TRANSLATION NO. 549

DATE: 16 May 1962

DEPARTMENT OF THE ARMY
Fort Detrick
Frederick, Maryland

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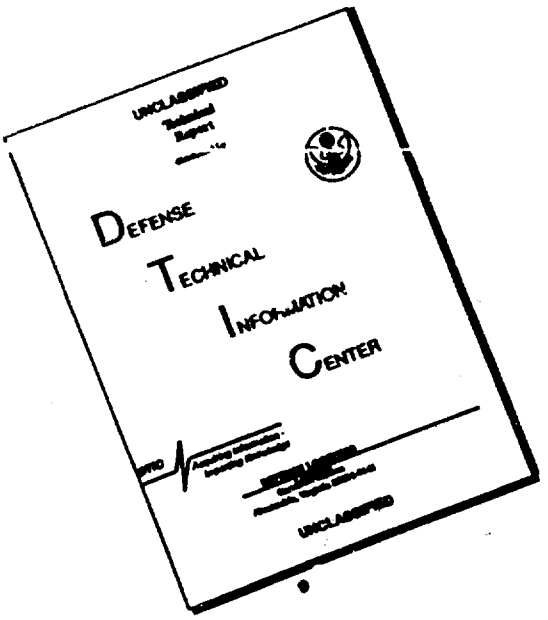

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Translations on Soviet Industrial Development

SOVIET FERROUS METALLURGY (25)

Introduction

This is a serial publication containing translations of selected articles on ferrous metallurgy in the Soviet Union. This report consists of translations on subjects listed in the table of contents below.

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1. Concerning the Expansion of Two Zhdanov Plants

By I. Kovalev, S. Medinskiy, and G. Orlovskiy,
staff-members, Zhdanov affiliate of Giprostal'

(Stroitel'naya Gazeta /Construction Gazette/, 14 Jan 62)

The articles on organization of projects, as printed in Stroitel'naya Gazeta, were discussed at the open party meeting of the Zhdanov affiliate of Giprostal'. The operating experience of our organization confirms the importance and reality of the questions raised in those articles.

Specifically, it must be admitted that the government instruction that projects must be prepared near the places of construction remains still unfulfilled.

Let us cite the following example. In the city of Zhdanov, two very large metallurgical plants -- the "Azovstal'" and the Plant imeni Il'ich are simultaneously undergoing a modernization and expansion. Formerly it was the Zhdanov affiliate of Gipromez (the present affiliate of Giprostal') which prepared the projects for these plants. Now, besides our affiliate with its staff of 360 members, the work is also performed by a Ukrgipromez brigade containing 220 members.

It would be reasonable to expect that the personnel of

these two organizations are able to take care of the needs of the plants. The clients, however, have a different opinion. For example, the leaders of the Plant imeni Il'ich assign important work to the Ukrgipromez which is located in Dnepropetrovsk and employs for this purpose a multitude of contractors, including even our affiliate.

Our affiliate also spreads its "sphere of influence" beyond the borders of Donetskiy Economic Region by working on projects for enterprises located thousands of kilometers away from the city of Zhdanov.

Naturally, such a manner of working for remotely located enterprises only complicates both the project and construction and, what is most important, it creates large obstacles that hinder cooperation between enterprises. We would not even mention that it makes the work on projects more costly.

In our opinion, the remarks on the unsatisfactory method of staffing the personnel of designing institutes are correct. The institutes in most cases advertise in the newspapers for workers and, occasionally, hire workers sent by higher educational institutions. The young specialists, however, are sent to designing organizations regardless of their aptitudes and abilities.

The training of the personnel during the years of the early Five-Year Plans was not badly organized. At that time the selection was made among students of junior grades who had an aptitude for designing; these were joined into groups and trained in accordance with a special program. The students of these groups gained experience in the designing institutes and upon completion of the course were sent to actual work.

It would be worthwhile to renew this good practice which has proven itself in reality.

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2. Magnitogorsk Plant Advertises for Work

(Stroitel'naya Gazeta, Moscow, 17 Jan 62)

The Magnitogorsk Forge and Rolling Plant of the Local Industries of Chelyabinskaya Oblast will accept work for converting into nails rod - wire made of 0.3 steel from two to 6.5 millimeters in diameter.

Work completed 20 days after arrival of the raw-material.

Apply to: Magnitogorsk, Gotsgorod, 2nd city block, the Forge and Rolling Plant.

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3. Concerning the "4200" Thick-Sheet Rolling Mill for Novo-Lipetsk Metallurgical Plant

by A. Tselikov, corresponding member of Academy of Sciences USSR and director of VNIImetmash

(Izvestiya, Moscow, 7 Feb 61)

An article entitled "Wasteful self-adoration" was recently printed in Izvestiya. Its authors, the designers of the Uralmash Plant A. Lipatov and V. Niskovskikh, told the readers about the controversy which flamed up regarding the design of the "4200" rolling mill for the Novo-Lipetsk Metallurgical Plant. The article had for its subject the technically unique construction of the costly thick-sheet rolling mill which must produce wide sheets for gas-transmission pipes. Its design was assigned to a staff of designers of the Novo-Kramatorsk Plant of the Donbass. The design of the rolling mill turned out to be unsatisfactory from the standpoint of modern engineering, costly, and uneconomical.

