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Second Interregional Symposium
on the Iron and Steel Industry

Moscow, USSR, 19 September - 9 October 1968

A-3

INFORMATION ON ACTIVITY OF THE IRON AND STEEL PERMANENT COMMISSION OF THE ECONOMIC MUTUAL ASSISTANCE BOARD [1/]

by

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Union of Soviet Socialist Republics

1/ The views and opinions expressed in this paper are those of the authors and do not necessarily reflect the views of the secretariat of UNIDO. The document is presented as submitted by the authors, without re-editing.

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INFORMATION ON ACTIVITY OF THE IRON AND STEEL PERMANENT COMMISSION OF THE ECONOMIC MUTUAL ASSISTANCE BOARD

by

Economic Mutual Assistance Board, USSR

SUMMARY

The Council for Mutual Economic Assistance is an international economic organization whose aim is to promote, through the concerted and co-ordinated efforts of its member countries, the planned development of their national economy, accelerated economic and technological progress, the raising of the level of industrialization in countries with less-developed industry, the steady development of higher labour productivity, and the continual improvement of the welfare of the people of member countries of the Council.

The Council for Mutual Economic Assistance is based on the principle of the sovereign equality of its member countries. Economic, scientific and technical co-operation between these countries is carried on in accordance with the principles of full equality of rights, respect for sovereignty and national interests, mutual advantage and comradely mutual assistance.

At present, the countries participating in the work of the Council for Mutual Economic Assistance are the People's Republic of Bulgaria, the Hungarian People's Republic, the German Democratic Republic, the Mongolian People's Republic

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* This is a summary of a paper issued under the same title as ID/WG.14/2.

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the Polish People's Republic, the Romanian People's Republic, the Union of Soviet Socialist Republics and the Czechoslovak Socialist Republic.

The Council for Mutual Economic Assistance is an open organization, which may be joined by other countries which share the aims and principles of the Council and agree to assume the obligations set forth in its Charter.

In 1964 an Agreement was concluded between the Council for Mutual Economic Assistance and the Government of the Socialist Federal Republic of Yugoslavia concerning that country's participation in the work of the Council's organs.

For the purpose of promoting the further expansion of economic ties between member countries of the Council and achieving broad economic, scientific and technological co-operation in various branches of their national economies, a number of Standing Commissions have been established by decisions adopted at sessions of the Council.

The Standing Iron and Steel Commission was established in 1956. This Commission approves recommendations of member countries of the Council or refers to sessions of the Council, or of its Executive Committee, proposals on the improved utilization of economic and natural conditions in member countries with a view to achieving the most effective development of the iron and steel industry of those countries, on the co-ordination of plans for the development of the industry, on specialisation and co-operation in production, on the most efficient utilization of production capacity, raw materials resources, materials and production in the iron and steel industry, the most effective utilization of basic capital investments, questions of multilateral scientific and technical co-operation and the co-ordination of scientific and technical research, the unification of basic parameters and standards in the industry, and other questions of interest to the member countries of the Council.

The Socialist Federal Republic of Yugoslavia has taken part in the work of the Standing Iron and Steel Commission of the Council since 1964.

Over the period of its existence, the Standing Commission has worked out and adopted recommendations to member countries of the Council on a large number

of questions connected with the development of their iron and steel industry and it is carrying on extensive work on the co-ordination of their iron and steel development plans.

Work on the co-ordination of the national economic plans of the member countries of the Council for Mutual Economic Assistance is carried on both at the bilateral and the multilateral level.

Up to 1965, the Standing Commission devoted particular attention in its co-ordination of iron and steel development plans to ensuring the supply to the iron and steel industries of member countries of the Council of iron ore, coking coal and blast furnace coke, and it worked out recommendations designed to ensure that the iron and steel industries of these countries were provided with the basic raw materials they needed.

As a result of the efforts made by countries to develop their iron and steel industry and the extension of co-operation among the member countries of the Council for Mutual Economic Assistance, the production of iron and steel increased. In 1967, the production of steel by member countries of the Council totalled 135.4 million tonnes, as against 64.0 million tonnes in 1956.

