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Vienna International Centre, P.O. Box 300, 1400 Vienna, Austria
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INTERRELATION BETWEEN IRON AND STEEL INDUSTRY AND INDUSTRIES OF CONSUMERS OF ITS PRODUCTS [1]

by

I.M. Denisenko
Senior Scientific Officer
Economic Research Institute of the
State Planning Commission of the USSR
Moscow, USSR

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INTERRELATION BETWEEN IRON AND STEEL INDUSTRY AND INDUSTRIES OF CONSUMERS OF ITS PRODUCTS

1. Structure of the [illegible] and Methods of Accounting the Production Manufactured Th[illegible]

The iron and steel industry, being a branch of the whole industry, comprises in various countries the manufacturing of various kinds of industrial products. This is why prior to studying the production relations of the iron and steel industry with other industries, it is necessary to consider general data concerning structure of the industry and those kinds of its products which determine its interindustry relations.

In the Soviet Union, the iron and steel industry comprises the manufacturing of the following kinds of products:

Making iron, steel, ferro-alloys and manufacturing rolled products and pipes;

Coke and by-product production;

Mining and dressing iron, manganese and chrome ores, as well as non-metallic raw materials for the iron and steel industry (flux limestones, dolomites, magnesites, fire-clays, quartzites and the like);

manufacturing refractory products;

manufacturing hardware for industrial purposes;

secondary processing ferrous metals;

manufacturing commodities;

manufacturing other kinds of products.

Under prevalent conditions, the iron and steel enterprises provide with their own products almost for all the requirements of spare parts and exchangeable equipment, of parts and subassemblies for the products equipment maintenance and overhaulings, of special tools, etc. In connection therewith, the iron and steel works manufacture a considerable amount of products in foundries, forging-and-press shops, machine shops, repair-and-assembly shops, and shops of metal structures. Part of the products of these shops is intended for capital construction in situ and is supplied for outside consumers, and, hence, makes an integral part of the iron and steel industry gross output.

As to accounting the manufactured products, availability of basic productive funds, number of engaged people, costs of production, and other factors to be taken into consideration from the viewpoint of national economy, the iron and steel industry is subdivided into eight

sub-branches determining its interindustry relations. Stated hereinbelow is the list of these sub-branches and products manufactured thereby.

Denomination of sub-branches	Denomination of products manufactured by these sub-branches
Ores of ferrous metals	Iron, manganese [illegible] mining, dressing and [illegible]
Non-metallic raw materials	[illegible], dolomite, magnesite, moulding [illegible] other non-metallic raw materials [illegible] and steel industry.
Ferrous metals	Iron, [illegible] ferrosilicon, ferromanganese, [illegible] rolled products [illegible] further treatment: [illegible]; tin [illegible] bars [illegible] of all kinds; [illegible].
Electric ferro-alloys	[illegible]
Coke and by-products	[illegible] anthracene, aromatic [illegible], combustible mixtures [illegible], carbolic acid, [illegible] anthracene oil, naphthalene, [illegible], and the like.
Refractory materials	[illegible] magnesite and chrome-magnesite [illegible] products, magnesite [illegible] metallurgical powder [illegible] fireclay-[illegible] for teeming, [illegible]
Industrial purpose hard-ware	[illegible] bars, springs (for watches, [illegible] special purpose), steel wire, [illegible] strip, multistrand steel wire, [illegible], telegraphic and [illegible], woodscrews and [illegible], spring washers, [illegible] nuts, loose nuts, rivets, [illegible], grinding steel balls, wire nets; other hardware (technical bus bars, telephonic rods, [illegible] spikes [illegible] woodscrews, steel sieve and welded [illegible] technical [illegible] and these counterslidings, etc.)
Secondary processing of ferrous metals	[illegible]

The gross output of iron [illegible] steel [illegible] is adopted to be the total cost of the finished products of the iron and steel [illegible], [illegible] finished products and semi-products produced in the shops of the enterprises, provided that the part of them is subtracted, which was consumed for the production needs of the given enterprise. In contrast to the gross output,

the total turnover comprises the entire total cost of finished products and semi-products of all the shops of the enterprises. Hence, the gross output is equal to the total turnover if the in-plant turnover (or intracombine turnover) be subtracted therefrom.

This information should be presented here, since in the further course there will be noted an analysis of the industry relations of the iron and steel industry in what concerns the output in terms of [illegible].

In spite of a [illegible] development of such progressive industries as chemical industry, electric power [illegible], [illegible], etc., the proportion of the gross output of the iron and steel industry in the manufacture of all the industrial products approximately [illegible] a proof to the effect that ferrous metals continue to act [illegible] material in the national economy and that substitution of [illegible] for the ferrous metals taking place at the present time, [illegible] the consumption of metal in the manufacturing of in-[illegible] engineering.

Stated [illegible] below is the [illegible] structure of the ferrous metallurgy in terms of the manufacture of the gross output and the total turnover according to published data of 1965.