Upon learning these facts, the designers of the Ural Machine Building Plant spent their free time and as a group designed a thick-sheet rolling mill serving the same purpose, but more perfect from the engineering standpoint.

nence the controversy about these two designs. Which, however, is the better design? This newspaper decided to debate this question on its pages. The first to express his opinion is the outstanding rolling mill specialist, professor A.I. Tselikov. ...*

In their article "Wasteful self-adoration" printed in the No 29 issue of the newspaper Izvestiya the designing engineers, A. Lipatov and V. Niskovskikh, made several critical remarks concerning the design of the "4200" rolling mill which was executed by Novo-Kramatorsk Machine Building Plant. They also criticised the resolutions passed on this design by the engineering council of Lipetskiy Sovnarkhoz.

The design was unfavorably characterized by the authors of the article. I think, however, that it is an opinion without merit. Whether it is so or not, according to the working plan of the scientific-technical council of the State Committee for Automation and Machine Building of the Council of Ministers USSR, the design will be reviewed during this month with the participation of a wide group of specialists, designers, and rolling mill technologists, and specifically by representatives of Uralmash Plant and VNIImetmash. It is to be hoped that the scientific-technical council of the committee will analyse all

engineering problems raised by the authors of the article and will render a qualified decision.

Since this council must be free to make up its own mind, I would not consider it expedient in this case to express my opinion on all engineering problems affecting the "4200" rolling mill and to state now as to who is correct -- the designers of Uralmash Plant, or the designers of Novo-Kramatorsk Machine Building Plant. In any case, however, the decisive role will be played by economics and the suggestion of Uralmash Plant that it is possible to reduce considerably the weight of equipment per ton of rolled metal should certainly be accepted.

At the same time it is expedient to take into consideration the VNIImetmash proposals to replace the cast stands weighing more than 120 tons each with stands made of reinforced concrete. This will make the stands more rigid and will reduce by many times the consumption of steel. There is still another VNIImetmash proposal: not to construct the "4200" rolling mill at all, but to make the pipes for which the mill is designed from sheets welded with spiral seams, or with two longitudinal seams.

In this manner the output of sheets per ton of installed equipment will increase more than twice compared with the output of the "4200" rolling mill.

If we take into account the highly-productive, continuous "350" rolling mill that was recently put into production at the Magnitogorsk Metallurgical Combine, we find that even this reduced volume of capital investments necessary for us to organize the production of gas-transmission pipes with a diameter of 1200 millimeters can be further reduced considerably.

Besides questions of technical nature, A. Lipatov and V. Piskovskikh raised in their article a number of other questions which, in my opinion, are of no less importance in our work.

The first question -- about putting the reputation of an organization above the interests of the State. This is a common occurrence, unfortunately. I will cite an example dealing with engineering of rolling mills.

Continuous rolling mills, in which the rolled metal has no return movements and enters in a continuous stream from one group of rolls to another, belong to the most productive type of rolling mills.

However, the principal designing organization in ferrous metallurgy, Gipromez, which handles technical assignments for rolling mills has taken a different position in selecting the type of the medium-grade "350" rolling mill. Giu-

Gipromez does not consider it necessary to make this rolling mill continuous, irrespective of the fact that the capacity of a continuous rolling mill is from 20 to 30 percent higher and the equipment weighs 15 percent less.

Gipromez does not think it possible to change its early opinion, lest its reputation suffers.

In a similar situation is the problem of production of large-diameter gas-transmission pipes. It is more economical to produce these pipes from welded metal sheets instead of producing seamless pipes, especially those with a diameter above 820 millimeters. Despite its complete obviousness, the Chelyabinskiy Sovnarkhoz insists on constructing for this purpose a tube-rolling mill weighing more than 20,000 tons.

It is also possible to favor the second question raised in the article which pertains to the specialization of the Uralmashzavod and Novo-Kramatorsk Machine Building Plant. In fact, no proper order has been yet established in this matter.

Clear specialization is a necessity for the metallurgical machine-building plants and it must be based on technological ability. Specifically, all thick-sheet rolling mills must be designed and produced by a single plant. The deconcentration of their production in two plants will not

help to improve the quality of machines.

The article by A. Ligatov and V. Niskovskikh mentions also the incorrect manner employed by technical councils in examining designs of large unique machines, such as for example, the thick-sheet "4200" rolling mill. This is correctly stated. A technical council must without fail invite prominent specialists, especially when a new branch of production is to be established in a given sovnarkhoz and the latter is still lacking the practical experience in this field. Therefore, in such cases it is necessary to appeal to the scientific-technical council of the State Committee for Automation and Machine Building of the Council of Ministers USSR which has greater abilities for a qualified examination of designs.

In conclusion it is still necessary to note that the work performed by the large staff of designers of the Novo-Kramatorsk Machine Building Plant, as a whole, must be favorably appraised.

Also that the designers of the Uralmash Plant, with their more extensive experience in designing thick-sheet rolling mills and having already prepared the technical design of the "4200" rolling mill, were without doubt able to introduce much that is useful and new for this design.

