

BRECON Vibrationstechnik GmbH

Vibration technology or self-compacting concrete (SCC)? Are these processes really in competition with each other?

At trade fairs in particular, visitors occasionally express the opinion without prompting that the manufacturers of vibration motors will soon disappear because the technology has been displaced by SCC. Statements like these show that very many users,

particularly in the precast concrete element industry, are concerned about this subject. However, what are the special strengths and weaknesses of these two processes? For which application is SCC of interest and what are its limitations?

As far as vibration technology is concerned, the concrete market can be roughly divided into two application areas of equal size – wet concrete and earth-moist concrete. Wet concrete is mainly used in the precast concrete element industry to produce precast concrete elements in steel formworks. Compaction is achieved with external vibrating machines on the formworks which today, are primarily in the form of high frequency vibrators which deliver approx. 5,000 to 12,000 oscillations per minute. The

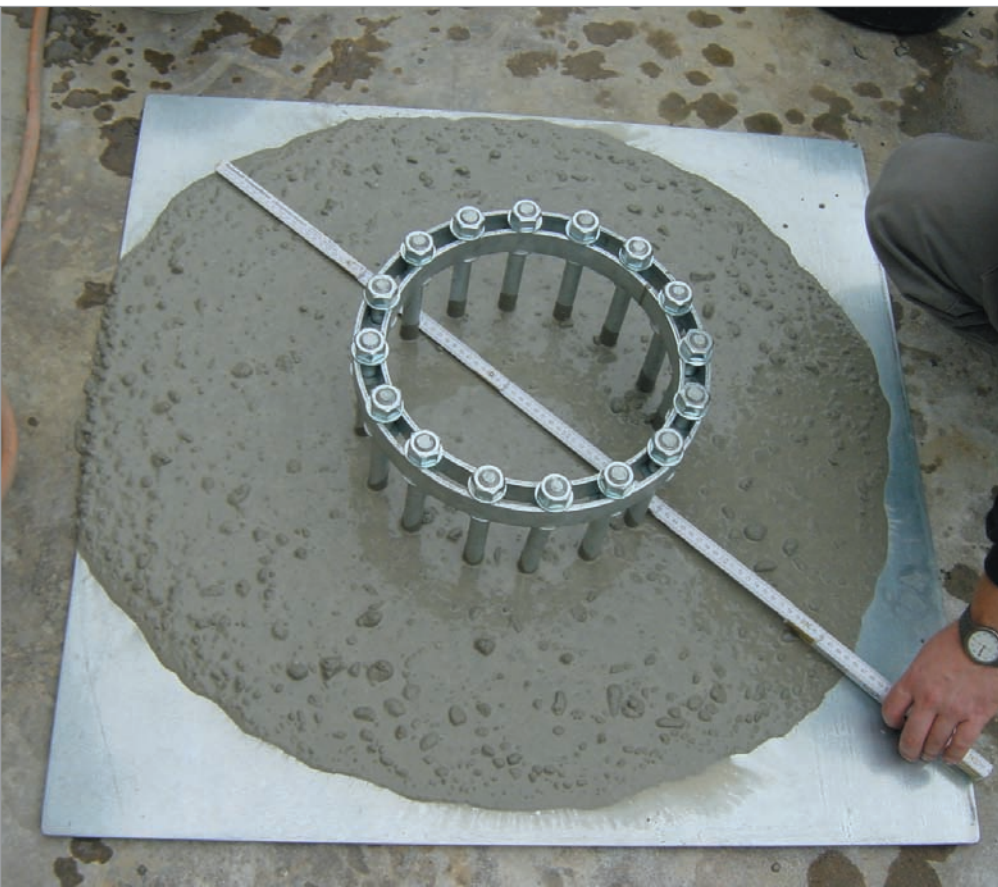
vibration time for high frequency vibrators is usually relatively short (10-30 minutes).

The vibration technology for the dry cast concrete application differs significantly from that of the wet concrete application. Examples of the earth-moist concrete application are pipe manufacturers, concrete block manufacturers, palisade machines and floor-level block machines. Dry cast concrete is usually compacted at approx. 3,000 oscillations per minute

and is very often associated with vibration with top load. Unlike high frequency vibrators, the vibrators in the above-mentioned production machines are also operated for much longer and run throughout entire work shifts. They also operate at substantially higher amplitudes. The jarring blows which are often deliberately used on the machines and the short cycle times make much greater demands on the quality of the vibrator than those made by continuous operation.

At this point, it is already possible to give one answer concerning the competitive situation of the two processes. Since SCC is purely a wet concrete technology at the moment, theoretically, it only represents an alternative for approximately half of all applications. Since SCC, an innovation which originated from Japan, became a topic of interest in the highly industrialised countries approx. 10 years ago, much has been gained in the form of practical knowledge and the market movements in the different countries have been similar. The volume share is still in the lower one-digit % range, even in Germany which is rich in innovative methods of concrete processing. The Netherlands is already top in the world with only approx. 5% SCC. However, the small market share is not the result of being reluctant to convert to the new technology, quite the opposite in fact. Particularly in Europe, many users have already gained experience with SCC; the vast majority, however, have decided against introducing it in their own production. Applications for which SCC has been chosen usually make specific demands on the process. For example, for channels in





manholes, the excellent fluidity of SCC suits the production process (see Figure "Slump").

The reason why vibration technology still dominates the market is that the obvious disadvantage of compaction by vibration – the noise – is balanced by crucial advantages. The compaction of the concrete using vibration is largely unaffected by the concrete consistency, temperature or timing of the processes. The compaction process can also be adjusted to the conditions of the concrete mentioned before by controlling the vibration frequency, intensity and time. The concrete mix can be selected so that the upstream processes such as mixing, transport and placement (concrete distributor and formworks) do not have to meet increased requirements.

Further information:



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The disadvantage of the noise has also been significantly reduced since about 1990 by numerous innovations. The biggest step forward was achieved by using a frequency converter and recently by using synchronous high-frequency vibrators.

As far as wet concrete compaction is concerned, vibration technology and SCC are in competition. After nearly 100 years of concrete compaction by vibration and 10 years concrete compaction by SCC, vibration technology is still the clear winner on points. Indeed, there are numerous examples where machines which were originally designed for SCC have been refitted for vibration technology. Although this is possible in some cases it is not always so. The only recommendation that can be made when designing plants is still to make sure that there is provision for the subsequent addition of external vibrating machines, even when deciding to use SCC.

Because development is ongoing in both areas, the decision as to which is the more favourable process will arise again for each system. ■