JPRS: 4083

30 September 1960

SELECTIONS FROM KANG T'IEH (STEEL)

Issue Number 8

- COMMUNIST CHINA -

U. S. JOINT PUBLICATIONS RESEARCH SERVICE
205 EAST 42nd STREET, SUITE 300
NEW YORK 17, N. Y.

SUBSCRIBING REPOSITORIES

University of British Columbia
Vancouver 8, Canada

Center for Chinese Studies
University of California
Berkeley 4, California

University of California Library
Berkeley 4, California

University of Chicago Library
Chicago 37, Illinois

Librarian, East Asiatic Library
Columbia University
New York 27, New York

Council on Foreign Relations
58 East 68th Street
New York 21, New York

Duke University Library
Durham, North Carolina

The Fletcher School of
Law and Diplomacy
Tufts University
Medford, Massachusetts

Harvard College Library
Cambridge 38, Massachusetts

Center for East Asian Studies
Harvard University
16 Dunster Street
Cambridge 38, Massachusetts

Harvard-Yenching Institute
Cambridge 38, Massachusetts

University of Hawaii
Honolulu 14, Hawaii

The Hoover Institution
Stanford, California

University of Illinois Library
Urbana, Illinois

Indiana University Library
Bloomington, Indiana

State University of Iowa Library
Iowa City, Iowa

Director, East Asian Institute
Columbia University
433 West 117th Street
New York 27, N.Y.

University of San Francisco
San Francisco 17, California

Institute for Asian Studies
Marquette University
Milwaukee 3, Wisconsin

University of Michigan Library
Ann Arbor, Michigan

Michigan State University Lib.
East Lansing, Michigan

University of Minnesota Library
Minneapolis 14, Minnesota

Ohio State University Libraries
1858 Neil Avenue
Columbus 10, Ohio

University of Oregon Library
Eugene, Oregon

University of Pittsburgh Lib.
Pittsburgh 13, Pennsylvania

Princeton University Library
Princeton, New Jersey

University of Rochester
Rochester 20, New York

Institute of Asian Studies
St. John's University Graduate School
Jamaica 32, New York

McKissick Memorial Library
University of South Carolina
Columbia 1, South Carolina

University of Southern Calif. Library
Los Angeles 7, California

University of Texas Library
Austin 12, Texas

Alderman Library
University of Virginia
Charlottesville, Virginia

Far Eastern Library
University of Washington
Seattle 5, Washington

Yale University Library
New Haven, Connecticut

Asia Library
University of Michigan
Ann Arbor, Michigan

Research Institute,
Sino-Soviet Bloc
P.O. Box 3521
Washington 7, D. C.

JPRS: 4083

OSO: 1033-S/a

SELECTIONS FROM KANG T'IEH (STEEL)

Issue Number 8

- COMMUNIST CHINA -

/The following are translations of articles from Kang T'ieh (Steel), Peiping, No 8, 1960./

CONTENTS

EXPERIENCE IN THE TRIAL ROLLING OF 18 KG. MEDIUM RAIL AND NO. 7.5 ANGLE STEEL IN 500/300 DOUBLE TRACK STEEL ROLLING SHOP

Kang T'ieh,
Peiping, No 8, 1960,
Page 457

Iron and Steel Research Institute,
Ministry of Metallurgical Industry; Tsingtao Iron and Steel Plant No 3

[The following is an extract from the above mentioned article.]

According to first estimates, production can be increased by 40% in [both] 18 kg medium rails and in No. 7.5 angle steel by the adoption of the double track rolling method in 500/300 small-scale steel-rolling shops.

The double track rolling system has become one item of the new technological revolution in small steel-rolling shops for the greater, faster, better and more economical establishment of socialism. By rational and organized arrangement, two shops can be made from the equipment and foundation of an already existing shop so that all equipment can be used to the fullest to increase the quantity and to improve the quality of products.

Thus, in the Second National Small and Medium Steel-Rolling Conference the Ministry of Metallurgical Industry strongly advocated the general adoption of the double-track-steel-rolling system for the development of a technological revolution in steel-rolling, with emphasis on fast and multiple production. According to this principle and in order to satisfy local needs for varied products, we applied the double track system to 500/300 small steel-rolling mills, using 6 inch

steel ingot for the 18 kg medium rails and No. 7.5 angle steel. Steel of two different cross-sections can be manufactured simultaneously. To 500/300 rolling mills, this is new, especially the rolling of No. 7.5 angle steel which has never been done before.