The initiative taken by them in preparing a preliminary design of the "4200" rolling mill deserves much praise.

In the final analysis, the extensive creative work of two large staffs and the dispute arising between them will make it possible to select the best features present in both designs and produce a unique "4200" thick-sheet rolling mill capable of high technical and economical performance.

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4. Another Opinion About the "4200" Rolling Mill

By G. Pokrovskiy, I. Larshin, V. Gordzyalkovskiy, and Ye. Gal'burt, members of the "Ukrgiprogaz" Institute.

(Izvestiya, Moscow, 28 Feb 61)

In his article "Which is the better design" (No 32 issue of Izvestiya) the corresponding member of Academy of Sciences USSR and director of VNIImetmash, professor A.I. Tselikov mentions with good reason the possibility of not constructing at all the "4200" rolling mill which, judging from everything, is designed for the production of straight-seam, large-diameter, gas-transmission pipes from rolled sheets. This construction costs many tens of millions of rubles. These funds can be employed for the construction of about ten mills for the production of spiral-welded pipes.

The process of making large-diameter, spiral-welded pipes from coils of sheets is known in the Soviet Union and in several foreign countries and has been adopted for production. It is the most progressive, simplest, and economically profitable method of making pipes and has several advantages. It assures a continuity for the process, ability to automate the operations, and a possibility of producing large-diameter pipes of practically unlimited length from comparatively narrow sheets, while the sheets from a "4200" rolling mill will be fit only for production of straight-seam welded pipes with one longitudinal seam and a diameter not exceeding 1300 millimeters.

A spiral-welding mill makes pipes with geometrical dimensions of high precision and complex finishing operations are unnecessary.

There is still another important advantage: pipes can be made from coils of steel sheets directly at the places where pipes are needed for construction of gas pipelines.

The quantity of gas transported in the country will sharply increase during the next few years. Certain main gas-pipeline will be 2000 and more kilometers in length. Large streams of gas will flow from Central Asia to the Ural regions, european part of the country, Transcaucasia,

and to the East. It will, therefore, require the construction of many thousand kilometers of large-diameter, large-capacity, main gas-pipelines. The "Ukrgiprogaz" Institute is, therefore, busy in trying to ascertain the expediency and the effect on the national economy which will result from employment of thin-walled pipes with larger diameters. Such pipes with a diameter up to 2000 millimeters are easier to produce when they are spiral-welded from coils of sheets rolled on "1700" and "2500" rolling mills.

Mills, the weight of which is determined in tens of tons, can be installed semistationary on platforms located near the routes of gas-pipelines. This will make it possible to increase from three to four times the effective utilization of railroad transport. In transporting large-diameter pipes, the railroad car loads do not exceed 25 percent at the present time.

It is for this reason that we consider it necessary for the scientific research, designing, and projecting institutes to concentrate their attention to the creation of light, transportable mills for the production of large-diameter pipes by spiral-welding of steel sheets obtained on type "1700" and "2500" mills.

As to the "4200" rolling mill? In our opinion it is not

needed at all for production of large-diameter pipes.

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Izvestiya is printing the letter of Comrades Pokrovskiy, Frolkin, Gordzyalkovskiy, and Gal'burt in the hope that the State Committee for Automation and Machine Building of the Council of Ministers USSR, the Gipromez, VNIImetmash, and the planning organizations will take this opinion into consideration when reviewing the question on the two designs for the "4200" rolling mill.

Is it really possible to get along without the "4200" rolling mill? How does this proposal affect the country's supply of sheet materials? Let this and other no less important questions arising from the proposal made by the authors of the letter from "Ukrgiprogaz" be answered by competent organizations.

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5. A Unique Slag-Handling Combine

(Izvestiya, Moscow, 2 Dec 61, p 3)

Dnepropetrovsk, 1 December. (By telephone). The staff of the planning-designing technological institute of the Dnepropetrovskiy Sovnarkhoz is fruitfully working on the creation of a brand new facility.

The design of the unique combine for handling slag dumps

of metallurgical plants has been completed. It is a huge self-propelled unit having a height of a 5-story building and represents an original plant installed on caterpillars. It contains 17 different units driven by electric motors with a total power of 500 kilowatts. The principal scooping working component is a rotor with 12 buckets which can extract from the dumps more than 120 cubic meters of slag per hour. Thereafter, the slag is carried on tape conveyors to the crushing machines.

The combine extracts up to 400 tons of metal during a seven-hour shift and is attended by only two workers. It is intended for the Magnitogorsk Metallurgical Combine.

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6. The Magnitogorsk Giant "2500" Rolling Mill Is not yet in Operation

(Izvestiya, Moscow, 2 Dec 61, p 3)

The "2500" rolling mill of the Magnigorsk combine is the flagman of our native machine-building industry. It was built by the entire country.

The builders spent 18 months battling persistently to gain the important goals of the Seven-Year plan. They

assembled 26,000 cubic meters of precast reinforced concrete, 28,000 tons of technological equipment, and laid 270 kilometers of gas pipes. And there is standing in the ranks -- the rolling mill, the like of which is unknown in Europe. Its power is truly fantastic. It is capable of converting a considerable part of the metal produced by Magnitka into sheets which are so much needed for the national economy. It is capable ... but it does not convert.