Denomination of the ferrous metallurgy sub-branches	Share of the product of sub-branches in relation to the total output of the industry, pct.	
	In terms of gross output	In terms of total turnover
Ores of ferrous metals	4.9	8.0
Non-metallic raw materials	0.8	1.0
Ferrous metals	71.1	65.5
Coke and by-products	10.9	14.0
Refractory materials	2.5	2.6
Hardware	6.7	6.1
Secondary ferrous metals	3.1	2.8
TOTAL:	100,0	100,0

From the data thus stated, it appears that two-thirds of the total output are constituted by ferrous metals, the second place being taken by coke and its by-products and the third, by hardware. In the current five-year period 1966-1970, some variations are occurring, which are stipulated by technical progress both in the iron and steel industry itself and in the industries, with which the former has production relations in what concerns the consumption of its products and the production expenditures.

The iron and steel industry is reported to be an industry branch with very high capital investments. To produce 1 ton of rolled products the national economy will have to expend about 185 roubles, including expenses on the mining and fuel industries. Each rouble of the iron and steel industry products requires by as much as 30 pct higher capital investments than the case is with the machine-building, by 35 pct greater than in chemistry, and by 10 pct greater capital investments than those of the building materials industry.

For the iron and steel industry basic funds (fixed capital) is characteristic a relatively high share of machines and equipment with a comparatively small specific share of trans-

port means and handling appliances. Under conditions prevalent for the beginning of 1966, the fixed capital structure of the iron and steel industry was characterized by the following data, %:-

Total	including					
	Buildings	Construction	Machines and appliances	Machines and equipment	Instruments	Transport Means
100	28	20	6	41	0.5	4

The industry structure of the ferrous metallurgy in terms of the % in basic funds is characterized by the following data: -

Sub-branches of iron & steel industry	Share of Basic productive Funds, %	
Ores of ferrous metals	18.1	Total: 100.0
Non-metallic raw materials	1.5	
Ferrous metals	65.1	
Coke and by-products	6.8	
Refractory materials	3.2	
Hardware	3.9	
Secondary ferrous metals	1.2	

The largest share is characteristic for the basic funds of the ironmaking, steelmaking, rolling and pipe-manufacturing branches, followed by mining and dressing iron ores and coke and by-product manufacturing. The smaller share of the basic funds is peculiar for secondary processing of ferrous metals.

In the current five-year period, the industry structure in terms of basic productive funds undergoes somewhat larger changes than that in terms of gross output. These changes are stipulated by trends in the capital investments as made in individual stages of the metallurgical production.

In the current five-year period, the capital investments will considerably increase to be made in pipe-manufacturing and especially hardware works and shops. The amount of capital investments in the refractory materials industry will also considerably increase. Distribution of capital investments between the main stages of the ferrous metals production is characteristic of the qualitative side of the iron and steel industry development. The greater amount of capital is invested in the final stage of the ferrous metals production and in the manufacturing and finishing of rolled products, the greater amount of productive funds is provided for rolling shapes that are more difficult to manufacture and for finishing metal after rolling (i.e. heat treatment, various coating procedures, etc.). A relatively large proportion of capital investments allotted for the iron and steel industry is directed for the development of rolling mills and the enlargement of the metal-finishing departments.

The amount of labour required for separate sub-branches of the iron and steel industry may be characterized by the number of personnel involved in each sub-branch. Given hereinbelow are data characteristic of the proportion of personnel employed in each sub-branch relative to the total number of personnel employed in the iron and steel industry as a whole: -

Sub-branches of iron and steel industry	In per cent to the total number
Ores of ferrous metals	10.9
Non-metallic raw materials for the iron and steel industry	1.8
Ferrous metals	[illegible]
Coke and by-products	4.4
Refractory materials	4.8
Hardware for industrial purposes	2.1
Secondary ferrous metals	4.3
TOTAL	100.0

The branch structure of the iron and steel industry is what concerns the production output, availability of basic productive funds and number of personnel employed has influance upon the nature of into industry production relations with countries suppliers and consumers of the products. The first kind of relations are termed relations in terms of the production expenditures, whereas the second kind, relations in terms of the product distribution.

The interindustry relations are best of all reflected by the input-output balance of the national economy. This is why prior to disclosing the ferrous metallurgy interindustry relations it is necessary to set forth, though in the briefest manner possible, a method serving to define them, i.e. method of the interindustry balance.

2. Brief Data on the Input-Output Balance of the National Economy

The first input-output balance was worked out in the Soviet Union in 1925 for the 1923/24 fiscal year.

Then, in 1958-1961, there was worked out an account interindustry balance for the 1959 fiscal year.

The development of account balances has provided a very valuable economical information on the structure of national economy and interindustry relations. It allowed the development of plan interindustry balances for a number of years. Preparation of plan interbranch balances in terms of cost was carried into effect in the Research Economical Institute under the State Planning Commission of the USSR, and in terms of natural products, in the Main Computing Center of the State Planning Commission of the USSR. At present, a united cost-natural products interindustry balance is being developed.

Development of theory and method of the interindustry balance was also effected in a number of other scientific institutions of the country, and in particular in the Central Economical and Mathematical Institute of the USSR Academy of Sciences.

