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U.S. DEPARTMENT OF COMMERCE
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Yan Lin

Report To The Office of the NIST Associate Director For Industry
And Standards

"THE EFFECT OF CHINESE STANDARDIZATION ON U.S. EXPORT
OPPORTUNITIES"

by

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China's standardization system is a large scale, state-regulated operation. Will it be a significantly limiting factor for U.S.-China trade? What effects have internationally-related activities had on the system? What is the present objective of the system? What can it contribute to the trade and technical exchange between U.S. and China? These questions will be addressed in this report.

1. How does the Chinese national standardization system work?

In China today, there exists one of the world's unique standards systems. Started during the early 50's with the Soviet system as its model, it has, through more than thirty years of modification, established an overall industry standards network. The China State Bureau of Standards (CSBS)¹, a government agency (since there is no private standards body), is the national standards body.

In this system, one finds four major types of standards: national standards, national military standards,² ministry standards, and local standards, which in most cases are adoptions of standards by local manufacturers and are called "company or enterprise standards." Ministry standards are promulgated by various governmental ministries and are therefore enforced by these agencies. For example, agricultural standards fall under the responsibility of the Ministry of Agriculture. Ministry standards were mostly developed by the standardization office or institute of each of the ministries during the 1950's and 60's, and many have since been updated to accommodate industrial development. Many new standards have been added to this category

1 CSBS has just been merged with a few other government agencies to form the State Technical Supervision Bureau.

2 Due to the scope of this report, the matters concerning military standards will be only mentioned here.

in the past ten years as a direct result of the economic revitalization campaign.

Under current CSBS policy, the category of ministry documents is to be eliminated, based on the concept that national standards can provide the most effective and economical benefits to industry and the country. This may be difficult since there are so many ministry standards that provide flexibility, such as direct reference to IEC/ISO standards. Where different interests create conflict, or where a possible national solution is considered beyond reach, a new category of standards, "specialized standards", will be used either by one ministry or through the joint efforts of several ministries. This will be the case when CSBS fails, or sees no need, to coordinate the project in its national standards program.

The role that CSBS plays is to use its regulatory power to coordinate standards activities at the ministerial level as well as at the provincial level. Its operation is based on the "Regulations on Standardization" enacted by the State Council, and includes issuing a Standards Development Program, providing financial support to various standards bodies under its Program, and organizing national ISO/IEC related standards activities.

The Standards Development Program itself is an overall scheme for development of national standards covering all aspects of industry. With no less effort than actually developing these standards, the Bureau sometimes has to decide to which ministry it will assign a given standards project. It becomes especially difficult when more than one ministry has the resources and the interest in writing the document. The CSBS usually tries to solve the problem by combining both its regulatory and coordinating functions.

On the other hand, for developing national standards, CSBS depends upon the standards institutes under the several cognizant ministries. They provide the mainstream of Chinese standardization activities and are responsible for creating standards documents in their own fields. In addition to taking care of ministry standards and military standards and providing technical support to local standardization efforts, they are engaged in making national standards through:

- submitting to the CSBS for approval an annual working plan for all projects within their scope;

- getting the development funds from CSBS³ after approval and starting the process (which usually involves one to three

³ Ministries also appropriate funding to national standards programs.

years of committee work and different interest groups, including manufacturers, users, government agencies, professional and academic bodies.⁴); and

- sending the final draft to the CSBS for approval before publication.

At the international level, CSBS holds the seats of Chinese National Committees of ISO and IEC and, in most cases, delegates the representations on the TC's to different ministries.

While the CSBS tries to regulate standards activities within industries, which in turn are regulated by the ministries, there are occasions when its policies are disputed by some ministries, including their standards offices. When no breakthrough can be achieved between the ministries and the Bureau, decisions to solve major differences are usually made by the State Commission of Economy. For instance, it used to be the policy of the Bureau that IEC and ISO publications never be referred to directly in a national document, unless these publications have been adopted as Chinese national standards. This policy did not win the favor of several ministries which desired to adopt international standards. However, in the past few years, some flexibility has been achieved in referencing IECQ standards.

2. Standard development: interactions between producers and standardizers

It is difficult to identify the concept of adopting industry standards by the Government in the Chinese standardization system since standards projects are sponsored by government agencies and the outcomes are made compulsory. Yet the idea of adopting standards does prevail in many important contexts. Take the current standards policy, for example: CSBS and standards institutes are determined to adopt most of the international standards (ISO/IEC, etc.) as either national or ministry standards, and manufacturers are encouraged to do the same when preparing their own documents. The philosophy is that China expects to improve its productivity and product quality; using internationally-accepted standards is one way of achieving that goal. Hence it will not be difficult to understand that the policy also includes adopting foreign national standards that represent advanced technology.

