

Science and practice

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The testing of materials in the interests of quality

The search for perfection in all fields is a trait of man (with a few exceptions, of course!) which accounts for the advances made in science and technics. With regard to industrial production, competition is another factor contributing to progress and its effects are two-fold in that it leads first of all to an increase in quality with respect to price and, secondly, to a reduction in price with respect to quality. By increase in quality we mean above all an improvement in the wearing properties (that is to say resistance to wear) and an increase in the utility of a product (e.g. a simple cotton coat being made waterproof). Results such as these are achieved by continually improving raw materials, working methods and the treatments to which textiles are submitted, in particular by keeping a continual check on products at all stages of production from the raw material to the finished articles.

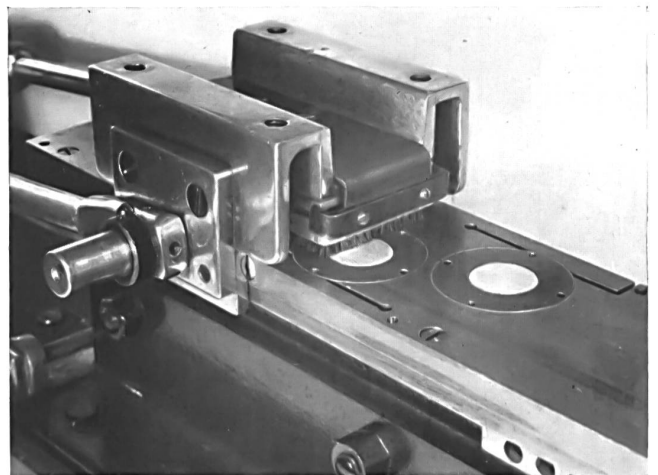
If at one time people were content to appreciate the quality of products offered on the market (from the raw material to the finished article) in a purely empirical manner by using their senses of sight, smell, touch, etc., the competition prevailing in the modern economic world has compelled producers to develop testing methods (and the necessary apparatuses to carry them out) enabling standards to be laid down to cover all cases and providing a means of comparison. Naturally it is to the advantage of any industrial concern making use of large quantities of certain raw materials to check their quality and regularity itself as well as the finished products. Swiss watchmaking factories, for example, to take a case outside the field of textiles, keep a regular check on the hardness and other characteristics of the steels they use, just as all weaving mills test the yarns with which they are supplied. There are however certain tests that cannot advantageously be carried out by the manufacturers themselves and there are also certain fields, such as that of textiles in particular, where wholesalers and retailers, and sometimes even consumers, wish to be informed concerning the composition, quality and exact characteristics of the articles they buy or sell (and also when an article gives rise to a complaint concerning its quality or appearance).

The advantage of having a testing institute able to carry out this work impartially for all industrialists and private concerns is therefore quite obvious — so obvious in fact that two centuries ago, in 1751, the first «Silk Conditioning Institute» was founded in Turin for the purpose of determining for raw silk buyers the exact commercial weight of silk regardless of its degree of humidity.

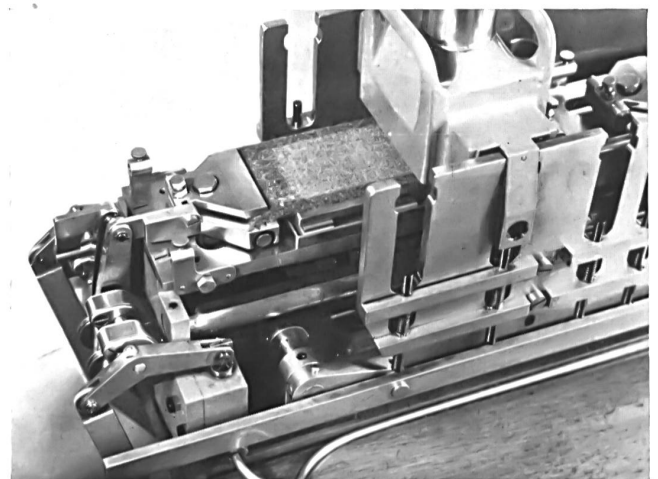
First among Switzerland's organisations for testing materials, we must mention the Federal Material Testing