RESEARCH AND TEST MANUFACTURE OF 15 KINDS OF NEW STANDARD BORON STEEL

Kang T'ieh,
Peiping, No. 8, 1960
Page 468

Wang Shih-chang,
Chang Mei-ch'ing,
Kao Ch'ing-ch'uan,
Sung P'i-kang
Hsu Shu-chuang,
Iron & Steel Research Institute, Ministry of Metallurgical Industry;
Ta-yeh Steel Plant

[The following is the conclusion of the above-mentioned article.]

From results of the trial, the production of boron steel is not difficult to handle. Boron steel has very good properties. Boron has an obvious effect in increasing the temper of steel. However, much work must be done in order to investigate thoroughly and systematically the specific properties of boron steel for the further development of our boron-steel system.

Summarizing what has been said, we arrive at the following opinion:

(1) The 15 kinds of boron steel can be officially put into production according to the new standard requirements. The temper and mechanical properties of boron steel are as good as the corresponding nichrome steel.

(2) During the smelting process, the recovery rate of boron can be stabilized at 40-50%. If a electric furnace is used, the first method of boron addition is better. More aluminum (~1.2 kg/ton) should

be added to boron steel with low carbon content, and the amount of Ti can be reduced to 0.04% (including loss). Consideration can be given to the standardization of the amounts of Al, Ti, and B added to steel of various types. Modified boron steel can be reduced without using wollastonite. However, wollastonite may best be used for boron steel containing carbon, though Al can be used as a substitute.

(3) Silicon is introduced along with the addition of boron iron and titanium iron, and a portion of silicon is reduced by aluminum. Generally, after the refining process, the amount of silicon is increased by approximately 0.10% and this should be estimated before hand. After the addition of boron an adequate period of time should be allowed to pass before carrying out the casting process so that the dispersion of boron can be even.

(4) Boron steel is easy to forge and when steel ingot has been converted into steel, the gradual cooling process can be reduced or even cancelled. Because of low degree of hardness, the flame can be reduced easily.

(5) Due to the high degree of quenchability, strength and hardness of boron steel containing carbon, research on boron steel with low carbon content may be considered for the making of accessories that do not need a very hard core.

(6) Boron steel of different dimensions but with a compressibility larger than 4 has basically similar mechanical properties.

(7) Boron does not increase the tempering stability of steel nor is there obvious indication that it is disadvantageous to the tempering brittleness of steel at room temperature.

(8) The mechanical properties and quenchability of boron steel, which is tempered after initial roasting, are slightly better than that quenched directly without roasting. However, the difference is not great.

(9) Whether there is any increase in non-metallic impurities in boron steel still awaits investigation. Besides the direct effect of boron, indirect effect due to the addition of aluminum and titanium should also be considered.

(10) Boron has very strong effect in raising the quenchability of carbon and alloy steel. In carbon steel the hardening factor of boron is about 2-2.5 and about 1.5-2 in alloy steel. When permanganates, manganese molybdenites and chromium manganates are present, the effect is even stronger.

(11) The rate of growth of crystal in boron steel is about 7-8 level at temperatures below 950°C, so basically there is no coarsening. At temperatures above 1000°C growth begins and sometimes uneven crystals appear but since heat treatment is usually below 1000°C, there is no practical problem. Aluminum has a retarding effect for crystal growth in steel but since the amount of Al added in forging boron steel has already been too much, the effect is greatly reduced. This may be the reason that the crystal size of boron steel grows easily. Ti has a stronger effect on the crystal growth of boron steel at high temperature. This is worth-while to investigate.

(12) In cross-sections of steel of larger dimension boron distributes quite evenly and preliminary investigation shows no refraction.

(13) Too much boron (0.007-0.008%) will make the steel brittle thus reducing the ballistic tenacity of the steel.

(14) However we should be tolerant of the amount of boron in steel. Boron should be measured by the quenchability of the steel. Quenchability must be raised considerably if boron diffuses into steel. Therefore, measurement based on quenchability is very reliable.

(15) Of the 24 furnaces, furnace 20CrMnB was found to have a superheating phenomenon. This should be noted. During actual manufacture, temperatures should be controlled not to exceed 1250°C.