The rate of development of steel production in the member countries of the Council for Mutual Economic Assistance has been considerably higher than in many other industrially developed countries. The share of these member countries in world steel production rose from 22.6 per cent in 1956 to approximately 27.5 per cent in 1967.

The technical level of the iron and steel industry has risen in member countries of the Council, and the range of products has been considerably widened. The increase in the production of iron and steel has promoted the successful development of the economies of these countries.

The Standing Commission has worked out the basic lines for specialization and co-operation in the production of various types of rolled sheet and tubes and has laid down an order of priority and timetable for work on international specialization and co-operation in the manufacture of various types of iron and steel products in the period after 1970.

The basic aims of international specialization in the manufacture of iron and steel products, as worked out within the Standing Iron and Steel Commission of the Council for Mutual Economic Assistance, are as follows:

- The promotion of the rapid growth of the production of iron and steel of the types needed to satisfy the growing needs of the various countries.

- The promotion of the effective utilization of the resources developed by the various countries in order to ensure the satisfaction of their future needs for the different kinds of products.

- Analysis of the expediency and possibility of constructing, in interested member countries, plants of the optimum size for a given type of production, using the latest production methods.

International specialization in particular fields of production is organized on the basis of the definition of groups of products in the manufacture of which three or more countries are interested in specializing.

The Standing Commission carries on work on unification and standardization in the iron and steel industry. This work consists of preparing recommendations on the standardization of the most important types of products and their main indices and requirements, thus securing a high degree of interchangeability and raising the standing of production, with the primary aims of successfully introducing measures on specialization and co-operation in production and developing trade exchanges between the member countries of the Council.

From the very beginning of its activities, the Standing Iron and Steel Commission has dealt with the co-ordination of scientific and technical research carried out by the member countries of the Council in the field of iron and steel. Measures are taken to co-ordinate research on subjects which are of interest to all or some of the member countries of the Council, particularly research on the oxygen converter production of steel, the continuous casting of steel, the development of new types of steel and materials for different branches of the industry, the enrichment of iron ore and manganese ore, the nodulizing of fine-ground concentrates, and the automation of production processes.

The Socialist Federal Republic of Yugoslavia has also participated in the co-ordination of research on a number of subjects.

The Standing Commission has carried out co-ordination work on the automation of blast furnace, steel melting and rolling operations. For the purpose of exchanging and spreading the working experience accumulated, international conferences on the automation of production processes in the iron and steel industry and exhibitions of automation methods have been held under the auspices of the Commission.

Over the last few years, the Commission has been the forum for the working out and discussion of many questions of technical co-operation relating to individual branches of the iron and steel industry and directed towards increasing production, improving quality of production, developing the manufacture of new types of products, improving the technical and economic indices of the operation of enterprises, including reduction of the specific expenditure on raw materials, fuel, and electric power, and improving working conditions.

Meetings, seminars, symposia and conferences of scientists and specialists from member countries of the Council for Mutual Economic Assistance have been held on various specific questions connected with the development of the iron and steel industry, likewise under the auspices of the Standing Commission. In the Secretariat of the Council for Mutual Economic Assistance, technical and economic investigations are being carried out on a number of questions in the field of iron and steel production which are of interest to the member countries of the Council.

In order to study various questions directly in the iron and steel enterprises of the member countries of the Council and to exchange details of scientific and technical achievements and experience of new developments, and Standing Commission has organized groups of specialists who systematically visit the individual iron and steel enterprises in member countries.

The activities of the Standing Iron and Steel Commission of the Council for Mutual Economic Assistance show that the Commission, in fulfilling the duties entrusted to it, has promoted the successful development of the iron and steel industries of the member countries of the Council and of the Socialist Federal Republic of Yugoslavia and has strengthened the economies of these fraternal Socialist countries.