The giant has not yet used his muscles. In August he has fulfilled only 48 percent of the plan, and only 43 percent in October. Hundreds of enterprises and construction projects were placed on a starvation diet by the rolling mill, and many others had to disrupt their work.

Why then does this rolling mill, the arrival of which was impatiently awaited by the automobile builders, tractor builders, and chemical and electrical engineering industries, why does not this very important unit work at full capacity?

The Magnitogorsk rolling mill, just as any other rolling units, is "inscribed" into a technological thread. In its simplified form this thread appears as follows: the mine, blast furnace shop, open-hearth shop, slab mill, and rolling mill. The new rolling unit was built, gained strength,

and the entire conveyer was undergoing an expansion. It is exactly this expansion which was delayed by the metallurgists and builders. With the introduction of the new rolling mill, the thread became stretched to a limit. To prevent its rupture, the rolling mill was forced to work at one half of its capacity.

First of all, it is held in check by the slab mill, the neighboring link to the conveyer. It operates for many years, but its construction is not yet complete. In 1958, the Magnitogorsk city party committee attempted to remove the obstacles for the "2500" rolling mill and organized a commission to check the equipment of the slab mill. Serious errors were found in the calculations of the Novo-Kramatorsk designers who designed the slab mill. The roller conveyers proved to be weak, and the vertical rollers were not up to specifications. Generally, there were found many defects. These were recorded in a document which raised an alarm. One would expect the Gosplan and other organizations to force the Ukrainian machine builders to correct the defects. But this did not happen. The document lost itself in the folders.

The document recorded defects which should have been eliminated at the plant by the joint efforts of the combine and sovnarkhoz. However, even the local leaders did not

act with common sense. In its attempt to solve the problems the sovnarkhoz called representatives and held the meetings directly at the construction site. The work in the rear, however, continued on a delayed basis. The sovnarkhoz, naturally, could not solve all problems, but many of these which it handled were successfully solved.

Well, what about the so-called "outside participants in the construction?

They are also guilty of many violations.

Their main guilt is that they delay the equipment. If one is to examine the delivery schedule and its execution, he would see a sad picture: lack of organization, discipline, and lack of order.

The mold shop is like a heavy weight upon the shoulders of the "2500" rolling mill. It was built together with the rolling mill and was supposed to go into operation at the same time. However, the people who were entrusted with this important construction project did not fulfill their duty. The "Ukrgipromez" shop was designed by a staff of engineers and designers well know in the country. Drawings were frequently delayed, some for a year. Then they were revised and again delayed. Solemn promises were made but not kept. At a

plenum of Magnitogorsk city party committee the chief engineer of "Ukrgipromez", Comrade Tonkonog, promised party members to take all measures in order that the shop would be built in 1960. The shop, however, remains unconstructed even now -- at the end of 1961.

The Syzran' Heavy Machinery Plant acts in a different manner: it also delays the pouring conveyers but makes no promises, however. Besides, it would find it difficult to promise anything... because the Syzran workers have not even begun to work on the equipment.

"Have not begun" ... These words are even frightening. When will the Magnitogorsk giant be able to flex its muscles if, the end of the construction of the mold shop is not yet in sight?

It is our conviction that every case of equipment delay and disruption of the delivery schedule must be considered as an extraordinary event and must be subjected to a detailed investigation. An end must be put to the irresponsible attitude for this important State matter. The Novo-Kramatorsk Machine Building Plant delayed the equipment for many units of the rolling mill and is six months late in delivery of parts and mechanisms for the second cutting unit. The latter should have been put into

[illegible] during the first quarter of this year, and it is still not in operation even now. The absence of this mechanism reduces the capacity of the rolling mill by 500,000 tons of sheets per year.

Delivery of mechanisms and instruments for the complex [illegible] rolling mill is disrupted by the Leningrad "Elektrosila" Plant and by the Khar'kov Electromechanical Plant. The equipment is delayed approximately six months.

The Zaporozh'ye Transformer Plant is under obligation to deliver a complete transformer substation during the third quarter of this year. They promise, however to make the delivery in the first quarter of next year.

The Ul'yanovskiy Sovnarkhoz delays the delivery of the cabinets with the rolled-in automatic devices; the Leningradskiy Sovnarkhoz makes no deliveries of slew cranes [povorotnyye krany].

The question is whether someone must be held responsible for disrupting the deliveries, or are the above delays to be regarded as common practice?

No, there can be laws in our State which will excuse the disorder in construction and production. If such a disorder takes place anywhere, the ones to be blamed are the negligent managers, the bad planners, and the irresponsible people. They should be held responsible.

7. Hydroelectric Power for Novo-Lipetsk Plant

(Smena /Shift/, Moscow, No1, Jan 62, pp 2-3)

... The Lipetsk Steel Institute announces the outfitting of an electrometallurgical division; students are mastering the new equipment which operates on the power supplied by the great "electrical" river. One cannot forget that, in emphasizing the importance of the first Soviet hydroelectric project, Maxim Gor'kiy said: "The Dnepr is conquered and from now on will obediently serve the development of socialist culture."