In other countries, a number also worked on the preparation of an interindustry balance. In the USA, economist V.Leontiev has developed a method of analysis of inter-industry relations by having recourse to tables of a checkered type and by using linear algebra for the purpose of studying the economic structure of the USA. Afterwards these tables have been named input-output tables. In spite of a great volume of theoretical investigations, however, the application of this method in the capacity of an instrument for the purpose of planning the development of the USA economic structure could not be carried into effect.

In the USSR, the interindustry balance becomes the most important means for planning the national economy and establishing the interindustry relations for each of its branches.

calculated earlier and compensation of current expenditures of materials throughout the balance's structure.

The system of equations [illegible] the following [illegible] quantity of finished products [illegible] manufacturing [illegible] industry of the [illegible] the balance's industries; [illegible] [illegible] product of another industry [illegible] producing the finished [illegible].

[illegible] the [illegible] balance):

[illegible]

[illegible] the number of the [illegible].

[illegible]

[illegible] of [illegible]

[illegible] quantity [illegible] used to the finished product. [illegible] manufactured by each industry [illegible] for compensating the [illegible] products of other industries [illegible] in the form of the following very simple equation.

x [illegible]

[illegible] equation is written as follows:

$x = \sum$ [illegible]

Such equations are [illegible] for all the industries of the balance. If the cost balance be composed of [illegible] the quantity of products of these industries is determined by means of [illegible] equations.

When [illegible] the natural interindustry balance, a number of equations are composed equal to the amount of products taking part in the balance.

In the system of equations, unknown are quantities of [illegible] products as manufactured by each industry [illegible] manufacturing each given [illegible]. These unknown values can be determined only [illegible] solving [illegible] system of equations. For this purpose, a composite schedule of [illegible] will have to be prepared. As to the form and content this schedule is essentially a table composed of figures characteristic of the expenditure of some kinds of products for manufacturing an unit product of other kinds, that is, containing coefficients of direct expenses.

A column of figures of the table and a [illegible] of figures are called vectors (of the column and [illegible]).

The interrelationship [illegible] of each branch of industry, as reflected in the perspective interindustry balance, largely depends on calculation of coefficients of direct expenses for all the industries comprised [illegible] balance inasmuch as these coefficients account for main trends in the technical progress of each [illegible] industry. The coefficients of direct expenses for the manufacturing of finished [illegible] are characteristic of the intensity of [illegible].

When working out the interindustry balance, coefficients of complete expenses are also determined, being characteristic of the expenses of one industry for the manufacturing of unit finished product of another industry in all the interrelated industries. Conversion of the

schedule of direct expenses coefficients is carried out on electronic computers, which re-
sults in the obtaining of a [illegible] being essentially a table of coefficients of
complete expenses [illegible] of finished [illegible].

Calculations [illegible] a tremendous amount of calcu-
lations that [illegible] of electronic computers.

Thus, for example, [illegible] thousands of computing operations
in order to calculate [illegible] complete expenses for an interindustry balance on 84
[illegible] Economical Institute
[illegible] being carried
number of [illegible] industries, that is, the
is thereby increased [illegible] number of calculating operations
[illegible] the number of industries.

The ratio between [illegible] of direct and complete expenses in the iron and
steel industry [illegible] electric power. If all the
expenses [illegible] coal industry are referred to the output
[illegible] products according
[illegible] kwt-hrs of electric po-
wer, whereas the coefficients of direct expenses will [illegible] be equal to 4415 kg of fuel
and 466 kwt-hrs of electric power.

Calculations of the coefficient of complete consumption of coal for ironmaking intended
for the final purpose have shown that direct consumptions of coal for making one ton of iron
were in 1959 equal to [illegible] kg, whereas the complete consumption rates, taking into account coal
as consumed for making coke, electric power and other kinds of production, were found to be
equal to 1412 kg. To make one ton of pig iron required 8741 kg of coke, while 1434 kg of
coal were consumed per ton of coke. [illegible] kwt-hrs of electric power were required per ton of
iron, while 5.5 kg of coal were consumed for the generation of 1 kwt-hr of electric power,
that is, the consumption of electric power for ironmaking was equivalent to the consumption of
[illegible] kg of coal, etc.

Prior to the preparation of the interindustry balance, that is, until 1959 there did
not exist any information which provide coefficients of direct and complete expenditures.
These coefficients enable the industry structure of material consumptions to be analyzed
throughout the industries, while taking into account the influence of technical and structural
improvements in the production on the level of material expenditures.

In the interindustry balance, it is mathematically envisaged that the volume of production
of each industry is equal to the product of the schedule of coefficients of complete expendi-
tures by the vector of the finished products consumption. On the basis of the production quan-
tities thus obtained, the volumes of the finished products supplies (interindustry flows) are
calculated from each separate industry into all the other industries.

Since the economical and mathematical pattern of the interindustry balance is expressed
by a system of linear equations, the mathematical basis for modelling interindustry relations
is constituted by methods of linear algebra.