TRIAL USE OF HIGH ALUMINUM NON-FIRE BRICK ON THE TOP OF ELECTRIC FURNACES

Kang T'ieh,
Peiping, No. 8, 1960,
Page 479

Iron and Steel Research Institute, Ministry of Metallurgical Industry;
Po-shan Shantung Refractory Materials Factory, Shantung

[The following is an extract from the above-mentioned article.]

High aluminum non-fire brick used for the top of electric furnaces shows good stability of heat and volume; seldom is there cracking or falling apart; duration is longer than fire bricks of the same class.

Refractory materials used for the electric furnace directly affect the various indices of production of steel ingot. Since 1955, high aluminum refractory materials have been widely used for electric furnace tops and have adequately indicated their excellence.

As a consequence of the rapid advancement of the metallurgical industry and the ever-increasing strength of forged substances, the demand for refractory materials both in quantity and quality is also increasing day by day. In recent years, the duration of electric furnace tops have shown tendencies of becoming shorter and shorter in certain plants. One of the reasons is that the resistance to rapid change of temperature in high aluminum bricks is not sufficient. Under high temperature the surface of the brick frequently falls apart in lumps.

Beginning [experiments] in 1957, the Iron and Steel Research Institute has succeeded in making a type of high aluminum non-fire brick, first in the laboratory then in the Shantung Refractory Materials Factory. This type of brick simplifies the production process and lowers the cost of production, and it has much better heat stability and density than the present high aluminum fire bricks. In order to determine its technological and economic value in industry, a test was carried out on the top of No. 6 electric furnace in a certain factory in March 1959. The results showed good efficiency and brick duration exceeded the average duration of high aluminum bricks of the same class used in recent years by that factory.

NEW METHOD FOR THE DETERMINATION OF SULFUR CONTENT IN COAL

Kang T'ieh,
Peiping, No. 8, 1960,
Page 482

Shen Yu-ming*,
Scientific Research Laboratory,
Kiangsu Hsu-chou Mining Bureau

[The following is an extract from the above-mentioned article.]

The photoelectric colorimetric method for the determination of sulfur in coal yields high accuracy, high efficiency and simple manipulation, and the result is the same as the gravimetrical method. It is suitable for the analysis of large samples.

At present, there are many standard (gravimetric) methods and volumetric methods for the determination of sulfur content in coal. Among them, the gravimetric method of using barium sulfate is more generally used. However, due to the longer time consumption of this method (it takes 12 to 16 hours for each determination), it is hard to meet the requirements of a great leap in production. The use of colorimetric method proves that it is suitable for the anlaysis of massive samples.

[The following is the conclusion of the above-mentioned article.]

(1) The colorimetric method for the determination of sulfur content in coal is easy to handle and the result is basically the same as gravimetric methods. If

* With Comrade Sun Ching-ying

the process of ignition is well arranged (for example, samples for the next determination can be weighed or colorimetric determination of samples from the earlier experiment can be carried out while samples are being burnt), 15 samples can be analyzed in one 8-hour day.

(2) Compared to gravimetric methods, efficiency is increased by 5 times and 4 kilowatt-hours of electricity saved. Much labor is saved in analytical work (for example, the tedious work of washing the beakers twice as in carrying out gravimetric methods).

(3) The manipulation of this method is a little harder than handling gravimetric methods, but the problem can be solved by noting the few experimental conditions mentioned above.

TO USE COKE-PULLING BAR FOR COKE EVACUATION

Kang T'ieh,
Peiping, No 8, 1960,
Page 484

Honan P'ing-ting-shan
Municipal Coking
Plant No. 1

[The following is an extract from the above-mentioned article.]

Red Flag No 2 coking furnace orginally required manual operation for coke scratching. Therefore workers had to work in the open under a temperature of 900°C. If coke scratching is carried out smoothly, it takes 15 minutes for each furnace, otherwise it takes one hour more if contraction of the cakes is bad or the temperature is low. In that case, too much cool air enters the carbonization chamber thus making the temperature drop abruptly and at the same time the furnace is set into extreme vibration. This will reduce the life of the furnace and it also crushes the larger coke-lumps and thus lowers the rate of caking.

We have been to Shih-chia-chuang to see the hand operated coke-pushing machine which is very good. However, its cost is too high and for its operation the existing furnace door has to be modified, pillars and belts have to be added. Much difficulties are involved in constructing this equipment, especially for the gas collecting pipe built of bricks. Nevertheless it has been inspiring to our factory. From pushing coke we think of pulling coke. After many experiments, it is proved that this method of pulling coke is simple to apply and is a good way to solve the problem of manual coke pulling, to increase efficiency and to reduce the burden of workers. The success of this experiment has a definite significance in prolonging the life of No 2 simple furnace.