We "swim" along the "electrical" river to Lipetsk.

On a bright frosty morning the mighty water-main brought us to Lipetsk. A wide panorama opened with the Lenin Square hovering above the city. A beautiful staircase was steeply running downward from the top of the mountain which was covered with asphalt. Down below is a park in its snowy mittins and streets full of motion and city tumult; further away is the azure smooth surface of the ice-covered river, a bridge, and the left shore of Novo-Lipetsk: multi-story buildings assuming a rose-tinted colorin the rays of the rising sun, and at the very horizon are gigantic smokestacks and the faint attic smoke of the Lipetsk "Magnitka"... How nice

it would be to endlessly enjoy this vast space, this wonderful beauty.

... The Soviet people measures history not by centuries, but by decades: 40 years after the Great October Revolution, the Novolipetsk Metallurgical Plant began its operation; by years: in 1926 according to the census Lipetsk had a population of 80,000 residents, but now it has almost 200,000; by months: the new gigantic blast furnace was built and put into operation in 10 months of last year, by weeks and days, because every week and every day the working Lipetsk takes another step forward on the road specified by the 22nd Party Congress.

A new history is being created for the worker's city. It's driving force -- our own life and the Soviet government. Plus electrification...

... every morning Sergey takes his seat in a small bus. At the end of its six-kilometer trip the bus stops at the side of a substation building and, then, Sergey is stunned by the amazing stillness. The collecting portals rise into the sky to a height of 30 meters, the wires stretch over the head. Power flows silently. Only a light crackle sometimes from the garland of insulators, as if it was gas escaping out from an invisible tank.

The substation bears the beautiful name of "Severnaya".

[illegible]-shouldered p[illegible]s are [illegible] from the forest on the way to this substation and again disappear into the forest. The poles extend further. Somewhere near Gryazi is the Lipetskaya substation wedged into the waterway of the great electrical river. It takes away a part of the power generated by the Volgograd giant and transmits it to Voronezh and "Severnaya". From there electric power is transmitted to the Novo-Lipetsk Metallurgical Plant and to the "Bugor" substation which feeds the city and its industries.

All of this has been settled long ago in Sergey's mind and to him it appears strange that someone may not grasp such simple facts. Well... He himself remembers his first visit to "Severnaya". Everything was interesting at that time: both how the power from the Volgogradskaya GES reaches the city of Lipetsk and the amount of it.

When the figure was given to Sergey, he thought: "Unbelievably large!" As it turned out, the total power used here was only a fraction of the power generated by the Volga.

In driving through the Avenue of Peace he noticed that far away in front of him, beyond the houses, is some kind of a cyclopic structure. He was told that it is a cold-rolling mill, the like of which is not possessed by any country. The mill occupies an area of 12 hectares. It is

10 times larger than the famous Luzhniki Sport Palace. In June 1960, the mill produced its first product -- transformer steel which rushes in form of a ribbon through the rollers of a unique five-stand rolling mill with the speed of an express train...

We are not sure whether we follow correctly the course of thought occupying the mind of the substation dispatcher, komsomol Sergey Alekseyev; we only notice that his eyes under the eye-glasses loose their happy look. He begins to tell us exactly what others told him some time ago.

He walks over to the control panel.

"You see this switch: it was turned on for the first time on 29 April 1960. On that day Lipetsk received the current from the Volgogradskaya GES. It put into operation the cold-rolling mill, it started the large-scale production of coke..."

... Assemblers are busy working behind the windows of the substation building. A second group of transformers is being installed alongside the present group. New shops and plants are being erected somewhere behind the wall of the forest. It means that more current is needed for the Lipetsk industries, the city, the villages...

The electric smelting furnace -- a tub suitable for

cooking fish soup [illegible] fairly large whale. Steel smelting, however, is far from being such an harmless thing. Hammer-like rumblings ceaselessly shake the runways of the shop. Blue waves and tongues of flame fill the tall domes with a fantastic interplay of light. The impression is that a lightning imprisoned in armor tries and is unable to free itself.

... The heavy and strenuous labor performed by people seems to be amazingly easy compared with the gigantic work performed by mechanisms. The Volgograd current carries everything on its shoulders: it loads the furnaces and mixes the boiling metal. The two largest electric furnaces of the Lipetsk "Magnitka" consumes hundreds of thousands of kilowatt-hours per day to produce the high-quality transformer steel.

"Our pride," is what people say when they talk about this steel. The mastering of its smelting in large electric furnaces represents an extremely complex engineering problem. The Lipetsk steel-smelters were the first in the country to solve this problem. They paved new roads in our country's electrometallurgy. They and the Volgograd kilo-[illegible]

... The ladle with molten metal swims along the shop runways [illegible] the molds which lay close one to another

like elephants. The ladle is received with care at the continuous casting unit, as if it were a cradle. No iron molds are needed there. Without going too deeply into the technology, it is possible to say that molten steel becomes solid and is converted into billets of definite size (blooms) without undergoing the many laborious operations of compressing the ingots in a blooming mill.

This unit is actually a complete plant. It is linked by 70 kilometers of electrical streams of wires and cables. Hundreds of electric motors drive the mechanisms of the unit...