The Council for Mutual Economic Assistance is an international economic organization which by uniting and co-ordinating the efforts of its member countries seeks to promote the planned development of their national economies, a faster rate of economic and technical progress, a higher level of industrialization in the less industrially developed countries, a continuous improvement in labour productivity, and a steady increase in the prosperity of the peoples of member countries.

To meet this end the Council organizes extensive economic, scientific and technical co-operation between member countries directed towards more efficient exploitation of their natural resources and more rapid development of their production forces; it aims at improving the system of international socialist division of labour by co-ordinating plans for the development of the national economies of member countries and for specialization and co-operation between their industries; it assists them in developing and implementing joint programmes for developing industry, agriculture, transportation, and trade, for the most profitable investment of basic capital allotted by the countries for the promotion of extracting and manufacturing industries, and for exchange of information on the latest scientific and technical achievements and experience in advanced production techniques.

In its work the Council for Mutual Economic Assistance is guided by "Basic Principles of International Socialist Division of Labour", adopted at its Fifteenth Session.

The Council for Mutual Economic Assistance is based on principles of sovereign equality between member countries, which co-operate with one another in the economic and scientific fields in accordance with principles of equal rights, respect for sovereignty and national interests, mutual benefit, and friendly, mutual assistance.

Practice of the principle of sovereign equality between member countries of the CMEA is guaranteed by equal representation in all the Council's subsidiary organs and, also by the fact that recommendations and resolutions are only adopted with the consent of those member countries interested, each country being entitled to express its interest in any matter under consideration by the Council.

The subsidiary organs adopt recommendations for member countries on matters of economic, scientific and technical co-operation, and passes resolutions on organizational and procedural issues. Implementation by member countries of the recommendations adopted by them is based on the approval of their governments, or other competent bodies, in accordance with the laws of the country. Recommendations and resolutions do not apply to the countries which state they have no interest in the matter in question. But any member country may subsequently join in the recommendations and resolutions adopted by the others.

At the present time the members of the Council for Mutual Economic Assistance are the People's Republic of Bulgaria, the Hungarian People's Republic, the German Democratic Republic, the Mongolian People's Republic, the Polish People's Republic, the Socialist Republic of Romania, the Union of Soviet Socialist Republics, and the Czechoslovak Socialist Republic.

The Council for Mutual Economic Assistance is an unrestricted organization, membership of which is open to other countries sharing the aims and principles of the CMEA and [illegible] the principles and obligations laid down in the CMEA Charter.

In 1964 the Council for Mutual Economic Assistance concluded an agreement with the Government of the Federal People's Republic of Yugoslavia on Yugoslav participation in the work of the CMEA organs. Under this agreement Yugoslavia is able to collaborate within the CMEA, with full rights and to mutual advantage, on matters of [illegible] interest to member countries and to Yugoslavia in various branches of the national economy.

The supreme organ of the Council is the session, which is attended by delegations from all member countries [illegible] and deals with all matters falling within the competence of the Council and to adopt recommendations and resolutions in accordance with the Charter.

The Council's principle executive organ is the Executive Committee, which consists of representatives [illegible] countries at the level of deputy heads of [illegible]. The Committee supervises all aspects of work relating to the [illegible] in carrying out the resolutions adopted by the Council.

The Council for Mutual Economic Assistance has a Secretariat, which performs economic, executive and administrative functions. Staff for the Secretariat is drawn from nationals of the member countries.

To further the development of economic ties between member countries and to bring about multilateral economic, scientific and technical co-operation in various branches of their national economies, the Council Sessions have set up standing committees, on which each member country is represented by a delegation, normally headed by a minister or a deputy minister in the relevant field.

The Standing Committee on Iron and Steel was set up in 1956 by a resolution of the Seventh Session. This Standing Committee adopts recommendations for member countries of the CMEA or submits proposals to Sessions of the Council or Executive Committee on improved explcitation of economic and natural resources in member countries with a view to more rational development of their iron and steel industry, on co-ordination of development plans for iron and steel, on specialization and co-operation in industry, on the most efficient utilization of plant capacity, raw materials, and iron and steel products and materials, on better investment of basic capital, on multilateral scientific and technical co-operation and co-ordination of scientific and technical research, on the introduction of basic standards for each branch of industry, and on other matters of interest to member countries.