(1) Due to its simplicity, promotion for general use is convenient. To construct a set of coke-pulling bars costs only about 700 yuan and there is no modification of furnace. It saves more than 6,000 yuan compared to the hand-operated coke-pushing machine. Its most important characteristics are its simplicity of construction and manipulation and the economy of material.

(2) It is fast to pull and efficiency is high. Only 4 minutes are needed to clear a furnace of coke, which is 5 to 10 times faster than by hand. Because of quick evacuation of coke, the furnace door can be closed in time to keep the temperature up thus maintaining high production.

(3) The whole cake of coke is pulled away from the carbonization chamber thus prolonging the life of the furnace by reducing vibration.

At present, coke-pulling is still done by workers and slot bricks must still be placed in the carbonization chamber, so a longer period of time is required. With gradual mechanization, machines powered by electricity can be used for manual labor. In the meantime, the question is how to replace slot bricks and to leave a hole in the bottom of the carbonization chamber for the coke-pulling bar and how to improve the door of the furnace so that the evacuated coke can be as far away from the door as possible.

"HSIEN" WOOD FOR SHAFTING

Wang T'ieh,
Peiping, No. 8, 1960,
Page 488

Canton Metallurgical Industry Bureau

[The following is an extract from the above mentioned article.]

Due to the high coefficient of friction for bronze, the 250/400 rolling mill has a short utilization duration and high electricity consumption. The bakelite shaft produced in Canton has a lower coefficient of friction than bronze and a higher degree of hardness and greater compressive strength than shafts of the same type made in Shanghai. Despite this, its [the Canton shaft] resistance to friction is not yet up to standard and also its supply is not adequate.

The T'ai-ch'ang Steel-Rolling Mill in Canton suggests the use of "hsien' wood (material used in the construction of native oil-crushing cisterns) for shafts during the movement for technological reforms and revolution. Oil-containing "hsien" wood is used for making shafts in that factory and the results have been fairly good. Not only is the problem of shaft supply solved but this also increased production and lowers costs.

Compared to bronze shafts the "hsien" wood shaft has the following advantages:

(1) The resistance to friction is good. Generally the life of bronze shafts in the 400 machine is only 120 hours, in the 250 rolling mill, 150 hours, whereas the life of "hsien" wood shafts in the 400 mill is 300 hours, in the 250 machine, 360 hours, which is an increase of two-fold.

(2) Consumption of electricity is reduced. Bronze shafts consume 188.5 kilowatts/hour (tu/hsiao-shih),

whereas "hsien" shafts consume only 150.0 kilowatts per hour.

(3) The cost is low. A 400/250 rolling mill saves 6,000 kg of bronze per year. A bronze shaft costs more than 2,700 yuan but a "hsien" shaft costs only 600 yuan.

In practice, some "hsien" wood has low oil content so it cracks and is worn out after a short period of time. Therefore, before making the shaft, the wood should undergo oil treatment to increase the oil content and to prolong the time for efficient use.

SUBSTITUTION OF SUGAR BY GYPSUM AS A BINDING AGENT

Kang T'ieh,
Peiping, No 8, 1960,
Page 489

T'ai-kang Refractory Materials Factory

[The following is an extract from the above mentioned article.]

Organic binding agents are the indispensable raw materials for the production of silicon bricks. Due to the rapid advancement of the refractory materials industry, such agents are gradually running out of supply. For a long time, our factory has been using sugar dilute and sophora japonica sap as the binding agent. They are very expensive and, in addition, because sugar is processed from food, the purpose of food economy is not served when nearly a thousand tons of food are processed each year for sugar. The sap comes from Hopeh. Last year production was hindered due to inadequate supply. Although various paper mills collect a large amount of waste pulp solution, yet the need is still not satisfied because the solution is too diluted (specific gravity 1.04-1.1; required specific gravity is 1.23 to 1.24).

Owing to inadequate supply of good binding agents, the rate of finished-good production has dropped from 95% to 92%. Emphasising this point, we performed a

series of systematic experiments using soft clay, gypsum and sugar, and in some experiments we did not use binding agents at all. Results show that on addition of one percent of soft clay, although the strength is increased, the resistance to fire is lowered. The strength is very low on the addition of 0.5-0.7% of aluminum sulfate. Bricks without binding agent have the least strength, the shape of the product is irregular and there are small holes too.