Another example concerns the Chinese national certification system for electronic components. This system

⁴ CSBS also operates a number of a nationwide Technical Committees.

provides for the implementation of the IECQ, the worldwide system to facilitate international trade in electronic components of assessed quality. The Chinese system uses national standards (including officially adopted international standards) as the basis for certification and includes ministry standards, as well as those developed by manufacturers interested in the system, after making sure that such standards are not available at the national level.

The development of an industry or a military standard begins with the CSBS approving the assignment of the project to an organization (in most cases, a standards institute; sometimes a research body or even a company) which is officially called a Project Managing Body (PMB). The PMB's have, of course, been previously recommended to the CSBS by each of the ministries working through the applications by rivaling organizations for undertaking standards projects. Giving its consent to most of the recommendations, the CSBS sometimes has to coordinate for or even decide upon the settlement of the competition among different ministries.

The PMB receives project funds for conducting necessary research and for drafting the standard. The way a PMB is selected is usually based upon the amount of expertise and resources possessed by a research organization, a manufacturer, or even a department in a university. Most of these organizations used to be under the control of the ministry and apparently, at present, maintain a strong relationship with it after the first round of decentralization. An example of this type of standards activity is the Institute of Communication, Measurement and Control, undertaking the work of developing the standard for satellite communications ground stations, with coordination provided by the China Electronics Standardization Institution, the standardization organization of the Ministry of Electronics Industry.⁵

The PMB then proceeds to set up a Working Group (WG) composed of major interested bodies such as research agencies, companies, universities, etc. The WG turns out a draft standard which is circulated for comments within 1 to 2 months.

At the discretion of the WG, one or more meetings to examine the draft may be held to resolve any difference before the final draft is submitted for approval. Sometimes the WG can get an initial document into a final draft by letter balloting. In either case the WG brings in more interested parties to vote on the draft.

⁵ This ministry has just been combined with another ministry to form the Ministry of Machinery and Electronics Industries.

A draft standard goes through several stages before being submitted to the approval procedures:

- first draft, by WG;
- revised draft, by a panel that is basically the WG joined by more parties;
- draft for final examination, by the panel; and
- final draft.

The approval stage can be further broken down to two steps for a ministry standard or three steps for a national standard:

- approval by the technical and engineering department of the Standards Institute,
- approval by the appropriate office in the appropriate ministry or ministries, and
- approval by the CSBS.

The most important step is the first one since the Institute is responsible for ensuring that the drafting process complies with the "Regulations on Standardization" and other related procedures and that the draft document contains no engineering or academic errors.

Completion of drafting and submission of a standard for approval is not considered the end of the effort by the Institute. In addition to monitoring the development of technology, which will inevitably make part or all of the standard obsolete, another important responsibility of the Standards Institute is to help industries and users apply the standard by holding seminars for managers, designers, inspection personnel, etc., as well as publishing implementation documents to expose the newly created draft to all interested parties.

The Institute maintains a relationship with the industry as a standards information service. It publishes and circulates standards to industrial organizations, and its Information Division releases periodic reports on new national, foreign and international standards.

Few standards documents are developed without the input from, or presence of, expertise from industry. In many cases, the Institute depends on manufacturers to verify test methods, using their laboratories or production lines to evaluate proposals.

3. The impact of China's quality program on US export opportunities

Within the electronics industry, quality requirements are now regarded as an inseparable part of the standards system. Quality and standards go hand in hand.

Established in 1981, the Chinese quality assessment system for electronic components now has about 20 approved manufacturers, 3 independent test laboratories and more than 30 certified products. With its aim to facilitate both domestic and international trade, China began to participate in IECQ in 1983 and was approved to be a full member of the ICC (Inspectorate Coordination Committee) in 1986, thus becoming a certifying country under this international system.

According to the rules of the system, the relevant bodies have been set up to ensure the designed operation. The Quality Certification Committee for Electronic Components of China acts as the National Authorized Institution (NAI) in representing China in the IECQ; the China Electronics Standardization Institute is the National Standards Organization (NSO); the China Electronic Product Reliability and Environmental Testing Institute is the National Supervising Inspectorate (NSI); and the National Institute of Metrology is the Calibration Service (CS).

A healthy characteristic of the Chinese system is reflected by its primary intention to upgrade product quality and to promote national and international trade, which fully agrees with the objectives laid down in the "Rules of the System". This will no doubt contribute to improved trade in electronic components with foreign partners because, in compliance with the "Rules of the System", the imported components of assessed quality will be accepted without further testing.