Electric current brings life to this miracle. We did not exaggerate by calling it a miracle! This word came off more than once from the lips of many foreign specialists who came here to observe the work of Lipetsk steel-smelters. "We visited Britain, France, Western Germany, Italy, and Canada," declared the leader of the delegation of Belgium engineers, Leo Blyumpol', "and we have seen nothing like it at their metallurgical enterprises. Your continuous steel casting unit is the best and largest in the world..."

"What has this got to do with the power from Volgograd?"

This question was rather unexpected for the chief of the electrical steel-smelting shop, Aleksey Grigor'yevich Kubarev, who was telling us about the continuous casting of steel.

"Truly, I must confess frankly that I never thought of it. But wait... It was only after Lipetsk received current from the Volga GES imeni 22nd Party Congress that we were able to put into operation the second unit... There is, of course a direct relationship. Everything we have in Lipetsk depends directly on this current. Take this, for example...

He names many things, but the main thing, that which cuts deeply into the memory, are the epithets used by the chief of the shop to indicate supremacy, such as the largest shop, the most advanced technology, the highest quality....

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6. Converters Must Be Built Without Delay

By I. Korobov, director, Plant imeni Petrovskiy

(Pravda, Moscow, 3 Jan 62, p 3)

On 13 December of last year Pravda printed two articles entitled "Open the road to metallurgy for converters." The editors received several comments on these articles. Today we print one of the comments -- an article written by the director of a metallurgical plant, I. Korobov, in which is told the experience of the making of steel by the converter method and proposals are made for its development.

* * *

We, the metallurgists, fervently support the opinion, expressed by Nikita Sergeyevich Khrushchev at the 22nd Party Congress, that steel smelting in converters using oxygen is considerably superior to the open-hearth method. We think it entirely abnormal to pay little attention to this progressive technology despite its explicit superiority.

The oxygen-converter process was first employed in the Soviet Union in 1955, i.e., seven years ago at the Metallurgical Plant imeni Petrovskiy. Several million tons of steel were produced during that time. The pioneers of the new process were the engineers of the plant, the scientists of the Central Scientific Research Institute of Ferrous Metallurgy, the Ukrainian Institute of Metals, the Ukrainian Institute of Refractories, and the designers of "Ukrgipromez".

By this time the steelsmelters of the Plant imeni Petrovskiy have accumulated very valuable experience in making steel in converters using oxygen. In addition, the research that was carried out made it possible to markedly improve both the technology and facilities for the new method of steel smelting. All of this proves convincibly, not by theoretical calculations but by actual practice, the great superiority of obtaining the metal by the converter method.

If one will compare the results during the past year of

the work of our two steel-smelting shops -- the converter and open-hearth shops -- he can readily convince himself that converters are superior and they have a great future. The units operating in the converter shop hold a charge of 25 tons each. The open-hearth shop has furnaces holding a charge of 300 tons each. Both shops use oxygen. Following are the results of their operations.

The converter shop smelts 36 percent more steel than the open-hearth shop. The cost, in rubles, of reduction per ton of steel are, respectively, 6.58 and 10.19; the consumption of refractories, in kilograms, per ton of steel are 15 and 23; consumption of oxygen, in cubic meters, per ton of products are 59 and 37; fuel consumption per ton of steel -- 9.5 and 149 kilograms; labor productivty per worker -- 134.11 and 96.66 tons of steel per month and, finally, the area occupied by the shops -- 11,961 and 18,752 square meters. These indicators speak for themselves.

It must be noted that the open-hearth shop has limited prospects for development, while for the converter shop the possibilities are very extensive and diverse. In the converter shop, the refractories which are made of expensive and scarce magnesite and chromite, can and must be replaced by inexpensive tar-dolomites. This is impossible in open-hearth shops, as testified by our and foreign experience.

Converters make it possible to considerably increase the production of steel directly from the ore. For this purpose it is necessary to organize the output of ore fluxing briquets made of powdered waste products of blast furnaces and fine fractions of iron ore. In addition, use can be made of briquets containing ore, flux, and coal. In this case, the proportion of iron converted into steel will be still larger. In our opinion, scientists should seriously tackle this important problem.

The converted-oxygen process makes it possible to use large quantities of metal scrap, as well as to work only with pig iron and ore. Open-hearth furnaces have no such advantages. This advantage of the converter method is very important, especially in view of the metal scrap shortage.

Oxygen converters yield steel with a small content of sulfur and phosphorus; this is difficult to obtain from an open-hearth furnace.

It must be specially emphasized that converters offer the most advantageous and economical means of reduction of pig iron with a high content of phosphorus. It cannot even be compared with the reduction of similar pig iron into steel in open-hearth furnaces. In this case, the slags from the converters will be considerably richer in phos-

phorus and are very valuable as fertilizers. All of this solves in a most advantageous form the problem connected with use of high-phosphorus ores.

The converter-oxygen process is of importance for large plants operating on a complete metallurgical cycle. The high tempo and continuity of production create the most favorable conditions for rolling-mill operations which receive ingots at high temperature before they are loaded into the heating furnaces.

