The International Federation for Heat Treatment and Surface Engineering (IFHTSE) discusses the importance of cross-border collaboration in heat treatment and surface engineering and the role of the federation.

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There is a continuing need for international effort among experts. Many problems, challenges, and opportunities are quite specifically “national,” or indeed regional or local, but industry in the main is increasingly global and a narrow view does more harm than good in the long run. Heat treatment and surface engineering science, technology, and processes are spread across the whole of industry and affect the lives of everyone. Moreover, there are some areas in which only a multinational approach can really make sense. Frequently cited examples are:

* Energy use and alternatives in processing. A French or American company operating in China needs to know the Chinese energy picture.
* Environmental acceptability. Industry should lead, not lag.
* Standards and designations. Very few people really want universal standardization of everything, but some normative approach is absolutely essential in certain matters if a truly global industrial activity is to be a productive reality: standards and designations, interoperability, recycling compatibility.
* Properties and performance data for modeling and simulation. Recently, several contributors to IFHTSE events have said firmly that the only way to assemble reliable databases for use in process modeling is through multinational effort.
* Globally recognized training in heat treatment and surface engineering. If industrial effort is global and if company markets can only make sense on a cross-border basis, then the labor market also becomes international. For employer and employee alike, some sort of widely understood attitude to education and training is also necessary. IFHTSE is a member of a European consortium developing a model scheme for education and training in surface engineering with pan-European relevance and global potential, with project input from France, Germany, Hungary, Romania, and the United Kingdom.
* Work on technical terminology. IFHTSE’s earlier contributions by way of multilingual glossaries and definitions need revision and expansion.
* International exchange of information is also essential in the matter of conference planning and scheduling. The critical importance of our field of activity means a lot of conferences around the world. Mutual knowledge of plans is a necessary aid for authors and other attendees alike to make sense of their travel budgets and to know what is being presented. IFHTSE’s website (ifhtse.org) offers a world calendar of conferences and exhibitions, now searchable by, for example, date, subject, and location. We mean to expand this.

**What does ‘international’ mean?**

One of the problems is the word “international” itself. What does it really mean? It has been used in so many senses which make it virtually meaningless. An “international conference on x, y, or z” often turns out to mean no more than that a few foreigners were listed on the program.

What we are talking about here is open activity. A closed conference, expressly limited to certain nationals is of course entirely meaningful — but would not require a great deal by way of publicity! Organizers of the run-of-the-mill open conference would do themselves no favors by turning down good registration fee money from wherever it was offered. So to that extent, all open conferences (language barriers apart) are “international.”

All IFHTSE events are open to participants from any nation that can show mutual relevance: but by “international congress, conference, . . .” what we in IFHTSE mean is that the...
scheduling and planning, and a good deal of the program construction, are also very definitely internationally based on multinational input.

Grant funding for R&D

The more some issue involves cross-border effort, the more it can and should become a candidate for “official” funding. One of the troubles with “official” funding is that there seem to be no channels for making a good case for a project which is needed by industry (bottom up) but which represents an investment level (in manpower, for example) very difficult to justify, or even impossible, especially for smaller companies.

Funding policy tends, unfortunately, to be guided by the “official” view of what is “sexy” (top down). A good example is the area of nanotechnology. This subject, or perhaps more precisely the term itself, has been noticed by the media and consequently, as might have been predicted, dramatized and fairly comprehensively misunderstood. The result, of course, is that politicians feel they must not only take it seriously, but must also take a position in case they are accused of lagging behind in research and innovation. This has the further consequence of ensuring that R&D grant finance is offered on a top-down basis with limited industrial input or comment at the crucial time.

The “new” European Union (EU) of 25 members (many of those countries have IFHTSE membership) presents a very great challenge for coordination in terms of R&D. It is clearly necessary to find some “public fund” way of matching the spin-off from U.S. military spending — and what used to happen in the Soviet Union — and the wish to create a critical mass to make this possible is entirely comprehensible. The problem is that because of the diversity and the inevitably diffuse and national nature of the existing investment, EU authorities are tempted to centralize and dictate the priorities for the distribution of public money in aid of R&D.