The United States was the first country to have its products approved under the System. Now its internationally certified components include various types of capacitors, resistors, switches and microelectronic circuits. For the Chinese OEMs, the IECQ system is a much welcome source to obtain quality piece parts while the components of assessed quality from foreign manufacturers potentially enjoy a high demand. While China is trying to turn out components of better quality than before (some of them have been approved as IECQ-certified components, including two types of resistors and one type of capacitor), there is still enough demand that U.S. exporters of quality components could take advantage of opportunities to supply their products to the Chinese market. The Chinese quality assurance system for IECQ will, out of its principle, encourage the development of this possibility.

4. Technical barriers? Government regulations as potential restrictions? Are there remedies?

It is widely understood today that technical barriers to trade serve as a means of protection in the form of technical criteria set up against foreign exporters. Like any other means of protection, they never exist in one country without other countries fighting back in the same way. These barriers are often created when standards or specifications are used as a basis for government regulations. In industrialized countries, such as western European countries, such standards and specifications can be equally as important as some government regulations. As China builds up its modern industry, its technical standards⁶ do not serve as technical barriers quite as much as government regulations which are affected by a number of factors, including safety.

Safety is an area that has been brought to the attention of the government in the past few years through studies of the practices in various industrialized nations. The State Administration of Import and Export Commodity Inspection (once called CCIB) is deeply involved in developing safety inspection procedures for incoming goods. Among its publications, regulations on import and export goods specify the requirements to be enforced by any designated inspection body. The first testing facility for ocean liners has recently gone into operation in Shanghai. This example may serve to impose safety requirements on other import and export products in the near future.

It is CCIB's policy to obtain support from ministries of industry. Due to its unique position, it enjoys such support and has accredited a number of test laboratories to perform safety tests, such as labs in CESI and CEPREI, etc.

Though China is on the way to decentralize its economy, it still finds its important economic and financial assets mostly under the control of the central government, which certainly decides the nature and form of its policy on foreign trade spending.

Basically, the state banking system allocates the major amount of foreign currency revenues to all the ministries based on what they envision the domestic needs to be. The state policy on foreign trade will decide how to spend these amounts. An individual company usually has no part in, or no direct access to, spending foreign currency; the role that it plays is, inevitably, to take part in technically related evaluations. It

⁶ China basically uses the metric system for measurement; moreover, its power supply system requires 220V/50Hz current.

is for the ministry (sometimes a local government agency) to give the green light to a project. A ministry can ask the State for more foreign currency supply if it sees a potential deal beyond its spending power. Learning through past lessons, the State government is ever more cautious in approving foreign spending. Any tightening by the State banking system or lack of interest by the ministry will result in casting out opportunities of foreign exporters and causing the individual companies to abandon their intended projects.

Unlike other industrial countries, Chinese technical documents, per se, can hardly be classified as significant trade barriers against foreign exporters. What might put restrictions on them may come either in the form of government regulations on imported goods, such as those enacted by the Ministry of Foreign Trade and its licensing system, or by a temporary change in foreign spending.

Sometimes questions of protecting domestic industries come into play. However, the barriers that may be developed are, in fact, unlikely to take effect if proper ways of approaching the Chinese domestic market are found. This is readily achievable, especially when the government is prepared to invest heavily in certain projects, such as those for telecommunications and computer equipment.

Safety of electrical and electronic equipment will not become a problem for American manufacturers since the government regulations on safety being established are mostly based upon international criteria, and quite a number of these international safety standards are based on the adoption of UL standards. If the U.S. participates in the worldwide program for mutual recognition of test data (the CB Scheme) under the IECEE, it should not encounter any difficulty in meeting Chinese safety regulations.

A recent development worth noting is the interaction between some Chinese government agencies and UL on safety testing of electrical products. There is no doubt that further cooperation of this kind will increase opportunities for U.S. exporters to explore the Chinese market.

However, finding the right partner may not be quite enough for American companies to complete the deal. It would be important for an exporter to interest government agencies (ministries, local, provincial, or municipal government agencies). So far, this has been done mostly through the efforts of the concerned Chinese companies working their way through the procedures, and from study groups in ministries or at the State level. The growing presence of agents representing U.S. companies is adding more and more hues to the picture, and will definitely lead to an even more open market in China. The idea

of trade missions to China would prove more and more effective if Chinese officials are made aware of the availability of U.S. technology.

