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CCMC NEWS

Quality Products Mean Business Profits

(reprinted from CanadExport, December 1, 1993)

It is estimated that the production of non-quality merchandise costs the Canadian economy an astounding $100 billion per annum. The cost alone to individual manufacturers of producing a non-quality item results in an average loss of between 15 per cent and 20 per cent of revenues.

This is coupled with pressure for Canadian businesses to become more competitive – in quality as well as price. Major corporations worldwide are requesting that their suppliers be ISO 9000 registered. Already, European businesses that have implemented ISO 9000 are prospering in the marketplace.

Europeans are moving quickly: in the UK only, approximately 25,000 businesses are already certified; Canada, so far, has some 500. Clearly, Canada must meet the quality challenge to remain competitive.

To this end, Public Works and Government Services Canada (PWGSC) and Industry Canada (IC) have announced the Supplier Quality Initiative (SQI) which will require companies competing for PWGSC business to comply with ISO 9000 standards. The SQI is designed to ease the transition towards ISO 9000 implementation and to make quality management a priority for doing business in Canada.

The initiative will require suppliers doing business with PWGSC to be registered to ISO 9000 by an accredited registration organization, where applicable. PWGSC will be able to purchase goods and services from suppliers with established quality management systems, helping to ensure that it buys what its clients want, at a level of quality they expect, and at a competitive price.

At the same time, the initiative will create the impetus to meet these world-class standards, thus helping suppliers become more competitive, nationally and internationally.

Suppliers who adopt the ISO standards will be able to market themselves to potential clients as having met an internationally-established level of quality.

There are many other benefits to suppliers adopting the ISO 9000 standards. These include:

- reduced operating costs;
- consistent standards of quality;
- reduced external client audits;
- increased customer satisfaction; and
- enhanced ability to enter new markets.

ISO 9000 usage will be investigated on a sector-by-sector basis. Assessments of the supplier base will be performed in consultation with the private sector and various government agencies. ✦

CCMC Implements ISO 9000

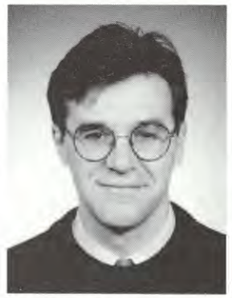
ISO 9000 will become the only quality assurance option for future CCMC evaluations.

CCMC's product evaluations allow building regulators, designers and users to rely on quality construction products. In order to maintain that level of confidence, the Canadian Commission on Construction Materials Evaluation has decided that CCMC will use the ISO 9000 Series as the requirement for quality assurance for proponents requesting evaluation. The exception will be when a product standard describes its own quality assurance expectations. CCMC operates under the general policy and technical advice of the Commission, which provides an arm's length relationship with NRC.

CCMC Technical Guides, which specify the minimum requirements that a product must meet to receive an Evaluation Report, use the ISO 9000 Series as an optional requirement for quality assurance. It will become the only option in future Technical Guides. Prior to fully implementing these requirements, CCMC is running a pilot project to determine the impact on manufacturers. Results of the pilot project will be presented to the Commission for discussion. During the transition period, manufacturers may choose to demonstrate compliance to the existing quality assurance requirements or to ISO 9000.

Information: Alphonse Caouette ✦

Research Associate: Christian Lauzier



Christian Lauzier has been a Research Associate with CCMC since 1993. His involvement with CCMC has led to a closer collaboration with experts from other research laboratories within IRC and outside. (See Crack Sealing, written with J-F. Masson.) Dr. Lauzier's research focuses on the development of improved methods to study the durability of fiber-reinforced plastics and road crack sealants, as well as new methods to identify polymers in polymer-modified bitumens. As a polymer chemist, Dr. Lauzier provides CCMC with essential support in dealing with the polymer-based composites entering the construction product area. He is also involved in a research program aimed at identifying factors affecting adhesion of polymeric materials to concrete, wood and metallic components of building materials. His technical experience in the analysis of polymeric materials includes transmission electron microscopy, scanning electron microscopy, x-ray diffraction, thermal analysis and infrared spectroscopy. Dr. Lauzier obtained his Ph.D. from McGill University and worked for five years in polymer related research and development.✦

Crack Sealing: Important Considerations for a Successful Installation

C. Lauzier and J-F. Masson

Although crack sealing may give satisfactory results in prolonging the service life of pavements, the method may still be improved by understanding the different steps in preparation of the cracks and conditioning of the sealants.

