

So.Co.Met. SPA, 31040 Nervesa della Battaglia, Treviso, Italy

Monitoring of concrete production in dry cast system

The company Fantuz Ugo srl in Gaiarine (Treviso, Italy), within its own quality control of the production, has carried out a series of tests on production cycles evaluating some changing, which have involved the mix design of the concrete, the demoulding of the elements and the process of the machine and of the moulds. The project has developed together with Master Builder Solutions® di BASF Construction Chemicals (Treviso, Italy) for the concrete mix design and for demoulding agent, and with So.Co.Met. Spa (Treviso, Italy) for machinery and moulds.



Outside area of Fantuz Ugo srl



Test laboratory

The core business of the company Fantuz Uso involves the production of special concrete elements for road and railway industry.

They are special products with different size and with steel inserts and accessories putting inside during the production. The production takes place with an automatic machine Socomet model B1, which works with a 3 minutes cycle achieving a really good daily production given the specificity

and the geometric characteristics of the elements.

The company Fantuz Ugo works with another manual machine Socomet model Easy Rolling and with vibrating table and manufactures several other concrete elements, as new jersey, mini new jersey, manholes and other more for small-medium project.

The monitoring program was developed through:

- The preliminary study of the concrete mix design, at the technological laboratory of Master Builder Solutions of BASF Construction Chemicals (Treviso Italy), to identify the changes and innovations to be tested in production.
- The production tests, comparing the standard situation with any proposed change
- The detection, always in production, of the performance parameters of the finished product (demoulding, handling,



Automatic machine B1 from Socomet



Special products manufactured by B1 machine



Manual machine Easy Rolling from Socomet



Products „Mini new jersey” manufactured by Easy Rolling machine

appearance, defects and need for repair, production waste) and the detection of the production cycle parameters (mainly, time and vibration frequencies, total time of production cycle).

Tests on concrete mixtures

The objective was to evaluate some of the mixture changes, comparing that normally in use, through two tests (PEM Production Efficiency Method and BPD Blood Pressure Device), aimed to identify the lowest energy required to compacting and to identify the capacity of self-supporting of the mixture itself at the demoulding time.

These two parameters, compacting and self-supporting of the mixture, are crucial in dry cast productions and with green demoulding. Of course, it was still verified the achievement of the performance of mechanical strength at 28 days.

It is interesting to note that the laboratory tests have provided some indications on the fresh concrete and resistances after 28 days of curing, which have also been found in the production plant. For the production of special pieces of plant B1, the more reliable mix design has resulted, compared to the standard mix, a reduction



MACHINES AND TECHNOLOGIES FOR WET CAST AND DRY CAST CONCRETE PRODUCTS



so.co.met. spa

via Foscari, 45 - 31040 Nervesa della Battaglia - Treviso - Italy

T. +39 0422 725769

F. +39 0422 725641

info@socomet.it

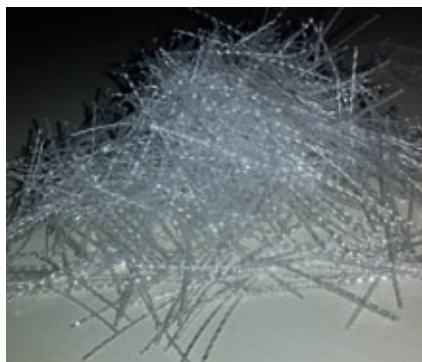
www.socomet.it



Testing devices: PEM - Production Efficiency Method and BPD - Blood Pressure Device



Control panel of the Easy Rolling machine



PP-Fibers MasterFiber 236

of 10% cement, the use of admixture MasterCast 738, an increase of 3% sand. The cost of raw materials of the new mixture is lower by about 1.50 €/m³, while keeping constant the mechanical properties and the look of the elements, compared to the non-optimized mix.

The test PEM (Production Efficiency Method) has identified in the laboratory which mix could achieve the best compaction with a lowest need of energy (indicating how to proceed in the plant mix).

In the factory production, this result has been verified first through the reduction (-10%) of the times of vibration at the same frequency, and then through the reduction of the frequency of vibration with a limited increase of the vibration time (+5%).

The best result on the finished product was detected by reducing the frequency of vibration, furthermore obtaining the advantage of a reduction of noise and surely also a reduction of the stresses of the machine and the molds.

For the production of mini new jersey element, which is without structural steel reinforcement, a further comparative test in the plant was made using PP fibers MasterFiber 236, 30 mm length, replacing the minimum steel reinforcement.

It was detected:

- Uniform distribution of the fibers into the mix
- No interference during the filling and constipation of the mould, due to the presence of fibers.
- Improved selfsupporting of the concrete after the demoulding.
- Reduction of about one minute of each cycle, by eliminating the steel reinforcement positioning.
- No effect on the surface finish, due to the presence of fibers.

The results achieved open interesting perspectives for the use of fiber MasterFiber 236 in other products made by the company Fantuz Ugo, also considering the advantages in terms of high durability of the concrete product.