The Socialist Federal Republic of Yugoslavia has been a member of the Standing Committee on Iron and Steel since 1964.

Over the period of its existence the Committee has drafted and adopted recommendations for member countries on a large number of issues dealing with development of their iron and steel industry. It does a great deal of work on co-ordinating development programmes in this field.

Co-ordination of their national economic plans is jointly undertaken by socialist countries on a voluntary basis and is directed at maximum enjoyment of the benefits of the world socialist system.

As shown by the experience already gained in economic co-operation between member countries of the CMEA, the co-ordination of programmes must pursue the following interrelated and objective principles governing

development of the international socialist division of labour: a true and objective evaluation of proportions necessary in the economic development of each country, and the world socialist system as a whole, so as to achieve a balanced economy in every one; a high degree of economic efficiency in the international socialist division of labour, as indicated by rapid industrial growth rates and fullest satisfaction of the requirements of each country's population, given minimal consumption of the labour force; the coupling of international specialization in industry with complex (multilateral) economic development of the individual socialist countries in the interest of the fullest and most expedient utilization of the natural and economic prerequisites for industrial production in each country, including manpower resources; gradual elimination of differences that have arisen historically in the economic levels of different countries, primarily by industrialization of those which are relatively poorly developed and by maximum exploitation of each country's domestic potential, plus maximum enjoyment of the benefits of the world socialist system.

By developing its national economy with international socialist division of labour in mind each member country of the Council for Mutual Economic Assistance can base itself on its own domestic resources and requirements as well as those of other fellow member countries when deciding on the basic proportions to be observed between branches of the economy. They are thereby in a position to avoid pointless duplication in manufacture of identical types of products and to construct plants with optimum capacity, making the broadest use for the purpose of modern production techniques ensuring the highest labour productivity.

Member countries of the CMEA and its subsidiary organs have taken a gradual approach to the co-ordination of their national-economic plans by letting socialist production relations in the people's democracies emerge gradually as experience in economic planning is progressively gained.

The plans are co-ordinated in the following way.

Member countries of CMEA draft their own national-economic programmes, which are primarily geared to domestic conditions and to the specific economic and political problems facing the country.

On the basis of the preliminary drafts the planning and foreign-trade organizations of these countries hold bilateral consultations during which they ascertain the possibility of exporting and importing the basic commodities on a reciprocal basis and discuss other aspects of economic co-operation. The results of the bilateral consultations are studied and summarized concurrently within the CMEA and summary estimates for production, consumption, export and import of the more important industrial products between member countries are drawn up on the basis of the paperwork submitted by them; these estimates make it possible to determine the overall requirements and possibilities, and to outline programmes requiring joint action by the interested countries.

The programmes are co-ordinated with strict regard for national sovereignty, mutual advantage and mutual aid. In the process no member of the Council for Mutual Economic Assistance may take charge of material, financial or other such resources of another country or enjoy any special privileges.

Work involving the co-ordination of national-economic plans is carried out both on a bilateral and multilateral plane. In view of the fact that major economic problems can only be dealt with successfully by uniting the efforts of the interested countries, the value of multilateral co-ordination becomes increasingly clear. The importance of co-ordinating long-term plans is also growing, as a direct consequence of the need for more efficient organization of industry and improvement in its branch structure in conformity with the principles of international socialist division of labour.

Prior to 1965, when co-ordinating plans for the development of the iron and steel industry, the Committee focused attention on ensuring supplies of iron ore, coking coal and metallurgical coke for the needs of member countries of the CMEA, and drew up recommendations aimed at providing the principle metallurgical raw material required. Some of the countries thereby increased their capacity for mining and dress iron ores. The Soviet Union stepped up deliveries of iron ore to member countries and thereby enabled them to develop their blast-furnace production, boost their blast-furnace

output, and cut down the specific coke consumption and the cost price of pig iron. Poland, the USSR and Czechoslovakia took steps to increase the mining of coking coals, to step up production of metallurgical coke and supply more coke and coal to member countries of the CMEA which do not have their own coking coal deposits.