Constantly increasing traffic loads have led to the problem of crack development in roads, which can be reduced by a periodic resurfacing with a fresh layer of asphalt pavement. Due to the high costs involved with the resurfacing of cracked roads, alternate methods of maintenance have been used to prolong the useful life of pavements. The major problem associated with cracks in pavements is the infiltration of water and hard particles (rocks and sand), which eventually erode the underlying infrastructure and cause new cracks to appear.

Crack sealing performed at an early stage of pavement degradation is one of the key parameters in the success of the maintenance operation. The sealant chosen to seal cracks is also very important and depends very much on the climatic conditions to which the pavement is exposed. In northern climates, urban pavements can undergo temperatures ranging from -30°C in the winter to 50°C in the summer. A procedure must be followed which takes into account all aspects of the installation of the sealant, including the execution of the work and the equipment used. The 5 steps of the following procedure are generally accepted in Canada and the United States as the minimal requirements for the proper installation of hot-applied crack sealants.

Crack Sealant Installation Protocol

- The crack is routed to a fixed geometrical shape to improve the mechanical properties of the sealant.
- The residue from the routing is removed.
- The crack is cleaned using air pressure or an aspirator and heated using a hot-air lance.
- The sealant is poured into the crack.
- The sealant is protected until its surface has hardened.

> CCMC's services are not limited to building products. As part of the Institute for Research in Construction, CCMC has access to expertise that can be applied in a variety of fields beyond the building sector of the construction industry. Paving is only one. Please pass this article on to your colleagues who are concerned with roadways.

In our field studies a series of crack sealants were installed following the procedure above. A closer analysis was done to ascertain whether the procedure itself was not responsible for the premature failure of some sealants.

Routing, Cleaning and Heating Cracks

Commonly used routers are capable of routing either straight or meandering cracks. They are equipped with carbide-tipped blade cutters mounted free on a flywheel and perpendicular to the asphalt. The action of the cutters is very different from that of a diamond saw, where the blade is thin and the material is removed by grinding into a fine dust. Common routers operate by hammering each cutter into the asphalt surface, removing large aggregates and particles. The action of such routers generates an enormous shock wave which is transmitted to the surrounding pavement, causing microscopic cracks. A preliminary investigation of the installed sealants indicates that on some roads the aggregates on the inner edge of the routed cracks may be loosened from the asphalt cement, leading to a premature failure of the seal. In such a case the sealant is not to blame, but problems will still arise from the penetration of water and solid particles under the asphalt concrete.

As far as heating the routed cracks is concerned, two schools of thought prevail. The first advocates blackening the rout prior to the installation of the sealant. The second favors a more rapid heating of the rout without blackening the rout edges and bottom. Both procedures are thought to drive oil and moisture away from the cracks; the general belief is that adhesion of the hot sealant to the rout is better when the rout is heated. Two major problems arise from blackening the routs. First, an oxidation of the asphalt renders it brittle. Second, the blackened asphalt tends to withdraw from the aggregates, leaving them uncoated and thus free to detach from the asphalt cement matrix.

Although we have not yet investigated this in detail, we suspect a link between the premature detachment or pull-out of some sealants from the routs and the routing/heating procedure.