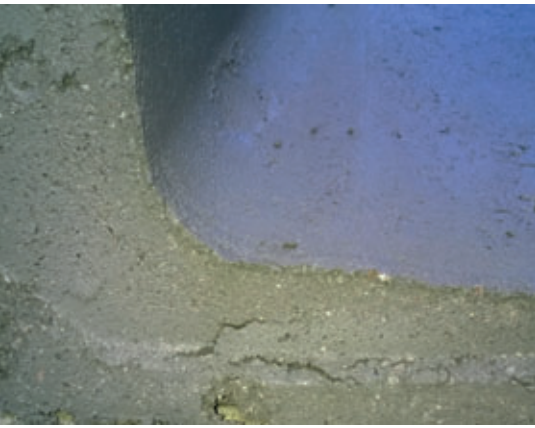
Release agents - comparing test

One of the targets of the manufacturers of concrete products is to meet safety and hygiene in the handling of release agents, which over the years have seen the development of more and more "green" products to comply with to the Government regulations.

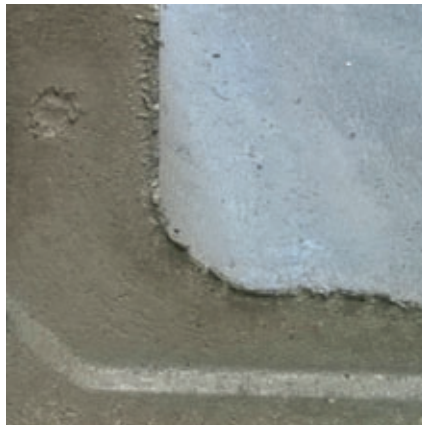
The tests, made together with the company Fantuz Ugo, were held on the automatic machine Socomet B1 used for the production of special products, which require a

Results achieved after this test program

Concrete product	No admixture mix	Mix design optimized	Advantages in production
Special products	<ul style="list-style-type: none"> • cement 42.5 type II • 12 mm max diameter aggregate • w/c 0.39 	<ul style="list-style-type: none"> • 10% cement less • 3% sand more • 1.2% MasterCast 738 • w/c 0.39 	<ul style="list-style-type: none"> • 1.50 €/m³ less of the total cost of the mix (raw materials) • 10% less of vibrating frequency (machine Socomet B1) • No defects on the product (breakings of edges, profiles, plastic shrinkage, ...) • 30% workability more
Mini new jersey (no structural steel reinforcement)	<ul style="list-style-type: none"> • cement 42.5 type II • 20 mm max diameter aggregate • admixture MasterCast 738 • w/c 0.38 	<ul style="list-style-type: none"> • 8% cement less • 5% gravel more • 1.0% MasterCast 738 • no minimum steel reinforcement. • 3% of fibers PE MasterFiber 246. • w/c 0.38 	<ul style="list-style-type: none"> • 5% less of the total cost of the mix • 12% less of vibrating frequency (machine Socomet Easy Rolling) • 20% less of each production cycle, thanks to no positioning of the steel reinforcement. • No defects on the product (breakings of edges, profiles, plastic shrinkage ...)



Product quality with the use of release agent based on synthetic oils



Product quality with the use of release agent MasterFinish RL 420

good surface finish and a high result of demoulding for the presence of specific forms especially on the heads of the products.

The test was a comparative between a release agent based on synthetic oils and Masterfinish RL 420, a release agent in water emulsion, biodegradable, environmentally friendly, non-toxic and non-irritating.

The comparison results showed a number of benefits in favor of the product in water emulsion Masterfinish RL 420:

- Positive acceptance of the personnel thanks to the absence of odors or other sensitization effects to humans.
- Application every two cycles of production, with elimination of one work phase every two cycles.

- Surface finish better and constant for two consecutive cycles after only one release agent application. Long life effect.
- Demoulding without defects even in areas with complex shape and profiles. Good effect even at critical points of the mould.
- Higher yield thanks also to the duration of performance of two consecutive cycles
- Less and easier cleaning of the machine

Conclusions

The monitoring carried out confirms that the control of the production parameters, which involve the mix of concrete and the management of the machine, allows to optimize the cost, to reduce or eliminate defects and production waste. Furthermore it allows to

evaluate and adopt advanced technologies to offer customers a product of high quality.

Important is the approach and the vision of the process in its totality and complexity, involving the skills of most industry experts in the analysis and evaluations, as was the case for this work. ■

FURTHER INFORMATION



Fantuz Ugo srl
Mauro Fantuz
Via Terraglio 104
31018 Gaiarine (Treviso), Italy
gestione@fantuzugo.it
www.fantuzugo.it



Socomet Spa
Fabio Marcato
Via Foscarini 45
31040 Nervesa della Battaglia (Treviso), Italy
fabio.marcato@socomet.it
www.socomet.it



Master Builder Solutions
di BASF Construction Chemicals
(Treviso), Italy
Nicoletta Zeminian
nicoletta.zeminian@basf.com
www.basf.com

Yipin Pigments

is a leader in the pigment industry.

- Yipin specializes in all types of pigments.
- Yipin has a worldwide customer base with customers in Germany, Australia, Russia, Turkey, USA and China.
- Yipin is ISO-9001 quality certified and ISO-14000 environment certified.
- Yipin supplies to a host of different industries such as Construction, Paint, Coatings, Plastics, Rubber, Ceramic, Printing, Paper, Cosmetic and Pharmaceutical to name a few.

Yipin 

YIPIN PIGMENTS



Iron Oxide Pigments

Complex Pigments

Granula Pigments

Liquid Color

Shanghai
Yipin Pigments CO., LTD
4839 Jiansonbei Rd.
Shanghai, China
Tel.: +86 21 6257 0666
Fax: +86 21 6257 8818
www.yipin.com