The efforts made by the countries to develop their iron and steel industries and broaden their sphere of co-operation have brought about an increase in the output of iron and steel. Steel production in member countries of the Council for Mutual Economic Assistance attained 135,400,000 tons in 1967, as opposed to 64,000,000 tons in 1956, i.e. over those years it was more than doubled and reached the following totals for each country (in thousands of tons).

	PRB	HPR	GDR	PPR	SRR	USSR	CSSR
1956	130	1416	3110	5014	779	48,698	4382
1967	1239	2739	4651	10,451	4088	102,242	10,002
$\frac{1967}{1956}$ %	953	193	150	208	525	210	205

The growth rate for steel production im member countries of the CMEA has been considerably higher than in many other industrially developed countries. The output of steel by member countries in terms of world production rose from 22.6 per cent in 1956 to approximately 27.5 per cent in 1967.

In member countries of the CMEA there has been an increase in the level of technical advancement of the iron and steel industry and a considerably greater variety of products is now turned out. The growth of iron and steel output has greatly aided the progress of their economies.

In conformity with the resolutions adopted by the Eighteenth Session of the Council, plans were co-ordinated in 1964-1965 for the development of the iron and steel industry in member countries over the period 1966-1970. The countries concerned reached agreement on deliveries of iron and

manganese ore, metallurgical coke, pig-iron, ferro-alloys, rolled metal and steel piping, as a result of which their requirements for products of this kind will be by and large satisfied over the period 1966-1970.

The Standing Committee on Iron and Steel recommended that member countries should continue with their programmes over the period 1966-1970 for improving the grade of metallurgical raw materials and fuel, improving production techniques, raising the standard of manufactured products, widening the assortment of them and introducing modern, progressive types of iron and steel products, reducing consumption factors for all the stages of the steel conversion process, introducing further mechanization and automation in the iron and steel industry, and improving labour productivity. The Committee has approved a schedule for co-ordinating the iron and steel development programmes of member countries over the period 1971-1975.

The Standing Committee has formulated the general lines along which specialization and co-operation in the production of certain types of rolled metal and piping should be developed, and has established priorities and deadlines for completion of operations in international specialization and co-operation for a variety of iron and steel products over the period following 1970.

The primary tasks in international specialization in the manufacture of iron and steel products, as formulated by the Standing Committee, are as follows:

To promote the rapid growth of iron and steel production with the variety of products required to satisfy the increasing demands of countries.

To promote the efficient use of funds allotted by countries so as to satisfy their future requirements in the corresponding types of product.

To ascertain whether it is advisable or possible to construct in the member countries concerned units of machinery with optimum capacity for the given type of product, using present-day production techniques ensuring concentration of production, the most efficient utilization of equipment, and high-grade products, and the improvement of technical and economic performance characteristics, chiefly, labour productivity and profitability

of operations, taking it into account that part of the products thus manufactured could be exported to other interested member countries.

This type of construction is advisable in cases in which certain products are not manufactured in all member countries, or are manufactured in limited quantities, and where it would be economically disadvantageous to manufacture them by modern units of machinery in each member country at the same time, since the optimum capacity of one unit would be far greater than the country's needs for the given product in the near future, and where export of the product to non-member countries might be difficult.

In such cases it is advisable to co-ordinate the construction of the plants in question as regards shop and assembly capacity, a larger assortment of parts, and supplies of necessary raw materials prior to completion of the relevant technological cycle in the country, and for the countries concerned to co-ordinate priority in the construction of similar types of shops; it is also advisable to consider the question of having the plants built, whenever required, by the combined efforts of the countries concerned so as to meet the needs of two or more countries for a longer period, and to render mutual assistance in making available the designs, equipment and raw materials required for the projected plants.