Perhaps driven by a mutual wish not to lag behind rather than any genuine desire for collaboration, U.S./EU workshops have been held with considerable relevance to heat treatment and surface engineering but with minimal real effect for industry. IFHTSE as a “nonaligned” network takes part in European Union funded work and is ready to act as a gateway to other collaborations.

It is indeed a global industry

European companies are probably better in general than their American counterparts at understanding that the world does not consist solely of the United States and Europe. The enormous changes taking place in China, India, and the rest of the Asia-Pacific region will continue to exert a very strong effect on global commerce and industry.

Certainly American automobile manufacturers (already global) have had the confidence to go into China along with the Japanese companies. They have quite reasonably, however, taken a “China is a vast market” view. They may not have fully considered the technological consequences; for example, what about local first-tier suppliers, and how do you mutually ensure quality, and according to what criteria? (Reports on joint ventures suggest that the latter is the main source of friction.) Chinese suppliers will want a big slice of the action and to be part of the supply chain complex. To do this they will want to match the “international” rules and standards,
which means they have a deep interest in being sure what those rules and standards are.

**Goal-setting studies:** The notion of “foresight” exercises attracted a lot of attention and energy in the latter part of the 20th century. The ASM Heat Treating Society’s Vision 2020 is a prominent example in our field. And there were others — in France, Germany, and the United Kingdom, for example. All were expressly national efforts dedicated to some kind of prediction by identifying drivers and “missing links.” These studies were not all concentrated on heat treatment and surface engineering, of course, but by being industrially based most of the work inevitably had relevance to these critical families of processes. Some diverse, significant aspects are worth noting — the American exercise was funded by the Department of Energy; the British study by the Department of Trade and Industry. Also, in the British scheme, surface engineering was specifically identified as one of the critical areas for industrial progress!

**New study:** The IFHTSE Executive Committee is now engaged in compiling a document with a worldwide approach. With a working title of IFHTSE Global 21, the audience aimed at is also wider than just the people in the industry. The study’s central objective is to look outside and provide information for decision-makers, national government departments, and nongovernmental organizations involved in economics, industrial development, and environmental management.

Many studies have attempted a quantitative approach, therefore IFHTSE Global 21 will be more of a qualitative statement on the basis that the eventual numbers are going to be consequential upon many sociopolitical factors and not solely upon economics and demand. We have access to the best available expert scientific and technological information within the framework of IFHTSE, benefiting from authoritative European and Asian input. We hope the appropriate North American input will also be forthcoming.

**Human factor is very important**

Dynamic collaborative action demands personal mobility. Electronic communication methods are best seen as an aid to this rather than as a replacement for it. Mobility of labor is obviously essential. The United States has always benefited from imported brainpower attracted by a generally justified perception that the country encourages initiative and offers “opportunity” and the right context for exercising entrepreneurship. Europe is in many ways a different planet, with its widely differing attitudes, traditions, and ways of working, plus the negative effects of some very restrictive regimes, in particular of the economically disastrous Communist age. Some of these “special effects” linger; for example, who owns what by way of real estate or intellectual property? It is to the credit of some farsighted and tough individuals that many companies, new and old, are surviving in this rather difficult setting.

Some of the “foresight”-type studies referred to previously have identified the human factor as being very important and even critical. At the most cynical (realistic?) level, many industry people interviewed were mainly worried about the future availability of technicians/technologists capable of operating increasingly sophisticated plant and equipment — a shortage of Ph.D.s is not foreseen! A discussion with senior Indian Government representatives at the IFHTSE conference in Hyderabad in 2003 revealed exactly the same concerns.