Gypsum is the second best binding agent next to sugar and it is stronger. The product is complete and its chemical and physical properties are up to standard. We have tried to mix calcinated lime powder with the milk of lime, but because the quick coagulation of lime makes mixing difficult, we have now adopted the method of dry mixing. When silica powder goes into the wet grinder, lime stone powder is added through a 1.5 mm tube. After mixing for 2 minutes, other substances are added.

According to native experience lime stone powder is considered best if it does not adhere to a dry glass rod, if it is slippery to handle or if it gives a clinging sound when it forms a dry plate after treatment with water. Experiments and actual production show that a 0.7% of lime stone can successfully substitute for sugar or sophora japonica sap as binding agents. The advantage of using lime stone is its low cost and it does not lower the resistance to fire. The calcium oxide can also be a mineralization agent. The rate of finished production can be raised from 92% to 96% and more. What is more important, the resources of gypsum are plenty so that there will be adequate supply for continuous and fast production.

WAYS FOR INCREASING PRODUCTION IN OUR MODERN COKING FURNACES

Ch'en Kuo-chu,
Wu-kang Coking Plant

Kang T'ieh,
Peiping, No 8, 1960,
Page 495

[The following is an extract from the above mentioned article.]

During the year of the great leap, although coke production developed tremendously, yet it is still behind iron and steel production. In order to change such a state of affairs workers are now trying their best to increase production, so that good coke can be made out of bad coal, and to increase chemical products. In order to further the climax of technological reforms, I would like to exchange my opinion with other workers for the sake of mutual inspiration.

Most of the modern coking furnaces in our country consist of coal-pushing, coal-loading, coking and firing compartments. There are also furnaces that have coal loaded on the top. They all have limitations due to the original designs. Although it is possible to increase the rotation of the machines, yet if it were to be doubled or increased by many times it is limited by the rotation of the motor. Therefore if we want to increase production just by shortening the caking time, we will be handicapped by the slow rotation of the motor. In my opinion, the main targets for technological reforms in coking furnaces are:

(1) Increase coal accommodation: If the volume of the furnace does not change, increase in coal only means increase in heat consumption and not the increase in caking temperature nor does it prolong the time for caking. Therefore, an increase in coal accommodation

helps production only on the basis that there is not addition of equipment and no increase in temperature. Besides making arrangements to see that the furnace accommodates coal to its fullest, the main idea is to raise the specific gravity of coal lumps. The specific gravity of coal is only half of the specific gravity of solid, compact coal. In other words, in a lump of coal, 50% of the volume is empty space. If we could reduce the empty space to 20%, we would increase the actual weight of coal in each furnace by 50%. That is to say the amount of coke can be increased by 50%. We might do that by adding binding agents such as oil. Besides, we could choose the optimum particle size and water for maximum coal accommodation so that the maximum specific gravity can be attained without affecting the quality of the coke and other byproducts.

(2) Shorten the time for caking: If supervision is strengthened, existing equipment is enough for shortening the time by one half or one-fourth of the designed indices. However, if the time for caking is shortened by raising the caking temperature, this will not only be handicapped by the heat resistence of the refractory bricks but will also bring trouble to the whole operation. What is more important it will lower the quality and quantity of the chemical products. Therefore, the shortening of time must be carried out only on the condition that the caking temperature is neither raised nor lowered. I think there are three aspects to consider in shortening the time of coking.

(i) Institute drying of coal so that coal drying time in the furnace is shortened.

(ii) Increase the evenness and stability of the temperature. Decrease the range for raising the temperature so that coke is formed at the lowest possible temperature.

(iii) Try to increase the heating phase at the center of the cake. Due to the poor conductivity of heat in coal, at the latter stage of coking a long period of time has to pass just for the coke formation at a very thin layer at the center of the cake. We can shorten the time by 1.5 to 2 hours if we could think of a good method of conducting heat into the core of the cake. We could proceed in the following two directions: one is to shorten the time difference between surface coke formation and central coke formation by increasing

the heat conductivity of coal, which can be accomplished by the addition of substances of high conductivity of heat; the other is to direct the hot gas inside the furnace to pass through the center of the cake so that the latter is pre-heated first.

NEWS OF MECHANIZATION AND AUTOMATION IS RAPIDLY SPREADING

Kang T'ieh,
Peiping, No 8, 1960,
Page 497

[The following are extracts from the above mentioned article.]