The pattern considered above is an open statical one, comprising by means of material
consumption coefficients the interindustry mutual relations in terms of the industrial con-
sumption of finished products. It allows the requirement of finished products in any industry
to be determined so as to obtain the calculated quantity of the finished products. Calculation
of requirements in manpower and in basic productive funds for the industries is separately
carried into effect according to this pattern.

The balance provides for mutual relations of the national economy industries to be within
certain proportions. This proportional character equally relates to the manufacturing of sepa-

[illegible] finished products and to the total cost of the entire products of each industry of th[illegible] [illegible] [illegible] proportions are expressed [illegible] [illegible] [illegible]

[illegible]

[illegible]

The [illegible] (Table 2):

[illegible]

Expenditures of [illegible] industries, [illegible] the [illegible] expenditures for manufacturing products of the iron and steel industry, [illegible] total [illegible] material expenditures

Items	[illegible] from [illegible] industry	[illegible] of expenditures for manufacturing products of the iron and steel industry, per [illegible]
1.	Iron and steel industry	[illegible]
2.	Metallurgy of non-ferrous metals	2.36
3.	[illegible]	[illegible]
4.	[illegible]	2.94
5.	[illegible]	[illegible].28
6.	[illegible]	1.10
7.	[illegible] paper industry	1.[illegible]
8.	[illegible] materials industry	0.12
9.	[illegible] industry	[illegible]
10.	[illegible]	0.12
11.	[illegible]	[illegible].86
	[illegible] industry	[illegible]
12.	[illegible]	[illegible]
13.	Communications	[illegible]
14.	Trade, [illegible] and material-technical supply	5.75
15.	[illegible]	[illegible]
	Total of material expenditures	100.[illegible]

[illegible]

1	2	3
	Non-metallic raw materials for the iron and steel industry	6.41
	Ferrous metals	14.64
	Coke and by-products	32.12
	Refractory materials	11.43
	Secondary ferrous metals	26.85
	Total:	384.98
2.	Metallurgy of non-ferrous metals	
	Ores of non-ferrous metals	10.30
	Non-ferrous metals	17.96
	Total:	28.26
3.	Fuel industry	
	Coal	80.31
	Petroleum refining products	7.87
	Gas industry products	18.35
	Total:	106.53
4.	Generation of electric power and heat engineering	
	Electric power	25.30
5.	Chemical industry:	
	Products of basic chemistry	1.90
	Products of tyre industry	1.07
	Total:	2.97
6.	Wood, cellulose-paper and wood-working industry	
	Forestry products	0.70
	Wood-sawing and wood-working industry products	2.16
	Total:	2.86

Table 4

Consumption of products of supply industries in roubles for the production of 1,000 roubles of the products of the iron and steel industry

[illegible]

Industries and supply sub-branches	[illegible] roubles of the sub-branch [illegible] industry							
	Raw [illegible] ferrous metals	[illegible]	[illegible]	[illegible]	[illegible]	Refractory materials	Hardware	Secondary ferrous metals
1	2	3	4	5	6	7	8	9
[illegible]								
[illegible] ferrous metals	[illegible]	-	[illegible]	[illegible]	[illegible]	[illegible].06	[illegible].59	-
[illegible] raw materials								
[illegible]	[illegible]		[illegible]	[illegible]		3.[illegible]	0.[illegible]0	-
[illegible]	[illegible]				-	-	[illegible]	[illegible].11
[illegible] and [illegible]	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	-	-
[illegible]	-		[illegible]	[illegible]		[illegible]	[illegible]	-
[illegible] ferrous metals			[illegible]	[illegible]		-	[illegible]	376.6[illegible]
Total	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	379.76
[illegible] metals								
[illegible]	-	-	[illegible]	[illegible]		-	[illegible].87	0.40
[illegible] metals			-	[illegible]	-	-	-	-
Total	-	-	[illegible]			-	25.87	0.40
[illegible] industry								
[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	-	[illegible]	4.0[illegible]
[illegible]	[illegible]	[illegible]	[illegible]		-	[illegible]	[illegible]	0.4[illegible]
[illegible]	[illegible]		[illegible]	-		[illegible].27	[illegible].07	-
Total	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	4[illegible]	21.39	10.44
[illegible] electrical [illegible]								
[illegible] power	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	2[illegible].04	20.91	5.25
[illegible]								
[illegible] products	[illegible]		[illegible]		-	-	-	-
[illegible] products			[illegible]	[illegible]	[illegible]	-	3.30	0.36
Total	[illegible]	-	[illegible]	[illegible]	[illegible]	-	3.30	0.36

[illegible]

1	2	3	4	5	6	7	8	9
Wood, cellulose-paper, and wood-working industry								
Forestry products...	7.47	5.40	0.24	-	-	-	-	1.04
Wood-sawing, wood-working industry products	-	-	-	-	-	-	24.72	-
Total:	7.47	5.40	0.24	-	-	-	24.72	1.04

Table 4 shows the production relations of separate sub-branches of the iron and steel industry in terms of their production expenditures.

From all these data, it will be evident that for the manufacturing of 1000 roubles of products of different sub-branches, there are consumed products of different industries and in various quantities, that is, the iron and steel industry sub-branches possess of unequal inter-industry relations (both in the quantitative and qualitative respects).

