IV - VALUATION AND EVOLUTION OF THE QUALITY OF CERAMIC TILES IN F. R. GERMANY

Fritz Oehm

- Studied engineering, specializing in ceramics. Graduated in 1958.
- Up to 1975, worked in the ceramic and construcction industry.
- Since 1976, director of the union of ceramic tiles and flooring manufacturers.
- Worked on development of various codes of industrial practice, on national level with DIN, European with CEN, and world-wide with ISO.

In the first place I would like to express my sincerest thanks for the invitation which gives me the opportunity, within the framework of this congress, to provide information about the quality of the ceramic tiles and paving manufactured in Germany, the long existence of inter-company quality control and resultant accumulated experience. I would now like to present some thoughts on future application of the quality insurance and certification of same.

Although it is not my aim to establish comparisons with other countries, I believe that the first German tile norms, published in January 1928 by the German Standardization Institute under the designations "DIN 1399" and "DIN 1400", constitute the oldest norms at world level in the sector of tiles and ceramics. Neither am I over- concerned about the age of those norms. What strikes me as most important is the fact that manufacturers of ceramic tiles and paving gathered in Germany 65 years ago in order to establish jointly the prerequisites of quality, compliance with which necessitated ongoing supervision of production. The manufacturers of former times had already reached the common recognition that, in order to provide client satisfaction and propagate the use of ceramic tiles and paving, it was necessary to maintain a certain standard of quality. The voluntary creation of such norms by German manufacturers, and their submission to the quality requirements established therein, reveal the high sense of responsibility already possessed by German manufacturers 65 years ago. I consider it to be particularly interesting that for longitudinal and width dimensions they laid down then a margin of tolerance of +/- 2% for ceramic glazed tiles and vitreous paving.

Although the comparison might seem a little "lame", I would nevertheless like to stress that, in a whole series of European norms published in 1986 and 1987 in the group A sector, or extruded product sector, tolerances of +/- 2% were also admitted, that is, the same values required 60 years ago by the German norms. This precocious assurance of product quality by means of norms already showed positive effects for German manufacturers by the end of the twenties and beginning of the thirties, not only in sales movements within the country, but also in exports. Exports doubled between

1927 and 1935. With the progressive rise in exports, the DIN norms and the requirements they contained were also transmitted abroad. It is surely unnecessary to mention that those norms have been subject to constant improvement, being completed in 1960 by means of a norm for split ceramic tiles.

When in the middle of the seventies the work was included in the CEN European norms, the DIN norms, together with other European norms, constituted the basic parameter for drawing up European norms for ceramic tiles and paving, and with few exceptions these have been adopted by Italy, France, Holland, Belgium, Great Britain, Spain, Greece and West Germany, having been deserving of recognition for over 5 years now. In the meantime they have become the basis of the ISO norms currently under study, which once they have been drawn up will have validity worldwide and will also replace our European CEN norms. With this, the ceramic tile and paving sector will have established a quality standard at world level which will facilitate familiarization with those materials on the part of architects and quantity surveyors, construction firms and contractors, providing them with certainty of the qualitative properties possessed by a product whose materials must for many decades, along with its visual appearance, also carry out functional missions.

But the mere creation and introduction of norms does not of itself achieve a great deal. Such norms must be fulfilled with vitality; that is, manufacturers must make those norms the basis of supervision of their companies. Those devoted to the manufacturing of products are of course aware that final control of a production run is not of itself sufficient. As suggested by the words themselves, "final control" comes at the end of a long series of controls which take place inside the company without being visible from the outside. The prior condition for modern production of stable quality is the exact supervision of the whole process of that production, which starts with the raw materials, if possible at their place of origin. A routine mission of long tradition amongst German manufacturers is that of qualitatively controlling all supplies of raw material, authorizing their subsequent elaboration only when the result of the tests has been positive. Over the course of time, methods have been developed to permit rapid and sure evaluation of raw materials received, so that the type and number of samplings is oriented in statistical quality controls. As examples of raw material entry controls, we may mention here the determination of the heat expansion coefficient, determination of calcination colour, determination of sediment by decantation. Following the raw material control all phases of production are continually supervised, all this with the objective of detecting as early as possible any deviation or defect, so that if any should arise the corresponding measures may be adopted.

For exact functioning of raw material quality control through to the finished product ready for sale, the independence of the supervisory staff with respect to the company (i.e. production) is essential. There must exist the certainty that quality controls are only subordinated to sales management, and never to the corresponding production manager, thereby avoiding clashes of interest.

If you were to ask me which are the tests constantly carried out on final products, I would have to reply that there is no single uniform reply in that respect. Current production technology does for example permit one hundred per cent control of measurement precision. Also practised is automatic consistency control on the conveyor belts. Nevertheless, the test which is most regularly carried out on finished products is daily control of water absorption, which for expert controllers with long accumulated experience also provides indications of other quality properties, such as resistance to flexion and cold stability (freezing), for herein there exist certain specific product dependencies. All quality values required by the norms are controlled at regular intervals of time, at least several times a year, within the factory's internal system, and for each group of articles. As the various manufacturers almost always have scheduled a variable number of groups of articles, this means that company quality control departments are carrying out complete checks of the norms on an ongoing basis. In addition to their own quality controls, for a long time now is has been common practice in Germany for manufacturers to obtain an official check certificate for their groups of articles. That official check certificate from a neutral department (there are several in Germany, as in any other country) is presented to the clientele as neutral confirmation of own daily supervision carried out. The type of supervision and client confirmation described has been accredited not only in sales in Germany, but also in exports to nearly 100 countries. That system has been functioning for more than 60 years, with

no outside supervision, or rather (to use a modern concept), without outside certification. An important element for the functioning of that system - and one upon which I would like to place special emphasis - is exact characterization of quality and general comprehension of the merchandise supplied.

