

# 16th International Corrosion Congress (16ICC)

September 19–24, 2005, Beijing, China

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## SESSION ON CORROSION EDUCATION AND TRAINING

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*"Virtually all corrosion failures result from carelessness on the part of the user or poor choice of material or configuration by the designer."*

Mars G. Fontana, 1970

### Motivation, scope and goal

The annual direct cost of metallic corrosion ranges from 3.1 to 4.5% of the gross domestic product (GDP) in industrialized countries. In the USA, for example, corrosion costs a staggering \$276 billion per annum, approximately 15 times as much as the annual cost of all weather-related disasters—including hurricanes, tornadoes, tropical storms, floods, fires and droughts that together account for US\$17 billion per annum. In Canada, 3.1% of the GDP is CN\$32.8 billion. This figure amounts to 2/3 of what the government spends on health and on education each year, is nearly twice the amount spent on research and development, and over three times the amount spent on national defence. These figures do not include the indirect/user costs of corrosion which would essentially double the above amounts.

Unlike weather-related disasters, corrosion can be controlled. As estimated, 25 to 30% of annual corrosion costs could be saved if optimum corrosion management practices were employed. Moreover, broader application of corrosion-resistant materials, the application of the best corrosion-related technical practices, including the best anti-corrosion practices now known, could reduce current corrosion costs by over 50%.

It is generally recognized that a significant percentage (upwards of 70%) of corrosion failures is due to human error and poor training in corrosion control. As early as 1964, La Que wrote that "Attention to education in corrosion is the most effective thing that NACE [National Association of Corrosion Engineers] can do to insure its future progress and maintain its statue at the level it must cultivate." Almost four decades later, in 2002, the improvement in "education and training of staff in the recognition of corrosion control" was identified as one of four non-technical preventive strategies in the special study entitled "Corrosion Costs and Preventive Strategies in the United States" that was initiated by NACE International and mandated by the US Congress as part of the Transportation Equity Act for the 21st Century (TEA-21).

How do interested individuals train to become corrosion engineers? Not by obtaining degrees in the subject, as no such specialization is available at the undergraduate level. Some corrosion engineers hold degrees—in Materials/Metallurgical Engineering, Chemical Engineering, Chemistry, Electrical Engineering, Civil Engineering, Physics or in a number of other areas. Many corrosion experts either have no degree, or have studied in fields with at best a remote connection to corrosion. Most of these people became corrosion engineers/experts through on-the-job experience and/or by individual study—some by trial and error methods after having been assigned the responsibility of protecting some structures or equipment from corrosion; some by working with people already experienced; and others by taking one or a few short courses offered by NACE International and other organizations.

Basic training and education in corrosion has become a major issue, and while the importance of research in the field of corrosion is recognized and the application of its theories to practical situations is honoured with great success, contemporary methods of teaching, education and learning in corrosion are not appropriate and prove to be highly insufficient. Unlike education in the classical engineering disciplines where abundant experience with respect to optimal teaching and learning has been converted into appropriate textbooks and other teaching aids, their counterparts in corrosion, except for a few noteworthy examples, seem to lag far behind.

The Session on Corrosion Education and Training is being planned as part of the 16th International Corrosion Congress that will be held from September 19–24, 2005 in Beijing, China. The objective is to bring together corrosion educators, corrosion professionals and industry leaders to review the current state of corrosion education in the context of industry needs and practices internationally and discuss the kinds of curricular goals, design and program delivery possibilities that would effectively meet corrosion education needs for the future. Prospective participants are invited to submit proposals for papers that address a number of issues including but not limited to: recent curriculum developments in specific institutions or countries; laboratory requirements and components of corrosion courses and programs; corrosion education needs for specific industries; collaboration between educational institutions, research laboratories, professional organizations and industries in delivering corrosion education; challenges in developing corrosion curricula in tertiary institutions; developing graduate programs to prepare researchers and professionals.

Of the two Panels that will round out the Session on Corrosion Education and Training, one will be devoted to discussing Fundamental Corrosion Education and the other to discussing General Corrosion Education and Vocational Training. In the first instance, invited panellists, discussants and members of the audience will address what constitutes "fundamentals" and the training requirements and capacity for undergraduate and graduate programs in corrosion at universities and colleges. In the second instance, the focus will be on professional training available through various organizations and vocational institutions.

The selection of papers to be presented at the Session will be made on the basis of extended abstracts (maximum 2 pages and 1000 words). Prospective authors are invited to submit their abstracts (in English) no later than **December 30, 2004** by e-mail to Sergei Shipilov, shipilov@enme.ucalgary.ca. Abstracts should include: title; authors and affiliations; telephone, fax and e-mail address of the principal author; and clearly outline an author's view on and vision of corrosion education. Authors will be notified of acceptance of their papers by February 28, 2005. Accepted abstracts will be printed in the Abstract Book and issued to all Session presenters during the Congress.

This session is the fifth in a series of International Corrosion Congresses (formerly the International Congress on Metallic Corrosion) organized by the International Corrosion Council. The previous four sessions were held during the 5th International Congress on Metallic Corrosion in Tokyo, Japan, 1972; 6th International Congress on Metallic Corrosion in Sydney, Australia, 1975; 7th International Congress on Metallic Corrosion in Rio de Janeiro, Brazil, 1978; and 8th International Congress on Metallic Corrosion in Mainz, Germany, 1981.

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