Analysis of the influence of interindustry relations on manufacturing the products of the iron and steel industry in terms of natural products is of a great interest. These relations are most fully disclosed in the interindustry balance in the form of natural products; when calculating this balance, the iron and steel industry was represented by 20 kinds of finished products. In spite of a great variety of products being manufactured in this industry, of a decisive importance are precisely these 20 kinds of finished products constituting more than 90 pct of the gross product of the industry. To manufacture these products, products of many industries are supplied.

Given hereinbelow is the nomenclature of the ferrous metallurgy basic products and the amount of products to be consumed for their manufacture.

Items	Denomination of the products of the iron and steel industry	Quantity of the main products to be consumed
1	2	3
1.	Iron ore	35
2.	Manganese ore	33
3.	Limestone	3
4.	Chrome iron ore	2
5.	Iron	45
6.	Steel	48
7.	Rolled products with pipes and forgings of ingots (but without products of further processing)	46
8.	Tinplate	20
9.	Cold-drawn bars	22
10.	Steel pipes	53
11.	Cast-iron pipes	4
12.	Electric ferroalloys	40
13.	Wire nails	14
14.	Ordinary wire	17
15.	Steel wire	6
16.	Steel cable	18

1	2	3
17.	Cold-rolled steel strip	16
18.	Coke with 6% moisture content	28
19.	Electrodes of all kinds	13
20.	Refractory materials of all kinds	40
	Total:	503

From the data given in the Table, it will be evident that more than 500 kinds of products of various production industries are consumed for manufacturing 20 products of the iron and steel industries.

The above-mentioned quantity of products to be consumed is not complete one: only the basic products are therein taken into account, but even these figures are characteristic of a great variety of the production relations of the iron and steel industry in terms of expenditures for the manufacturing of the main kinds of the branch's products.

The nomenclature of the balance will widen as the computing technique farther improves. Widening nomenclature becomes possible when the interindustry balance is divided into separate blocks that comprise one or a group of tightly interrelated industries. In such blocks, it seems possible to disclose more amply the intrabranch interproduct relations both in terms of production expenditures and products distribution, but this is a special topic, and there is no possibility of deciding it amply in the present report.

4. Interindustry relations of the iron and steel industry in terms of its products consumption in the national economy

The interindustry production relations of the iron and steel industry in terms of consumption of its products, i.e. in relation with the consumption, are more ample, whereas the degree of concentration of the relations is somewhat lower than that of the production expenditures; yet the concentration of relations will be even here considerable. Table 5 states data on the consumption of the products of the iron and steel industry according to the interindustry balance data.

Table 5

Interindustry relations of the iron and steel industry in terms of consumption (distribution) of its products

Items	Consumers of the products of the iron and steel industry	Proportion of the ferrous metallurgy products to be consumed, in pct.
1	2	3
1.	Iron and steel industry	26.86
2.	Metallurgy of non-ferrous metals	2.51
3.	Fuel industry	0.69
4.	Electric power and heat engineering	0.09
5.	Machine building and metal working	34.75
6.	Chemical industry	1.73
7.	Wood, woodworking and paper industry	1.21
8.	Building materials industry	3.99
9.	Glass and porcelain-faience industry	0.17

1	2	3
[illegible]	[illegible] industry	[illegible].35
[illegible]	[illegible]	0.87
12.	[illegible]	0.35
	[illegible] industry:	[illegible].57
13.	[illegible]	16.98
14.	[illegible]	[illegible]
15.	[illegible]	[illegible]
16.	[illegible]da, [illegible] and [illegible] and chemical [illegible]	[illegible]79
17.	[illegible]	0.52
18.	[illegible]	[illegible].34
19.	[illegible], [illegible] and [illegible]	0.52
20.	[illegible]	4.46
	[illegible]	100 pct

From the [illegible] it [illegible] that [illegible] pct of the gross output of the iron and steel industry [illegible], [illegible] are intended for machine building, 17 pct are [illegible], [illegible] are consumed by the building materials industry, whereas only about [illegible] pct [illegible] the material production.

The intensity of [illegible] may be characterized by the consumption of the products of the iron and steel industry [illegible] the manufacturing of unit product of other industries, [illegible]. Table 6 states these data on using 1000 roubles [illegible] of the products of the consuming industries.

Table 6

[illegible] expenditures of the products of the iron and steel industry for the manufacturing [illegible] products of other industries

Items	[illegible] material production	Expenditures of the products of the iron and steel industry in roubles per 1000 roubles of products of other branches of material production
1	2	3
1.	Iron [illegible]	2[illegible]4.28
2.	Metallurgy of [illegible] metals	49.31
3.	[illegible] industry	3.59
4.	Electric power [illegible]	1.55
5.	Machine building and metal working	87.77
6.	Manufacture of [illegible]-mica and coal-graphitic products	27.68
7.	Chemical industry	19.62

1	2	3
8.	Wood and wood-working industry	12.19
9.	Building materials production	48.25
10.	Glass and porcelain-faience industry	11.27
11.	Light and petroleum-trade industry	0.71
12.	Foodstuffs	3.52
13.	Other industries	1.23
14.	Agriculture and forestry	0.37
15.	Building	57.05
16.	Transport and communication	2.68
17.	Trade, provision and supplies	5.15
18.	Other branches of material production	1.23

Data of Table [illegible] provide a quantitative characteristic of the interindustry relations of the iron and steel industry in terms of consumption of its products in the national economy. They supplement the data given in Table 6.