Despite the inertia of the old centralized system established in China over the past four decades, American trade policy, if developed and carried out properly, could be very influential. The determination to go on with reform, and to bring up the low productivity places a high demand on modern technology and equipment and makes any potential technical barriers not as serious as where government provides the emphasis. With the government's plan to modernize the nation's telecommunications system, U.S. companies are expecting an unprecedented capital investment by the Chinese government. However, they will face fierce competition from companies of other countries.

5. Opportunity for technical information exchange between China and U.S. trade missions for inspection and safety testing of electronic components and equipment.

At present, technical information exchanges between China and U.S. trade missions occur mainly in two forms. On the Chinese side, large-scale projects are inevitably conducted either by the State government agencies or by local government bodies. Usually these projects are planned 1 to 5 years in advance and are related to joint ventures, investment abroad, and industrial shows. Small-scale exchange programs are more frequent, and often lead to significant agreements. These activities take place in countless numbers and are related to product information, management techniques, purchase of equipment, academic discussions, technical training, etc.

U.S. trade missions can expect great success if the Chinese government agencies concerned with major joint venture projects are shown that solutions to their problems and expertise suiting their interests are available from U.S. companies. From a long-term point of view, small-scale exchanges can prove equally fruitful in providing a better understanding of American technology, its products, and the market. These small-scale exchanges might impact the relevant institutional mechanisms by which Chinese engineers, scientists, managers and some directly-involved decision-makers influence top government officials on the technical side of bilateral trade relations.

There has been a tremendous effort in establishing product inspection and certification systems in China in recent years. As active participating countries of the IECQ, both China and the United States (and other participating countries) are now able to cooperate fully in promoting the System; bilaterally, more exchanges in both information and trade are facilitated with China's strengthening of its quality assessment system for

electronic components and many effective exchanges of visits have been made between the two sides. For the moment, there should be no barrier set up as a result of various Chinese certification systems, the purpose of which is focused more on improving quality than any other intentions. From the market point of view, while some Chinese manufacturers of approved (certified) components are looking for export opportunities, there is a sharp demand from Chinese OEMs for other quality parts. With technical visits being considerably more easily arranged, U.S. trade missions would have little difficulty in getting the attention of their potential Chinese users.

The safety testing of electrical and electronic equipment has become a matter of common concern in China. The Chinese government has set up and recognized a number of testing laboratories to provide safety certification services. There may seem to be a difference in the approach now that China is a member of IECEE, an international harmonized system for conformity safety testing of electrical equipment, while the United States remains an observer. Although a lot has been going on between China and the United States in this area over the past few years, no formal agreement concerning safety testing of products has been reached. More opportunities for cooperation exist judging from the fact that the Chinese government has been making careful study of American practices in product safety testing; it is likely that China may adopt a great many of its elements.

6. Conclusion

As a result of an industrial evolution, standardization in China has become an integral part of the process from design through manufacture to maintenance. Through standardization, one achieves a reduction in cost and an increase in competitiveness. But there are times when these advantages and other benefits brought along with good standardization activities can create technical barriers in international trade. This is an understandable but short-sighted practice intended to fend off foreign competition. Products of unacceptable quality certainly do not fall into this category and cannot be used against a reasonable standards system.

Under the present industrial circumstances, China is eager to improve its productivity and to upgrade product quality by modernizing its technology and information services. The role that the Chinese standards system plays in this modernization drive is essentially to serve industry and to achieve better production. On a worldwide scale, it will contribute more and more to effective exploration of the vast Chinese market in the next few decades. Few technical barriers exist in terms of standardization affecting U.S. exports to China. U.S. exporters will find that possible difficulties may sometimes be the result

of change in emphasis by the government in certain fields, or the shortage of the foreign exchange, rather than that of the present standardization efforts.

Another positive effect on Sino-U.S. trade may gradually be exhibited as China tries to rapidly adopt international standards and what it calls "overseas advanced standards", most of which are American standards.

Like any country's standards system, the Chinese system can be used for protection against foreign competitors, but it will not be a major weapon until China can compete at the international level, backed by better products, and can put an end to the present situation in which domestic demand still outweighs the supply.

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11. ABSTRACT <i>(A 200-word or less factual summary of most significant information. If document includes a significant bibliography or literature survey, mention it here)</i> This paper describes the standardization system as it exists in the Peoples Republic of China and identifies the role of the China State Bureau of Standards (CSBS) in the standards coordination process. The standards development and approval process is also described. The implementation of the IECQ program in China for producing electronic products in conformance with internationally recognized quality requirements is explained and the organizations responsible for the several aspects of the system are identified. The paper advocates technical information exchange programs between the U.S. and the Peoples Republic of China and more U.S. trade missions to China to encourage the adoption of U.S. standards as well as to increase trade between the two countries.			
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