plc². Samples of concrete were exposed either to simulated silage effluent or to dilute acetic acid for periods up to 15 months. When **MetaStar** replaced 15 mass% of PC, mass loss in the concrete was reduced by 18 - 28%. These results were confirmed qualitatively by full scale trials at a farm site.

REFERENCES

- ¹ CERIB, Poster479, Montreal (1992)
- ² S.J. Martin, Metakaolin and its contribution to the acid resistance of concrete, Proc. Int. Symp "Concrete for a sustainable Agriculture", Stavanger, 1997.

FIGURE 1: Effect of metakaolin on resistance of concrete to mineral acid, pH 4.5

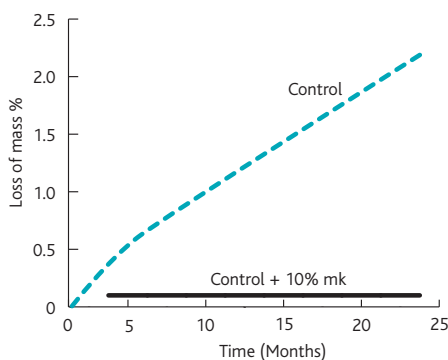
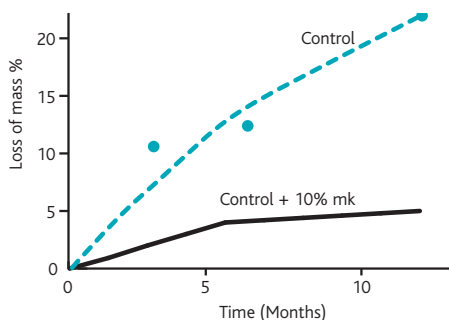


FIGURE 2: Effect of metakaolin on resistance of concrete to organic acid, pH 4.5



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