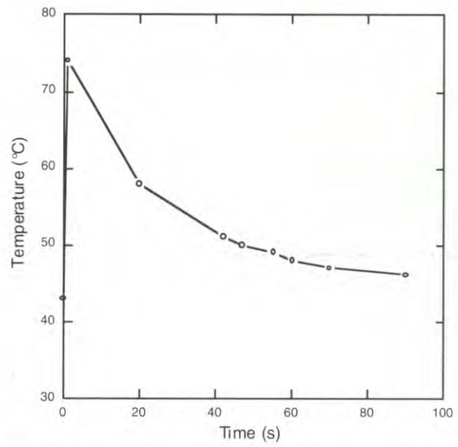


Figure 1 Rout temperature vs. time after heating

Temperature Rise in Routs after Passage of the Hot-Air Lance

Figure 1 shows the average temperature at the bottom of a rout versus time after passage of the hot-air lance. The highest temperature reached upon passage of the lance is far from what is required to render the aged asphalt concrete tacky enough to facilitate adhesion of a sealant poured at a much higher temperature (175 – 200°C). The temperature does not even reach the boiling point of water. It also took approximately two minutes for the rout to reach the equilibrium temperature of the surrounding asphalt (approximately 40°C on a sunny day). Considering that in the very best conditions the sealant is poured into the rout immediately following the passage of the lance, when the rout temperature is at 80°C, the efficacy of such a treatment is doubtful, especially if moisture is a concern.

Degradation of Sealants at Elevated Temperatures

It is generally accepted that single-walled kettles with direct heat should not be used for pavement repair work. Double-walled kettles heated with hot oil and equipped with an automatic temperature control device, stirring system and thermometers indicating both the temperature of the oil and the sealant, must be used. This is of primary importance, especially when the sealant stands for a long period of time in the kettle, which tends to overheat; this is damaging to the sealant since the polymers used to modify it may degrade at even slightly higher temperatures. Even at a temperature considered by the manufacturer to be harmless, there still is some sealant degradation, which is apparent from a change in viscosity. For the sealants studied, the service life will probably be reduced due to the physical and chemical changes that occurred during high temperature storage.

Although crack sealing may give satisfactory results in prolonging the service life of pavements, the method may still be improved by understanding the different steps in the preparation of the cracks and the conditioning of the sealants. Blackening of the routs by the hot-air lance should be avoided, as it may damage the asphalt. Considering that the temperature rise of the rout after passage of the hot-air lance is not really significant, the usefulness of that step is questionable. Without any doubt, sealant degradation in kettles seriously reduces their performance.✦

CCMC and CWDMA Survey Window and Patio Door Industry

CWDMA and CCMC will survey window and patio door manufacturers over the summer months.

As reported previously (Issue #4, Winter 1993), the Canadian Window and Door Manufacturer's Association (CWDMA) has created a new certification program for windows and patio doors and has requested that the evaluation program currently offered at the Canadian Construction Materials Centre (CCMC) for the same products be discontinued.

Before CCMC can act on this request for the withdrawal of its program, the Canadian Commission on Construction Materials Evaluation (CCCME), the independent body overseeing CCMC, has decided that the window and patio door manufacturers should be surveyed to determine if they favour CWDMA's new program over CCMC's existing program. CWDMA and CCMC will conduct this survey jointly over the summer months. Canada Mortgage and Housing Corporation will collate the results.

The results of the survey, along with other information collected on both programs, will be utilized by CCCME in deciding whether CCMC's window evaluation program should be terminated and, if so, when. Readers will be apprised of any decisions taken in a future issue of the News.

For further information or to express your views on these programs, please contact Guy Gosselin, Assistant Head, CCMC (613-990-0458). ✦

CCMC News Gets Raves from Readers

As many will recall, a survey was conducted last year to determine if the *CCMC News* articles on key evaluation activities, current product trends, proper installation guidelines and other news are pertinent to the line of work and interests of readers. The results have now been analyzed and we are happy to report a very high level of satisfaction.

Out of nearly 8300 survey cards returned (64% English and 36% French), 92% indicated interest in continuing to receive *CCMC News*. Of those who answered the question "How do you rate *CCMC News*," 94% rated it either as "Excellent" or "Good," and 6% rated it as "Fair." Ninety-seven percent of readers read at least half of the *News*. The results were highly consistent across the country and for both official languages.

Articles of most interest to readers concern product installation, product trends, evaluation criteria, quality and testing issues. Furthermore, over 50% of respondents indicated that CCMC should be evaluating insulation, roofing, windows, cladding and structural products. Many readers suggested new product areas for us to consider.

We thank our readers very much for the time you took to provide us this feedback. Your comments and suggestions will be invaluable in planning future issues of *CCMC News*. ✦

Release of Summer 1994 Registry

The Registry of Product Evaluations, Summer 1994 Edition, is nearing completion and will be mailed out near mid-August. Evaluations which did not make the publication cut-off of April 1 will be listed in the next issue of *CCMC News*. ✦

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