The European norms establish that the term "1st class" can only be used to designate products which meet all the quality requirements of those norms. If they do not meet some of those quality requirements this does not mean that the merchandise is unusable, but in no event can it be designated as "1st class". Nor should it reach the market without any designation at all. For that reason we have introduced in Germany the concept of "2nd class" and also "inferior selection", to make it clear to the user that it is a lower degree of quality. Only when designations are unequivocal and comprehensible can misunderstandings and erroneous applications be avoided. In the interest of all ceramic tile and paving manufacturers, their products should be characterized with a clear and easily identifiable indication of quality, providing the consumer with clarity and certainty. Only in this way can ceramics successfully resist competition from non-ceramic products.

As I indicated earlier, I would like you to allow me to make a few more comments on the subject of "CEN Certification", for here, owing to the rather wavering development of European directives and prescriptions, a certain amount of uncertainty has arisen and, according to my impression, even a mistaken approach to the concept of "certification".

As you will surely know, the CEN management committee has been presented with an application for certification for the ceramic tile and paving sector, which is currently the object of study. The abbreviation of the competent guild is CCC 5. The mission of that certification committee consists in creating the premises so that checks on ceramic tiles and paving can be carried out within EEC member countries according to unified norms, with checking methods and apparatus which allow direct comparison of test results, thus creating the prior conditions for reciprocal recognition of the certificates issued.

It does not have the mission, and I would like to be most clear on this point, of drawing up regulations for a product certification, and I shall come back to this later. What is certain, however, is that the regulation and establishment of reciprocal recognition of checking certificates in EC member countries is a correct measure and one worthy of applause. It is of no importance when referring to supply within a given country, but for exports it saves a further check at a department of the receiving country, as was required in the past. This has always led to a double test, with the resultant double cost. That additional required check was based on the existence of other checking norms in the respective receiving country. But when product norms and the corresponding checks have been harmonized and introduced in EC member countries that argument loses consistency. It is therefore reasonable that member countries should reciprocally accept the certificates of recognized checking departments of the manufacturing country. This facilitates for the manufacturer exportation of his products and, very importantly, avoids unnecessary costs.

From the German point of view, the question with respect to CEN certification is very different. In the sector of products for construction there naturally exists a series of norms which have certain safety factors. I refer, for example, to reinforced concrete beams or elements of prefabricated roofing, that is, elements of construction with static missions. For reasons of safety, such elements undoubtedly require supervision from outside the company and, therefore, neutral supervision of quality or product certification. With respect to ceramic tiles and paving - which are also elements of construction - the matter must be viewed in a different way. They have no relevance to safety which enforces constant quality supervision or certification from outside the company.

An external control of ceramic tiles and paving, for which, according to European directives on construction products, there exists no technically justified need, would in the opinion of the Germans be an extra burden on company time and costs, without making the slightest contribution to a greater level of qualitative certainty in relation to meticulous supervision carried out at the factories themselves. And if, in spite of everything, in spite of all the controls, complaints have at some stage to be lodged against a defective supply, then neither the outside- company certificate nor his own are

of the least help to the manufacturer. In such a case he is the sole person responsible for the defective goods, and it is he must replace them or refund money paid for them.

I would like to take this occasion to call the attention of all European manufacturers to making use of the potential offered by the "Council Norm for regularization of the legislative and administrative norms of member countries on construction products", signed by all EC member countries on 21 December 1988. In that norm, in chapter 5 and with the title "Certification of conformity", article 13, it is established clearly that:

1. The manufacturer is exclusively responsible for certification of conformity of a product.

2. A prior condition for drawing up of certificates of conformity is a factory's own system of production control, and

3. Only as a measure additional to own production controls is outside supervision possible. In other words, only one possibility is noted here, and at no time an obligatory norm.

In the norm the choice of the type of certificate of conformity necessary is made dependent upon the importance of the product with respect to the health and safety of persons. In this respect, under a criterion of easing of costs, it is clearly stated that preference must be given to the least costly method. According to this it is quite clear that in the case of ceramic tiles and paving a manufacturer's declaration of conformity with the said norms is sufficient. Such certification of conformity, coinciding with the European norm, also constitutes the least costly method. It now depends upon us, as EC manufacturers of ceramic tiles and paving, to make use of that simple and economically advantageous possibility offered us by the norm. As a complement, I would like to point out further that annexe 3 of the said EC norm, under figure 2, provides a list of the various possibilities for certification of conformity. I strongly recommend to every European manufacturer a close study of that EC norm on construction products, before conclusion, eventually for supervision contracts pending discussion with external departments, and I recommend making use of possibilities 2 and 3 outlined in annexe III, number 2 ii. We manufacturers must be sufficiently aware and strong to recognize the possibilities offered by the EC norm, and to use them to the full, supervising we ourselves our own products and their quality, under our own exclusive responsibility, not setting foot on the terrain of outside supervision, which only means greater expense and higher product prices.

I hope, distinguished audience, that with these last reflections I have been able to provide you with some ideas on future quality supervision and certification which will lead us to a strengthening of our own responsibility and not to seeking outside responsibility, which would thrust upon us a quality supervision making the product more expensive.

Thank you very much for your attention.