International specialization in industry is based on classes of manufactured parts, and is possible when three or more countries are interested in a particular part.

Under the Committee's supervision programmes are drawn up for international specialization in the manufacture of the most important of a broader range of products in conjunction with modernization of existing plants and the building of new ones, for which considerable capital and long periods of time are required. In view of this, international specialization projects are designed to cover a prolonged period, notably, the years 1971-1975, with inclusion of an evaluation of prospects for 1980.

Considering the fact that international specialization in industry is a continuous and long-term process, it is applied to classes of manufactured parts, and is effected in stages, as a function of the requirements of

the countries concerned and the availability in them of suitable conditions for implementing the specialization projects.

Specialized production is initially developed for:

(1) Products which are not manufactured in member countries of the CMEA, or are not manufactured in sufficient quantity, or which do not meet the present-day standards required by consumers, who for this reason import the products from other countries;

(2) Products which are required to a relatively small extent in a few countries and which could easily be manufactured in one or two countries to meet the needs of the others;

(3) Products which the interested countries could manufacture themselves in enterprises set up for that purpose;

(4) Products for which only some member countries of the CMEA have productive manufacturing conditions.

In developing programmes for international specialization in the manufacture of iron and steel products the standing Committee takes into account the following possibilities:

(1) Manufacture of certain products has already been organized, or will be organized, in one or more countries, and that in view of the relatively small requirements by the other countries there would be no point in manufacturing the products there as well, since there is a possibility of exporting the products from the country (countries) in which they are being or will be manufactured, without further increase in capacity;

(2) For the export of certain products there will have to be a corresponding increase in output in countries where the product is being or will be manufactured. In this particular case specialization involves co-ordinating the construction or reconstruction of certain plants. Here the assistance of other countries may be needed to increase capacity;

(3) To meet the needs of member countries in certain products, new plants, shops or assemblies will have to be constructed in one or several member countries. Here the specialization directly involves co-ordination in the construction of certain plants, either by building plants turning out a variety of products in a few countries, with capacities adjusted to take in the requirements of others, or else by letting the relevant countries help build the plants in other member countries (the forms the help takes may differ). The required capacities of the plants, systems of supplying them with raw materials or semi-finished products, their location and forms in which the countries help in building them are determined by agreement between the interested parties.

For each of the possibilities mentioned there is a corresponding order in which the specialization documents are drawn up.

In certain instances, particularly when new production units are set up, international specialization involves the direct organization of scientific and technical research, which has to precede development of the specialization programme or else be conducted concurrently with it.

The elaboration of programmes for detailed specialization in a specific range of products (profile size or classes of steel), including rarely-made rolled metal profiles, at plants already operating, undergoing reconstruction or being built, and co-ordination by interested countries of their work-load schedules for rolling and pipe-drawing mills, machine-part shops, and other units, including schedules for utilization of temporarily idle equipment, together with barter of iron and steel products, are directly related to the changing requirements of countries and are problems of an operational nature.

The Committee is working to introduce set norms and standards in the iron and steel industry. The work involves drawing up recommendations for standardization of the most important products, their principal performance characteristics, and specifications which will ensure a high degree of interchangeability of parts and high standards of quality, and is primarily designed to ensure the success of the specialization and co-operation programmes, including programmes for developing trade between member countries

of the CMEA. Efforts are being concentrated on solving the following principal standardization problems:

(1) Establishment of a rational assortment and range of products based on a technically sound selection of standard dimensions and characteristics;

(2) Standardization of the principal parameters and characteristics of parts, components and units;

(3) Establishment of fixed characteristics describing the quality for raw material, semi-finished goods, and final products, including physical and chemical properties, operational reliability, etc.;

(4) Standardization of specifications pertaining to the manufacture, packaging, marking and storage;

(5) Standardization of methods of testing and inspecting raw materials, parts and products;

(6) Establishment of standardized meanings, definitions, technical terms, rules for writing up technical documents, and symbols;

(7) Standardization of norms serving as a basis for technical documentation.