As to the physical and mechanical properties of converter steel, these can be made superior to those of open-hearth steel by employing industrial oxygen of higher purity. At the present time the physical properties and the chemical composition of converter steel made by the Plant imeni Petrovsky are equal to those of open-hearth steel and are superior to it in ductility, weldability, and plasticity. Consequently it is now necessary to expand the field of application for converter steel in the national economy, to use it for pipes, for rolling sheets, for many types of low-alloyed steels, and to establish for them standards.

The production of equipment for new converter shops is not a very difficult task for machine-building plants. As a matter of fact, a considerable part of the same equipment

that are those for typical open-hearth furnaces can be used in converter shops. Among these are: steel-pouring, repair, and bridge-cranes, steel-casting ladles, cars for carrying pig iron and slag, charging machines, etc.

In our opinion, in constructing new converters their capacity should be considerably larger than is practiced at the present time. The converters in new plants should have capacities of 250 tons and above. Such units assure a high productivity. Besides, the equipment suitable for the melt of such weight is already available -- it is produced for a long time for typical open-hearth furnaces.

It would be proper to note that as far as continuous casting of steel, automation, and complex mechanization are concerned, these can be employed in converter production more conveniently and more effectively than in open-hearth operations. As to the cost of constructing new steel-melting shops of the same capacity, the cost of converters is usually exaggerated. The explanation is simple. The old designs called for constructing converter shops containing bulky fireplaces, complex gas scrubbing and charge-delivery, steel-pouring cranes, and other excessive equipment. Experience proved that much of it should be simplified, and some of it should be eliminated completely.

[illegible], it is impossible to leave out of consideration [illegible] factor that [illegible] terms necessary to increase the [illegible] of the steel industry. Experience [illegible] in this respect, the advantage is on the side [illegible] technology, on the side of converters.

[illegible] of these put together offer sufficiently convincing proof that it is necessary to force the construction of converters using oxygen, ore-lime briquets, and metal scrap.

Therefore, the production metallurgists cannot agree with the ideas of the planning organs on construction of new steelmelting units. These ideas underestimate the value of converter operations. It is an erroneous standpoint. In our opinion, it is necessary without delay, as early as in 1962, to double or triple the capital investments for the construction of converters by reducing the construction of the less profitable open-hearth furnaces. This will make it possible to solve most effectively the very important problem -- to attain the production level specified by the historical 22nd Party Congress.

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9. The "BR-2" Oxygen Unit of the "Azovstal'" Plant

By S. Ivanenko, correspondent

(Ekonomicheskaya Gazeta, Moscow, 15 Jan 62)

The "BR-2" oxygen-producing unit was brought to the "Azovstal'" Plant in the city of Zhdanov. It is a large and complex unit capable of producing 35,000 cubic meters of oxygen per hour, of which 11,000 cubic meters have a purity of 99.5 percent.

This is the first units of such a capacity in our ferrous metallurgy. As soon as it is in operation at the "Azovstal'" Plant, it will increase the melting rate of the open-hearth furnaces and it will also effect with the aid of oxygen the pyro-refining of the ingots of the newly-constructed slab-mill.

The value of the "BR-2" unit extends far beyond the border of a single plant. A very early testing of this advanced model is necessary to further develop the production of similar equipment for converters. The sooner the high-duty unit is put into operation at the "Azovstal'" Plant, the earlier will be introduced the progressive method of smelting steel in converters employing oxygen.

The equipment for the unit, however, is laying idle in

Zhdanov. Its assembly has not begun yet, and it is impossible to assemble it. Why? Because there is no place where it could be installed. Not a single building is ready out of the large complex of structures which are supposed to rise already at the "Azovstal'" Plant.

Perhaps the arrival of the oxygen unit was unexpected by the Donetskiy Sovnarkhoz and the "Azovstal'stroy" Trust? No, not at all.

As early as one year ago it was decided to consider it a crash construction project entitled to a high priority. In June of last year the Donetskiy Sovnarkhoz held a visiting conference in Zhdanov. Specifically, the sovnarkhoz decided to put into operation the "KK-2" unit during the fourth quarter of 1961. Since the construction was proceeding unsatisfactorily, the sovnarkhoz approved a "firm" schedule of delivery of objects, suggested the establishment of a three-shift operation, attached to this sector the administration of "Prokatstroy", and released the latter from all other duties.

In the resolution of the visiting session of the Sovnarkhoz it is stated: "To consider the construction of the 'Kr-2' oxygen block as a high-priority project and to complete it ahead of other objects."

Well, it was a good decision. It emphasized very clearly the importance of very early operation of the oxygen unit. However, by the will of the same sovnarkhoz and of the general contractor -- the "Azovstal'stroy" Trust -- this high-priority construction found itself in the class of least important projects.

The date for putting the oxygen unit into operation has passed. But nothing has changed substantially at the construction site during the six months that have gone by since the adoption of the resolution. Nobody took care to establish a three-shift operation and to attach the construction organization to this project. On the contrary, several construction brigades were recalled even before the ink was dry on the resolution adopted by the sovnarkhoz.

"There were many of them during the summer," said the brigade leader, Vasiliy Rusavskiy, "then only two were left. The chief of the sector, Valentin Alekseyevich Prikhodko, arrived recently and issued an order to transfer the brigade of Aleksandr Babichenko to another construction site. So only my brigade was left and it contains only 10 workers."