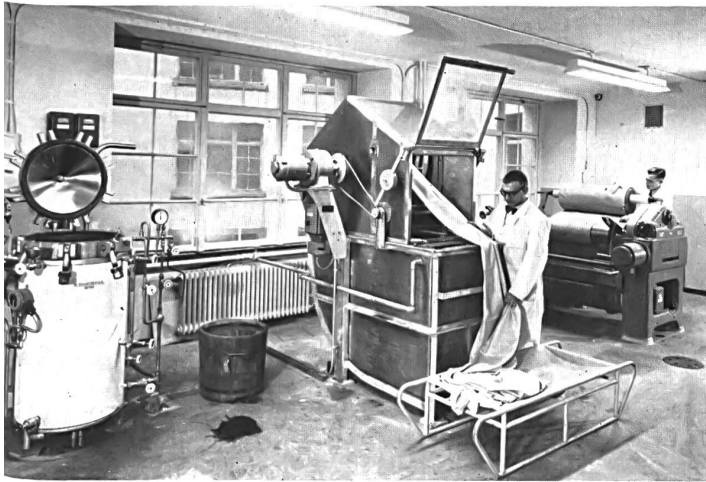
Laboratory and Research Institute (E.M.P.A.) which is under the supervision of the Board of the Federal Institute of Technology in Zurich and dependent on the Federal Department of the Interior. It is divided into three departments, two of which (A and B) are situated in Zurich and handle machinery, building material and

Testing for abrasion by brushing,
on convex testing samples.



Testing a carpet for abrasion.





Laboratory for dyeing and other chemical processing.

general and industrial chemistry, while the third (C) is responsible for tests and research in the fields of textiles, leather, paper and soap. This third department is situated at St. Gall where it works in close collaboration with the School of Higher Commercial Studies. The link between EMPA and industry is maintained by an advisory commission composed of industrial and commercial representatives. Department C, in which we are more particularly interested, has set up several technical commissions in order to spread the knowledge acquired through the tests and research carried out and to discuss the practical results obtained. Finally, the Swiss Association for the Testing of Materials is responsible for the development and standardisation of the methods and conditions for examining materials. This co-operation is the result of the collaboration started some twenty-five years ago between the EMPA and the testing and research laboratories of private industry.

“The purpose of the examination of textile materials,” said professor Engeler, head of department C of EMPA at St. Gall, “is the irrefutable scientific determination of their properties and the expression of these in precise figures, so as to set up standards enabling them to be evaluated for the benefit of the technical side of manufacture or for purchases and sales.”

Naturally no testing laboratory could limit its activity to the use of already known processes for the scientific establishment of the characteristics of a product without dooming itself to slow extinction. On the contrary, it has to devote a large amount of its time and energies to research with a view to perfecting its testing methods and discovering new ones.

We cannot go here into the details of the research and analyses carried out by EMPA in the field of textiles. We hope however in a later number of this periodical to be able to give this interesting subject the special article it deserves. We shall limit ourselves therefore, today, to quoting some figures which give an idea of the vast scope of the work it undertakes.

In 1956, department C in St. Gall received 4480 requests for analysis, accompanied by 8420 test samples. This work was shared by the institute's 4 sections and 3 specialised laboratories. 185 of these requests, i.e. 4.2 %, came from abroad.

Out of the 2400 tests on textiles, 10 % involved the composition of products (qualitative and quantitative), 55 % the determination of the quality (half of which involved cotton products), 20 % the conformity of deliveries with samples or the special specifications laid down in an order (e.g. specifications of a government department regarding the delivery of cloth for uniforms) and 15 % miscellaneous tests (strength of ropes, impregnation of fabrics, etc.) and work for technical trade commissions.

20 % of the 2400 requests for analyses of textiles came from government departments and 80 % from private concerns, craftsmen, tradesmen and private individuals.

As these figures show, the work done on textiles by department C of EMPA at St. Gall is considerable, and private concerns make frequent calls on the collaboration of this institute for the checking and maintenance of the articles they produce, buy and sell.

R. C.

Photos Empa

Testing cotton for spinning, from the fibre to the finished yarn.