The Committee has drawn up a set of instructions for calculating reserves of ferrous metal ores and estimating losses and depletion of stocks. It has also approved a system for classifying methods of below-ground ore mining. It has introduced standardized nomenclature for rolled iron and steel products and developed standard designs for the principal equipment used in blast furnace and coke by-product shops. The terminology used to describe output characteristics in agglomerate, pig-iron, steel and ferro-alloy production has been unified. The Committee has adopted a number of recommendations on standards for raw materials and manufactured parts made of iron and steel and has approved a unified procedure for analysing resources and requirements in scrap steel and pig-iron and for calculating and analysing a country's metal reserves.

The principal form of scientific and technical co-operation at the present time is co-ordination of the most important research projects in progress in member countries of the CMEA that are of mutual interest to them.

Co-ordination of scientific and technical research within the Council for Mutual Economic Assistance enables member countries to concert their efforts and resources in the field of research, so as to devote them first and foremost to solution of the scientific and technical problems of greatest mutual interest. This form of co-operation helps to do away with often needless duplication of the same research work in different member countries.

Of prime importance in research co-ordination programmes are the proposals submitted by countries in the light of their own national programmes. The countries hold bilateral or multilateral consultations, at which they settle problems of mutual interest.

While co-ordinating their research work, member countries decide what organizational forms the co-operation will take in each separate case by mutual agreement, allowance being made for the specific conditions in each country.

Countries engaged in the co-ordination of a particular project normally come to agreement on the appointment of a supervisory organization and the corresponding institutes that will carry it out.

Since it was originally set up the Committee on Iron and Steel has been co-ordinating scientific and technical research carried out by member countries of the CMEA in the field of iron and steel. It has dealt with topics of interest to some or all member countries, including oxygen-converter steel production, continuous pouring of steel, development of new brands of steel and other materials for a variety of industries, iron and manganese ore enrichment, nodulizing of fine-ground concentrates, and automation of production processes. The Socialist Federal Republic of Yugoslavia has also been collaborating in the co-ordination of research in a number of fields.

To ensure the division of labour in their research on given topics, the countries collaborating co-ordinate their work programmes, keep each other posted on a yearly basis on what progress the research is making, and exchange a very large amount of technical material.

Research work already conducted in member countries under the co-ordination programme has paved the way for adoption of a series of

technological operations which have been of considerable technical and economic benefit and have helped to improve the quality of output. To mention only one, an air-blast system, designed and installed in blast furnaces operating on liquid fuel, has cut down coke consumption in melting pig-iron and stepped up furnace output. Studies in the field of converter steel production using oxygen have made an important contribution to the technology of making steel in converters. The industrial application of findings in the field of electro-slag remelting of steel, remelting in vacuum-arc and electron-beam furnaces, and vacuum treatment have enabled member countries of the CMEA to develop the production of very high purity steels.

In 1965, the Committee approved a long-term programme for co-ordination of highly important research in the field of iron and steel production over the years 1966-1970. The programme provides for co-ordinated research on 30 different subjects, among which are improvement in the production technology for high-purity steels and development of new types of steel and new materials for various branches of the national economy, progressive methods of enriching iron and manganese ore and nodulizing fine-ground iron ore concentrates, improved coking methods and reduced coke consumption in blast-furnace production, automation of production processes and formulation of methods for operative planning and control of iron and steel production.

The Committee has helped to co-ordinate work on the automation of blast-furnace, steel and rolled-metal production. Following a resolution of the Committee, two International Conferences on Automation in the Iron and Steel Industry and Automation Exhibitions have been held for the purpose of exchanging views and discussing experience accumulated in the field, one in Ostrov (CSSR) in 1961, and one in Budapest in 1965.