Construction work is going on for a year. Not a single building was constructed during this time -- the work got

stuck in the "zero cycle". At the beginning of 1962 even the foundations are not completed and not a single metal structure has been installed. The question is: of what use was the visiting session of the sovnarkhoz and the approval of the schedule? As it turned out, nobody was willing to fulfill this decision. True, the sovnarkhoz made it obligatory to hold weekly conferences at the construction site and to check the course of the works. Two months ago these conferences were cancelled by the head of the "Azovstal'stroy" Trust, V. Blinovskiy, apparently because he was convinced that they are fruitless.

The picture remains unattractive. The cable equipment which arrived for the oxygen unit was transferred to other places. Brigades of assemblers are expected to arrive but no work was prepared for them. Out of the required 2100 cubic meters of precast reinforced concrete, only 250 was delivered; only 175 tons of metal structures were delivered of the required 3100 tons.

"Reinforced concrete plates do arrive but not the columns," says the chief engineer of the capital construction section of "Azovstal'", N. Belousov, "and this is because the administration of the sovnarkhoz which is directed by engineer Comrade Dorofeyev, did not order precast reinforced concrete for us."

"The situation with metal structures is even worse," adds the director of the plant, V. Leporskiy. "As it turned out, it was useless to hope that we will get them soon. Here is a convincing document... it is the reply to my letter to the Ministry of Construction UkSSR."

This document speaks convincingly about the real attitude of the Donetskiy Sovnarkhoz toward this important construction project. We will cite only one paragraph which discloses the reason for not delivering the metal structures during the past year. The deputy minister, M. Lobanov, reports that: "The Donetskiy Sovnarkhoz did not provide for the construction of metal structures for the oxygen station out of the funds allocated for 1961."

The allocation for production of precast reinforced concrete was cancelled; and no funds were allocated at all for production of metal structures. The order formerly placed with the Zhdanov Metal Structure Plant was transferred to the similar Makeyevka Plant where, of course, it remains unfulfilled.

The question is: of what use is the resolution adopted at the visiting session of the sovnarkhoz if all of its clauses remain on paper? By the way, no one was held responsible for this.

The purpose is not to breed new resolutions by the sovnarkhoz. The most important thing is for its workers to turn their faces towards this very important construction project and to concentrate for it a strong detachment of builders and material resources. Also, the party committee of Donetskaya Oblast should investigate the lag in construction.

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10. Good Progress Made by "Zaporozhstal'" Plant

By I. Malyy, party committee secretary

(Ekonomicheskaya Gazeta, Moscow, 17 Jan 62)

The metallurgists of "Zaporozhstal'" ended very well the third year of the Seven-Year Plan. In level of production the plant reached the following goals ahead of time: the goal of 1962 in smelting of steel, the 1963 goal in pig iron production, and the 1965 goal in output of rolled metal.

The national economy obtained many tens of thousands of tons of steel, pig iron, and rolled metal above the plan for the year. The obligations assumed by the Zaporozh'ye metallurgists in the socialist competition have been considerably overfulfilled.

"The past year,-- the year of the historic 22nd Party

Congress -- was very "fruitfull" in the life of our personnel," states the secretary of the "Zaporozhstal'" party committee, Ivan Vasil'yevich Malyy. "We succeeded in producing more metal above the plan than we promised, because we have found new production reserves. Exactly what are the reserves? I will explain it by citing several examples.

The blast-furnace workers raised the blast temperature to 100-130 degrees higher than it was at the beginning of the Seven-Year Plan. This alone increased the pig iron output by 105,000 tons per year.

The excellent attendance of the blast furnaces served to prolong their inter-repair period of operation. Thus, in 1961 it was planned to stop one of the blast furnaces for overhauling. As it turned out, the furnace was in such a good condition that no overhauling was needed. We will apparently repair it one year later that it was originally planned. The application of oxygen in blast-furnace operations was very effective.

New reserves were found also by the steel-smelters. In 1961 was fundamentally modernized, the second in order, the 185-ton open-hearth furnace (the first one was modernized in 1960). The weight per melt in it has been now increased to 500 tons. The significance of it? It added

approximately 125,000 tons of smelted steel per year.

Still, this is not the only technical measure taken for the steel-smelting operations. Our riveted pouring ladles were replaced with welded ones. It was done by the efforts of the plant workers. The ladles became lighter in weight, but they contain more metal. Hence, it made it possible to increase the weight per melt in the open-hearth furnaces. At the present time, our typical 185-ton furnaces are giving out melts weighing 220 tons each. How did it affect the total output of steel? I will name the following figure: it increased the annual out by 207,000 tons.

It is necessary to underscore here that the weight per melt in certain typical open-hearth furnaces was raised to 250 tons. All remaining furnaces are to be changed to handle such melts.

The rolling mill operators do not lag either in making use of reserves. In level of production, they were the first to reach the goal set for the last year of the Seven-Year Plan which they accomplished by modernizing the heating facilities, using higher rates or rolling (this was considerably helped by replacing the motors of the mill), and by introducing other new methods.

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