The interindustry relations of the iron and steel industry in terms of consumption of products of its principal sub-branches are characterized by data stated in Table 7.

Table 7

Interindustry relations in terms of consumption of

[illegible]

Industries consumers	Share of products of the sub-branches of the iron and steel industries to be consumed, in pct				
	Rolled ferrous metals and non-metallic raw materials	Iron and steel pipes	Refractory materials	Ferrous metals	Hardware
Iron and steel industry	89.9	42.5	41.3	26.1	0.6
Metallurgy of non-ferrous metals	0.4	13.5			
Machine building and metal working	3.7	12.6	12.2	46.1	36.2
Building materials industry	3.5		1.6	4.1	8.6
Chemical industry	1.4	19.9	3.0	1.6	
Wood and wood-working industry					8.1
Other industries	0.9	6.5	5.9	3.2	
Total for the industry	100.0	100.0	64.0	82.1	53.5
Building			36.0	16.9	20.6
Agriculture					12.6
Other branches of the national economy				1.0	13.3
Total	100.0	100.0	100.00	100.0	100.0

The prevalent [illegible] of ores [illegible] ferrous metals and non-metallic raw materials is consumed by the iron and steel industry [illegible] only [illegible] small [illegible] thereof is consumed in machine building, principally [illegible]. The building materials industry mainly consumes non-metallic raw materials [illegible].

More than [illegible] coke and by-product industry products are consumed by the iron and steel industry, [illegible] for use in the chemical industry.

The most [illegible] refractory industry [illegible] are the iron and steel industry and [illegible] more than [illegible] of the refractory products consumed in all the national economy.

Products of the [illegible] include iron, steel, rolled products, semi-finished [illegible] ferro-alloys.

The essential [illegible] of ferrous metals are consumed in three industries: in the iron and steel industry, [illegible] machine-building and metalworking, and in building.

In the iron and steel industry, the prevalent share (about [illegible]) of ferrous metals [illegible] used for the [illegible] and hardware. The share of metal to be [illegible] owing to a more rapid development of the manufacture of steel [illegible] hardware for industrial purpose.

In addition, [illegible] rerolled [illegible] other plants owing to closing the [illegible] in decreasing the intraindustry consumption [illegible].

The share of [illegible] also reduced [illegible] the consumption of ferrous metals. This trend [illegible] the consumption of metal per unit of gross output of the machine building owing [illegible] in the machine building structure and an improvement of the metal [illegible] quality.

On account of [illegible] the chemical industry and of the building materials industry, [illegible] the general consumption of ferrous metals will increase.

The nature and quantitative [illegible] of the interindustry relations of the iron and steel industry [illegible] of ferrous metals supplement data on the structure of consumption of the [illegible] products as natural products throughout the branches of national economy. [illegible] are given in Table 8.

Table 8

[illegible] rolled products in terms of natural products

Denomination [illegible] consumers	[illegible] per cent to the total amount
Iron and steel industry	29.1
Machine building [illegible] working	41.1
Building materials industry	0.7
Chemical industry	0.5
Other industries	3.4
Industry as a whole	74.8
Building	21.0
Transport	3.1
Other industries	1.1
Total	100.00

From Table 8, it will be evident that [illegible] pct of the main products of the iron and steel industry in the form of finished rolled [illegible] consumed by the iron and steel industry itself for the manufacturing of [illegible] of the fourth processing. Machine building and metal [illegible] rolled products.

Somewhat another [illegible] the industry's finished products, such as finished commercial [illegible] building industry consumes these products up [illegible] industry, only 2 pct.

Of great interest are [illegible] main types of the industry's products, in which [illegible] products and intraindustry interplant supplies [illegible] consumption. There is separated the gross output [illegible] (finished) products of the industry [illegible] determined industrial flows of the principal [illegible] spheres of consumption of these products [illegible]

Table 9

Production flows [illegible] the products of the iron [illegible]

Denomination of products	Total output	[illegible]	[illegible]	[illegible]	[illegible]	Total output	[illegible]	Inside the industry	Total in the industry	For the outside consumers
Iron ore	100.[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	80.[illegible]	21.0/20.0 x/
Sinter	100.[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible].8	1.2
Iron	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	85.8	14.2
Steel	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	96.0	4.0
Rolled products	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible].8	66.2
Steel pipes	100.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		1.[illegible]	98.7
Coke, at 6% moisture content	100.[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible].5	77.4	22.6
Hardware for industrial purpose	100.[illegible]	-	-	[illegible]	[illegible]	[illegible]	-	[illegible]	-	100.0

x/ The numerator accounts [illegible] the denominator, the ore balance.