The movement for mechanization in steel-rolling shops is vigorously developing. Since the opening of the conference for Exchange of Experiences in Small 400/250 Steel-Rolling Shops by the Ministry of metallurgy in December 1959 and the opening of training classes in the use of pulleys (wei-pan), news that the pulleys are being used in steel-rolling mills comes from everywhere. In many units, such as the small, old rolling-mill at the Soochow Iron and Steel Plant, the use of pulleys has been completely realized. The Nanking Leap Forward Iron and Steel Plant has manufactured a simple erect pulley. In many factories complete mechanization is on its way to completion. For example, the Canton Chieh-ho Iron and Steel Plant required only four and one half days to completely mechanize a newly-constructed 400/250 rolling mill. Productivity was doubled and the number of workers was reduced from 24 to 9. In Shanghai, there are already three mills which do not require manual operation. At present, this movement is continuing to develop.

* * *

The Hsin-hu Iron and Steel Factory has developed a closed automatic rotating table (chuan-p'an) in its shop. Steel ingot when coming out from the roasting

furnace to the rolling mill goes to the proper place as required by the mill. In the past, four workers were needed in each shift to work under high temperatures. All that is needed now is just one worker on the operating platform. In order to liberate 12 workers from working under high temperatures only one "open hearth" rotating table of native and foreign combination has been constructed... Its characteristics are: very high mobility, scraps cannot spread out, the main axle can move up and down, and the boiler wheel is pressed both on top and bottom by bronze shafts.

* * *

The Tung-haiang Steel Plant is progressing toward semi-mechanization and complete mechanization. Within the factory 10 kilometers of light rails have been constructed to realize light transportation.

Besides linking the 6.5 kilometers of route from the railway station to the mine, transportation lines for raw materials, by-products and also triangular transportation lines have been constructed between various furnaces. There are also transportation lines, communication lines and rotating table lines between various resources so that every unit is organically linked together. Transportation within the factory has been changed to a great extent and is kept going continually. Efficiency has been raised and labor is saved. From the railway station to the factory, one person used to be able to transport only one ton of material per day, but not since each person is given a cart, one can transport 9 or 10 tons. Efficiency has been increased by 9 times. Slag from the 40-cubic meter blast furnace is now carried away by carts so that slag workers have been reduced from six to just one, an increase in efficiency of five times.

* * *

From 31 March to 3 April the Cold-Form Steel Production On-the-Spot Conference was held in Shanghai by the Ministry of Metallurgical Industry. In attendance were some 70 individuals, representing An-kang [Anshan], ten Shang-kang [Shanghai] plants, various [illegible] metallurgical bureaus of concerned provinces and cities, scientific-technological commissions, Construction

Science Research Institute of the Ministry of Construction Engineering, Wei-shu-yen Auto Repair Plant of the Ministry of Railways, Ch'ang-ch'un Automobile plant No. 1, Shanghai Auto Plant, Ferrous Metallurgy Design Main Institute (Tsung-yuan), Peiping Iron and Steel Industrial College, T'ung-chi University, as well as other concerned enterprises, scientific research organs and design departments.

Director Liu of the Iron and Steel Division of the Ministry of Metallurgical Industry emphatically pointed out that in order to increase the varieties of steel and to practice economy in metals, we must grasp the production of cold-form steel and must increase its production. The whole nation should be activated to carry out designing, building, production and research at the same time with the fastest pace and with the self-help spirit and the method of combining native and foreign, to control this new technical field of cold-form steel and to build up a whole system of cold-form steel.

Representatives from Shanghai and Anshan spoke on their experience in the production of cold-form steel and strip steel. Representatives from Ch'ang-chun Automobile Plant No. 1 and the Construction Science Research Institute talked on their experience in the use of cold-form steel. All the representatives also observed the production of cold-form and strip steel.

After discussions, all the representatives concurred in and understood the main points in the production of cold-form steel: (1) A large amount of metal raw materials can be saved; the weight of structures can be reduced and the work can be accelerated. These advantages are especially obvious in construction and in automobile manufacutre. (2) Varieties of steel can be greatly increased because cold-forming can produce cross-sections that cannot be produced by steel which is rolled while hot. (3) Small rolling mills can be used for heavy materials thus leaving some larger mills for making heavier rails and medium and thick plates.

Lastly, plans for the distribution of cold-form steel, scientific research, increase of varieties, and standards of certain types of products were proposed and submitted to various concerned units for approval.

