

Steel Fiber Reinforced Shotcrete

It is time to find out about it.

by Mike Ballou

In an age when the building, tunneling, and in some areas, mining industry, is thriving in North America, we in the shotcrete industry should be looking for ways to increase productivity and save on ever-increasing labor costs. This type of thinking often requires the use of products that we either are not familiar with or have never used at all. Since we are in an industry where our chief concerns are keeping a safe workplace, while at the same time, trying to increase production or speeding up project completion time, we are often times unwilling to try new technology because we are afraid of the unknown. We fear a decrease in production, having to buy new equipment, and worst of all, lost-time accidents.

For this reason—the unknown—many shotcrete contractors and mine managers have shied away from the use of steel fibers in their shotcrete. Their arguments against using steel fibers are often the same. “We use mesh or rebar for reinforcement because we know for sure that the reinforcement is in place *before* we apply shotcrete. That way, we don’t have to worry whether or not we have added the correct amount of steel fibers, or if the steel fibers are mixed uniformly, or if the fibers will do the job at all.” Or, we hear the all too familiar response, “If it is not broken, don’t fix it.”

In my opinion, this “if it is not broken, don’t fix it” attitude is keeping a lot of shotcrete contractors from increased production and greater financial successes. Sure, the economy in North America is strong now in the year 2000, but how long are we going to rely on a strong economy to help our business grow? We need to be part of that strength. We are experiencing a labor market that requires shotcrete contractors and mine managers to increase the wages and benefits of their employees, but by doing things the same way they have “always done it,” production is

not keeping up with an ever-increasing overhead. In order to maintain profitability, these overhead increases are passed on to the consumer. This is allowed sometimes, but at other times, projects go over budget and shotcrete may get the blame for these extra costs.

The consumer/owner says, “That’s it—this shotcrete is too expensive. We are going to have to find another way to do this.” And they will find another way. Their way may not save them anything, but they will find another way.

So what I am saying is if we do not start looking at ways to place shotcrete in a way that makes sense economically and is safe, engineers and owners of projects are going to find other ways that will, or that they *think* will be. In Europe, this is already happening. Their workforce is shrinking and their labor costs are extremely high. They no longer think of hiring people for only the duration of a project because they may not get them back for the next one. To keep key skilled nozzle men and shotcrete people, they are now offering higher wages and benefits. So for this reason, most of the European tunneling and mining shotcrete projects are now being designed with steel fiber reinforced shotcrete instead of mesh. By shotcreting with steel fiber reinforced shotcrete, using remote-controlled robotic equipment, they are stabilizing and securing areas without having to send men in to install mesh, thereby ensuring a safe workplace. They use modern and functional dosing equipment to ensure that the proper amount of fiber is added in each mix. The steel fiber reinforced shotcrete system is also being used in North America, but has not really caught hold yet to the same extent as in Europe. Some contractors just don’t like shotcrete; they tolerate it. They don’t like to think about using steel fibers because they are one more “unknown” that they would rather not worry about in the mix.

I would like to conclude with a quote from Dr. Ing Gerhard Sauers, a long-time designer and specifier for shotcrete for underground support: “One of the greatest enemies of progress, improved quality and innovation in industry, which includes tunneling, is summed up by the two words, “why me?”

Too few people are willing to accept responsibility. While remarkable advances have been made in science and technology, particularly in this century, man’s nature has not always evolved to keep pace. It is to be hoped that future improvements in technology will go hand in hand, closer with those of “humanity and fairness.”

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