The Conference held in 1965 was attended by more than 250 specialists from member countries of the CMEA and from Yugoslavia. After discussion of the papers submitted by the specialists, the Conference proposed a general outline for the further development of automation and adoption of new automation systems and equipment in the iron and steel industry. The findings of these two conferences have been used as the framework of a plan for

co-ordination of the most important research in automation in the iron and steel industry; the plan provides, inter alia, for the following:

(1) Development of mathematical techniques for describing the main technological processes in the metallurgical industry;

(2) Operative planning and control of metallurgical plants using mathematical techniques and computers;

(3) Development of a procedure for determining optimum work loads for rolling and tube mills using computers for the purpose;

(4) Development of an algorithm and complex automation system for agglomerate production.

The Committee has resolved to hold a third International Conference on Automation and an Automation Exhibition in 1968 for member countries of the CMEA and the Socialist Federal Republic of Yugoslavia.

Over the last few years the Committee has formulated and considered a large number of problems relating to technical co-operation in various branches of the iron and steel industry designed to increase output and raise standards of production, develop new products, and improve technical and economic output figures for plants, including decreases in the specific consumption of raw materials, fuel and electric power, with an improvement in working conditions. It has considered, inter alia:

(1) In the mining industry: The state of iron and manganese ore reserves, improvement in the quality of iron ore concentrate and the possibility of a higher iron content in commercial ore, adoption of new techniques and technology for extracting, dressing and coking iron and manganese ore, and basic types of equipment for the open-case mining of ores and non-metalic minerals;

(2) In blast-furnace production: Greater blast-furnace productivity, intensification of agglomerate production and improvement of its grade, higher blast temperatures and a lower metallurgical coke consumption;

(3) In steel and feroalloy production: Improvement in the technology of melting and pouring steel, including for steel sheeting used for long and extra-long drawing, and improvement of manufacturing processes for very high-purity steels. Systems have been developed for producing granulated ferrosilicon, and using nitrided ferrochromium and ferromanganese in stainless steel making;

(4) In rolled metal production: Provision of adequate supplies of different types of rolled metal for member-countries, improvement in grade and increase in volume of electric steel, with reduced specific wattage losses, electrolytic tinning, new types of materials for the needs of chemical engineering, and certain other products;

(5) In pipe and tube production: Provision of large-diameter pipes for construction of the Druzhba oil pipe-line, improvement in quality and increase in volume of piping and tubing manufactured for deep and super-deep drilling, and development of coated steel piping.

(6) In refractory production: Manufacture and duty of refractories in the iron and steel industry, use of new and more-resistant types of refractories in iron and steel production, the pattern of refractory consumption in member countries of the CMEA, and mechanization of time-consuming operations in refractory production.

Following resolutions of the Committee, some of the issues relating to development of iron and steel industry are studied at conferences, seminars, symposia and meetings attended by scientists and experts from member countries, and the Secretariat works at technical and economic research projects on related problems of interest to them.

With a view to making certain studies on the spot and to exchanging information on the latest industrial achievements, the Committee regularly sets up groups of specialists who visit iron and steel plants in member countries of the CMEA. The mission of these groups is to study, first by analysis of material submitted in advance and then by familiarizing themselves personally with production systems during visits to plants, their technical and economic

performance data, experience in advanced techniques and achievements gained in technology and organization of the given industry utilization of basic equipment, mechanization and automation of technological processes, and to draft proposals aimed at improving the output figures for plants engaged in similar production to be considered at meetings of the Committee.

The Committee has set up groups of this kind for mining, coke by-product, blast-furnace, steel, rolled metal, piping, machine part, and refractory production (on an average of two groups a year).

The setting up of these working groups and their work in the field has given member countries an opportunity for a very fruitful exchange of information on advanced production techniques in the iron and steel industry. Adoption of the proposals submitted by these groups has helped member countries to boost production, reduce cost prices, and improve the grade of certain items without having to spend substantial capital. Member countries of the CMEA have made frequent reference to the great success of these groups.

What has been said above is only a general outline of the activities of the CMEA Standing Committee on Iron and Steel.

The Standing Committee's activities show that by performing its duties it has been able to promote successful development of the iron and metal industry in member countries of the CMEA and the Socialist Federal Republic of Yugoslavia, and has strengthened the economy of the brotherly socialist nations.

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