The tables of the production flows [illegible] products for the iron and steel industry [illegible] of pipes were directed outside the industry, [illegible] inside the industry; about [illegible] pct of [illegible] rolled products, etc.

From the data stated [illegible] interindustry relations of the iron and steel industry [illegible] region of consumption of ferrous metals [illegible] especially important

role in the national economy. They represent the essential constructional material intended for uses in the industrial production as a whole and in the building industry.

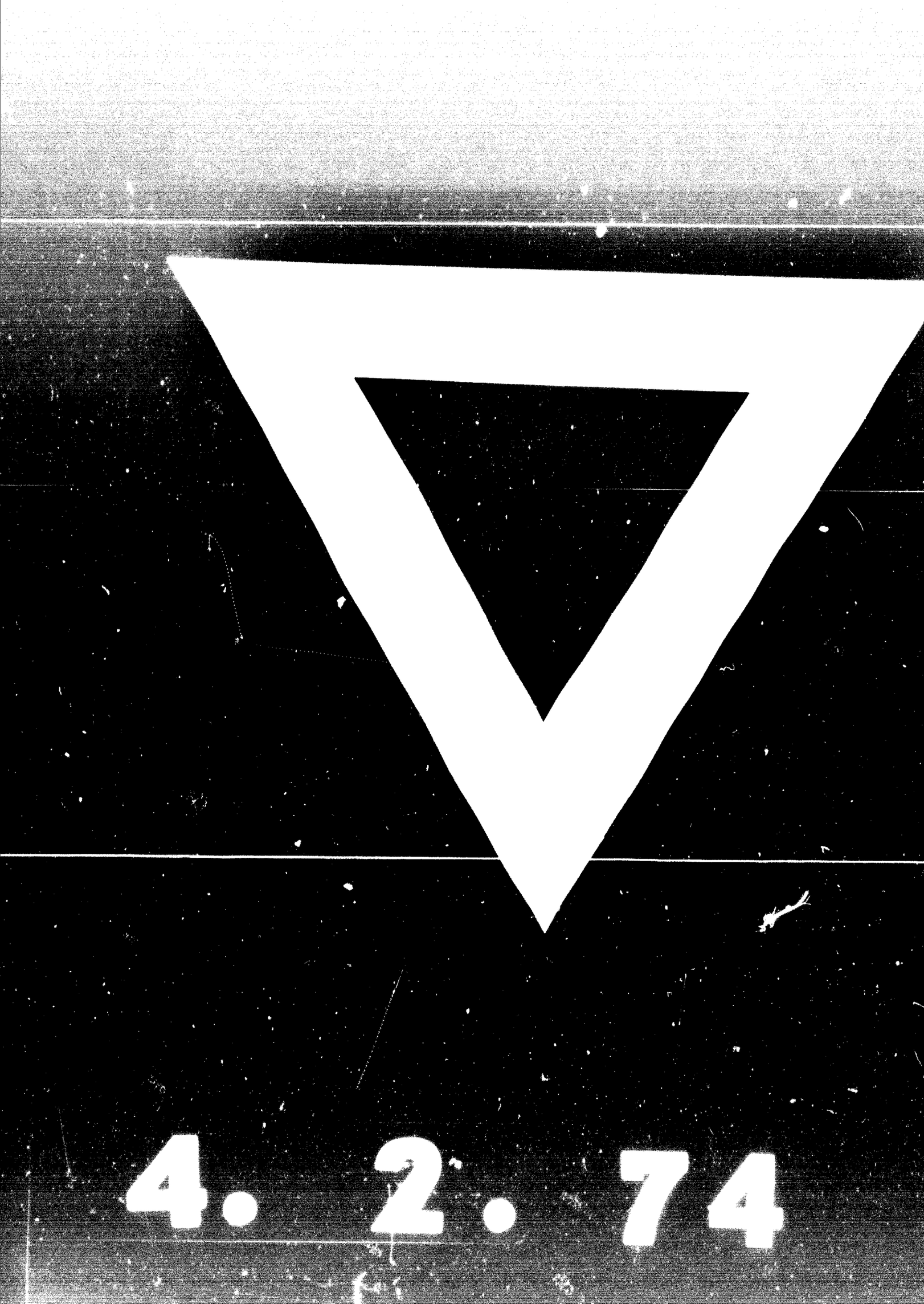
Influence on the interindustry relations of the iron and steel industry, on the manufacturing and consumption of ferrous metals is exerted by the level and structure of the entire industrial production, technical progress both in the iron and steel industry itself and in the industries [illegible] which [illegible] though the most developed production relations.