* * *

From 11 March to 13 March, the Shantung On-the-Spot Conference for the Mechanization of Small Rolling Mills was held in Tsingtao. The representative from Tsingtao talked about his experience in fitting the "surrounding-disk" (wei-p'an) into the mills and in automatic streaming and three-headed steel feeding.

* * *

The heroes who attended the Chiao-tao Shih [Coking City] gathered at the Chiao-nan and Chiao-pei Iron and Steel Plants. They conducted a technical show in order to exchange experiences in steel production. The show included 10 items such as procedures in front of the furnace, car loading, mechanical crushing, artificial minerals, automatic ignition in native coking furnaces, automatic closing of gates, sintering of ores, safe rotation of blasting machines, etc.

Much experience was exchanged after the show and discussions, experiences such as the manipulation of bow-shaped steam machines for closing openings, double-track waste isolator, quick casting, loading the 22 cubic meter furnace in the Chiao-nan Plant using small cars, 360-day safe transportation of blasting machines, experiences in cylindrical lime roaster and in the sintering of ores, etc.

* * *

The use of anthracite for smelting steel is an important step in the development of the iron and steel industry and at the same time it opens a new path to fuel for steel production. The No. 1 furnace in the Ch'uan-chou Iron and Steel Plant in Fukien is fed with 100% anthracite and operation is smooth and steady. The productivity of this 6-cubic meter furnace has always been high. One ton of iron consumes approximately 1.2 tons of anthracite and the iron produced is completely up to quality standards.

* * *

In referring to the chemical composition of chromium ore, we calculate the chromium content in the

ore. As usual desulphurization and decarbonization are carried out beforehand. Considering the possibility of decarbonization in chromium ores, we melt the carbon completely and adjust it in such a way that it is about 0.7% above the limit. At the latter stage of oxidation when sulfur has only less than 0.018% left it is added to chromium ore and the temperature is raised for the extraction of slag. The slag is diluted and is added to red-hot chromium ore in separate portions. For every ton of steel 304 kg of iron silicate (45%) is added for deoxygenation. Then combine a portion of tourmaline and carbon powder to make weak tourmaline. After about 15 minutes, reduce it by silica powder and charcoal powder, and the same alkalinity is maintained. The whole reduction phase is normal and the chromium retention in steel increases vertically. The decarbonization by the addition of chromium ore also meets the requirement. This proves that although the oxygen content in chromium oxide is higher than iron ore yet the decarbonization value is equivalent to that of iron ore 10 minutes before the formation of steel. Adjust silicon-manganese-chromium as well as the temperature and steel can be produced by the addition of aluminum. This method can be used in areas where iron chromate is in short supply because chromium ore is used to make alloy steel of low chromium content. During manufacturing, 65% of iron chromate can be saved. (Wang To-hun, Ma-an-shan Iron and Stpel Company).

* * *

The Chung-nan Steel Rolling Mill at Soochow is a locally-operated and poorly equipped small factory. The two-roller rolling machine is made up of discarded parts. In spite of its small size, it is outstanding. The various measuring tapes made of 0.02 mm steel strip find their market even in foreign countries. At the beginning of 1960, under the leadership of the Party, workers of the factory paid special attention to the hardness of the roller crusher, the regulation of crushing stress and central heat treatment. They have solved the problems of distortion of elasticity in the roller, surface defects, lubrication, and heating system. They have been successful in the mass production of No. 45 medium carbonated steel strip of thickness 0.01 mm, width 50 mm and length of 30 meters. The surface is

smooth and shiny; the measurements exact and both elasticity and hardness meet requirements. (Fan Chien-hsing, Kiangsu Metallurgical Design Institute).

* * *

Recently we have succeeded in using the "surrounding-disk" (wei-p'an) of No. 7.5 angle steel in the 360 rolling mill and in "surrounding-disk" of 8 kg light K rail. Utilization has been very good. (Liu K'un, Shanghai Iron and Steel Plant No. 3 Factory).

10,122

- END -

THIS PUBLICATION WAS PREPARED UNDER CONTRACT TO THE
UNITED STATES JOINT PUBLICATIONS RESEARCH SERVICE
A FEDERAL GOVERNMENT ORGANIZATION ESTABLISHED
TO SERVICE THE TRANSLATION AND RESEARCH NEEDS
OF THE VARIOUS GOVERNMENT DEPARTMENTS