**ASM’s many contributions**


ASM provided the platform for Walter Jominy and others to talk to their European counterparts and encourage an international collaborative approach to the future. The early meetings in Germany and elsewhere so soon after World War II showed great foresight and indeed courage. The formation of IFHTSE was one of the logical consequences and, in that body, ASM leaders in the heat treating field continued to exert influence over the next 30 years. The most obvious names are George Bodeen, George Krauss, and most recently George Totten — “The Three Georges.” Bodeen, always regarded as an “elder statesman” and always to be relied upon to keep the real-time industrial need in view, was prominent in many conferences around the world; so much so that IFHTSE made him its life Honorary Vice President. Krauss, an academic but always perceived as a sound “steel man,” was IFHTSE President for the two-year period 1989–1990. He led us in conferences in Portugal and Russia. The much-traveled Totten was IFHTSE President for
2002–2003 at the time of conferences in the United States and Poland. He also introduced the “industrial chemistry” angle to our thinking, maintained good contacts in Russia and the rest of the former Soviet Union (FSU), and has always kept us close to developments in China.

Quenching example: It is worth looking in detail at the quenching process as an example of initiative. Specifically, we in IFHTSE are particularly conscious of the U.S. input to the “quenching activity.” Quenching, being closely connected with hardenability, became a very important issue during and after World War II. It was Jominy, one of the most prominent American metallurgists, who went to Germany and raised the whole subject with Otto Schaaber and Urs Wyss, and they became the real founders of what is now IFHTSE. Many years later, when George Totten chaired ASM’s Quenching and Cooling Committee, and Bozidar Liscic (coauthor of this article) chaired IFHTSE’s Committee on Quenching, a close cooperation between these two committees began. This cooperation yielded tangible results:

- The first international standard for testing quenching oils (ISO-9950), issued 1995 through the activity of IFHTSE’s Committee on Quenching, subsequently became an American standard (ASTM D6200) in 1997.
- The American standard for testing aqueous polymer quenchants (ASTM D6482), issued 1999, uses for agitation the so-called Tensi device, developed by Hans Tensi in Munich, Germany.
- The quench probe, known in professional literature as the Liscic-Nanmac probe, is a result of many years of cooperation between probe inventor Liscic and its U.S.-based manufacturer Nanmac Corp. (Framingham, Mass.).

Thus a sound and rational approach to the general housekeeping and a welcome hosting of IFHTSE’s quenching group alongside ASM’s own American group ensured continued progress, especially in providing information on a range of national actions in the United States, Europe, and Japan, and in developing a much-needed ISO standard.

Other areas: Also of great relevance to IFHTSE’s areas of interest is the constitutional work embodied in phase diagrams, and no one will deny the leadership of ASM — Technical Director Bill Scott in particular — in getting the Alloy Phase Diagram International Commission (APDIC) off the ground.

However, there are those that fear that Totten — “George III” — is the last of the line so far as high-profile U.S. involvement goes! That would be a pity, because cross-border collaboration is just as necessary now as it ever was.

Federation Fellows: We are certainly glad to have the excellent and imaginative input from Chuck Faulkner and Scott Mackenzie of Houghton International Inc., Valley Forge, Pa., in support of the IFHTSE Fellowship scheme. IFHTSE Fellows are individuals who have made outstanding, globally recognized, and significant contributions to the development of heat treatment or surface engineering. This may be by way of a single notable advance, or through a long-term build-up of influence in, for example:

- Process technology and practice
- Process control
- Plant and equipment
- Process economics
- Application of scientific advances
- Environmental protection, health, and safety
- Education and training.

The unique characteristic of this scheme is that the citation must consist of one sentence! In other words, the contribution being recognized must be very obvious. So far, six appointments have been made: two Americans (Krauss and T.S. Sudarshan), a Chinese (T.C. Lei), a German (Bernd Edenhofer), a Japanese (Kiyoshi Funatani), and an Englishman (Tom Bell). The scheme also emphasizes that international effort — committees, groups, task forces — in aid of any of the subjects mentioned above can only happen through leadership by individuals such as these.

We, and our colleagues in the IFHTSE Executive Committee, are looking for more of those leaders and hope that we have not seen the last of the Americans with an international outlook. We are glad to be communicating on planning with Sudarshan (Materials Modification Inc., Fairfax, Va.) on the excellent Surface Modification series of conferences. We also are glad to collaborate with George Vander Voort (Buehler Ltd., Lake Bluff, Ill.) on his presentations. Certainly, we hope for great things from Victor Li (Portland State University, Portland, Ore.), who has agreed to try to coordinate multinational action on thermal properties data.