Value of the gross social product	Use of products in the national economy (consumer branches) / Elements of the products cost are made of (production branches)	Iron and Steel Industry								Machine Building Industry	
		Ores of ferrous metals	Non-metallic raw materials	Ferrous metals	Electric ferro-alloys	Coke and by-products	Refractory materials	Hardware	Secondary metals	Tractors and agricultural machines	Automobiles
		1	2	3	4	5	6	7	8	9	10
	1 Ores of ferrous metals	0	-	5500	300	-	-	-	-	30	8
	2 Non-metallic raw materials	1	-	300	30	-	40	-	-	5	4
	3 Ferrous metals	45	5	1500	60	10	5	880	-	900	600
	4 Electric ferroalloys	-	-	20	10	-	-	2	-	1	-
	5 Coke and by-products	25	-	250	40	90	15	-	-	9	4
	6 Refractory materials	1	-	180	1	1	30	2	-	5	5
	7 Hardware	1	1	20	1	2	2	64	-	60	75
	8 Secondary metals	-	-	450	0	-	-	-	-	10	5
	9 Transport and agricultural machine-building	3	1	1	-	-	-	-	-	900	-
	10 Car-building industry	2	1	3	-	-	1	2	-	30	800
	... ...										
	... ...										
	... ...										
	100 Meat and meat products	-	-	-	-	-	-	-	-	-	-
	101 Milk and dairy products	-	-	1	-	1	-	-	-	1	2
	... ...										
	130 Industry in total	600	60	5300	600	1150	180	1200	150	4000	3000
	131 Construction	-	-	-	-	-	-	-	-	-	-
	132 Agriculture	-	-	2	-	-	1	1	-	3	2
	133 Other branches of the material production	300	40	1498	60	60	40	139	120	500	398
	Total of material consumption	900	100	6800	660	1210	221	1340	270	4500	3400
	Amortization	100	50	500	50	40	50	20	10	400	300
	Increase of employed	500	110	2000	50	50	150	120	160	1800	1000
	Pure revenue of enterprises	45	50	1500	5	50	50	90	45	3000	2300
	Centralized, pure revenue of the state	55	10	500	-	50	15	70	15	500	1000
	T O T A L	700	200	4500	160	190	279	260	230	5500	4600
	Total of the gross output	1600	300	11300	820	1400	500	1600	500	10000	8000

S C H E M E

...THE NATIONAL ECONOMY (Conventional data) (millions of roubles)

Foodstuffs industry: Meat	Foodstuffs industry: Milk	...	Total for the industry	Construction	Agriculture	Other branches of the material production	Finished product: Total to be consumed in the material production	Compensation of being out of order and overhauling of the productive funds	Consumption funds: Individual	Consumption funds: Social	Accumulation funds: of basic productive and nonproductive funds	Accumulation funds: of turnover funds (reserves and storages)	Losses	Export	Import	Total amount of the finished product	Grand total of the gross output
100	101	...	120	121	122	123											
-	-		1275	-	-	-	1275	-	-	-	-	-	-	225	-	[illegible]	1500
-	-		170	110	-	-	280	-	-	-	-	20	-	-	-	[illegible]	300
20	30		7700	2200	10	450	[illegible]	-	8	42	-	30	-	[illegible]	40	[illegible]	[illegible]
-	-		727	-	-	-	727	-	-	-	-	10	-	64	1	[illegible]	[illegible]
-	-		1295	-	-	-	1295	-	-	-	-	-	-	105	-	[illegible]	1400
-	-		332	160	-	-	492	-	-	-	-	-	-	8	-	8	500
-	-		11550	308	30	2	1490	-	28	62	-	-	-	25	5	110	1600
-	-		500	-	-	-	500	-	-	-	-	-	-	-	-	-	[illegible]
-	-		2513	200	660	25	3398	1150	-	2	3500	1650	-	350	50	6602	10000
2	4		2728	180	50	2	2960	550	900	100	2200	920	-	400	30	5040	8000
1000	-		2070	-	-	-	2070	-	4200	250	-	300	-	210	50	4930	7000
-	300		1550	-	-	-	1550	-	3500	420	-	180	-	250	-	4450	6000
1200	600		122600	21000	8500	9000	161100	8000	102000	1400	9000	18000	-	[illegible]	6500	158900	300000
-	-		-	-	-	-	-	13800	-	-	24800	400	1000	-	-	[illegible]	[illegible]
4000	3500		17060	20	14000	20	31100	100	20000	7200	600	350	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1200	1000		29040	600	[illegible]	500	30440	-	3000	200	-	160		[illegible]			[illegible]
6400	5100		163600	21620	28100	9520	228840	21900	125000	8800	34400	18910	[illegible]	[illegible]			[illegible]
[illegible]	50		10000	1200	3000	4000	18200	-10200	[illegible]	-3000	-	-	-	-		[illegible]	-
[illegible]	500		40000	12000	22000	12000	36000	-1000	-120000	-	-1500	-	-	-		[illegible]	[illegible]
[illegible]	100		30400	4180	6300	12480	[illegible]	-1700	-	-1800	-2900	-6010	-350	-		[illegible]	[illegible]
[illegible]	450		50000	1000	900	2000	53900	-9000	-	-4000	-30000	-12900	-500	-2800	[illegible]	[illegible]	[illegible]
[illegible]	900		130400	18580	31900	30480	211160	-21900	-125000	-880	-34400	-18910	-1650	-300	7500	-211160	-
7000	6000		300000	40000	60000	40000	440000	-	-	-	-	-	-	-	-	-	[illegible]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