

# Continuity and Change of the Iron and Steel Industry in China

—the Case of the Northeast District in the Late 1940s\*—

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## 1. Introduction

Historical analysis of the steel industry of Manchukuo is possible from two perspectives. (1) One approach is to comprehend the economic structure of the Empire of Japan before the World War II, i.e. to clarify what role the Manchurian economy played in the prewar Japanese economy. (2) The other is to make clear what influence the advanced industrialization in Manchukuo exercised upon the post-war Chinese economy. Toshiro Matsumoto [1988, 1995a] studied from the former perspective, whereas this report is from the latter. Next to no one has ever analyzed the Manchurian economy by looking back from the post war period<sup>1)</sup>.

The aim of this paper is to explain the post war legacy concretely. We will focus our attention on the mining and iron-manufacturing divisions of Showa Iron & Steel Works (昭和製鋼所, Manchuria Iron & Steel Works at Anshan in 1944-45, Anshan Iron & Steel Co. after the war), which was a pivotal enterprise in Manchukuo. We will pay attention to the facilities which were used in the iron and steel industry and survived though the second half of the 1940s. The damaged facilities were repaired, and went back into operation in the early 1950s.

The iron and steel industry in the northeast district of China was severely affected by the war in the 1940s. On the other hand, a very quick recovery was

made in iron and steel production up to the prewar highest level during 1949-52. Soon after that, Anshan Iron and Steel Co. became one of the most important production bases for iron and steel in China as it had been in the prewar period. In spite of the severe damage by the war they made a remarkable recovery in production.

War damage in heavy industry in the Northeast: The heavy industry in the northeast district of China was seriously damaged in the second half of the 1940s, which is indicated in Tables 1 and 2. The damage ratio of the iron and steel industry reached 50-100 (60-100)% in 1947 (Table 1). In respect to the facility capacity, the damage percentages of the iron and steel industry were as high as 86% in ore-concentrating plants, no less than 66% in coke plants, and 50% in open-hearth steel plants (Table 2).

The recoveries in iron and steel production: The output of the Chinese iron and steel industry recovered to the prewar level in 1949-52. The output of pig iron was 1,929,000 tons, crude steel 1,349,000 tons, and rolled steel 1,312,000 tons in 1952. They exceeded the levels of 1943, by 7.1%, 46.1%, and 91.2% respectively. The recovery of production in this period was actually accomplished by repairing the residual facilities that had been built up in the age of Manchukuo/Republic of China and were left untouched by the Soviet Union's army (Nicchu Keizai Kyokai

Table 1 The Damage of Removal by the Soviet Army

industrial sector	Pauley mission		Jpn. technologist	
	removed 1,000 US\$	damage %	removed 1,000 US\$	damage %
electric pow.	201,000	71	219,540	60
coal mining	50,000	90	44,720	80
steel	131,260	50-100	204,052	60-100
railroad	221,390	50-100	193,756	50-100
machinary	163,000	80	158,870	68
liquid fuel	11,380	75	40,719	90
chemical	14,000	50	* 74,786	33
			food etc.	
			59,056	50
cement	23,000	50	23,187	54
nonferrous	10,000	75	60,815	50-100
textile	38,000	75	135,113	50
pulp, paper	7,000	30	13,962	80
radio, tel. etc.	25,000	20-100	4,588	30
total	895,030		1,233,164	

source : Nishimura[1985]p. 453, Yamamoto[1986], Tabata[1990]p. 40.

note : \* =chemical.

Table 2 The Removed Production Capacity by the Soviet Army

		1945. 8.	removed	remains	ratio (%)	unit
iron & steel	mining	4500.0	3860.0	640.0	14.2	1,000 ton
	concentrating	990.0	810.0	180.0	18.2	1,000 ton
	coal separating	1500.0	1500.0	0.0	0.0	1,000 ton
	cokes	2075.0	1375.0	700.0	33.7	1,000 ton
	blast furnace	2500.0	2350.0	150.0	6.0	1,000 ton
	copper refin.	1330.0	830.0	500.0	37.6	1,000 ton
	open-hearth steel	1000.0	500.0	500.0	50.0	1,000 ton
elec.	generator	174.4	144.4	30.0	17.2	10,000 kw
cement	equipment	182.0	123.5	58.5	32.1	10,000 ton
machin.	equipment & materials	33900.0	15900.0	18000.0	53.1	10,000 US\$
spinning	spi. & weav. machines	630.6	344.6	286.0	45.4	1,000 spinning

source : Nakagane[1986]p. 53.

[1977]p. 2). The output in Anshan(鞍山) was recorded as pig iron 700,000 tons in 1952(the net output 2,244,000 tons in 1943), steel ingots 770,000 tons in 1952(the net output 560,000 tons in 1938), and rolled steel 760,000 tons in 1953(the net output 750,000 tons in 1943). Production of steel ingots and rolled steel recovered to the maximum pre-war levels at the beginning of the 1950s(N.K.C.[1956a]pp. 47, 64, 75-6). Since that time, Anshan has

occupied a prominent position in the Chinese iron and steel industry and the steel ingot output of 4,050,000 tons in 1958 accounted for 36.6% of the whole steel ingot output of 11,080,000 tons in China (Nicchu Keizai Kyokai[1977]p. 3 ; Chugoku Kenkyusho ed.[1962]p. 109).



## 2. War Damage of Showa Iron & Steel Works—Overview of the Process

### (1) Four instances of war damage

Showa Iron & Steel Works(Anshan Iron & Steel Co.)suffered war damage 4 times in the 1940s. The first damage was caused by air raids made by the U.S. air force a couple of times in 1944. The company's operation rate, which had been reduced to as low as 60% due to those raids, recovered to the level of 80% in the August 1945. The other war damages occurred after the collapse of Manchukuo. The second damage, i.e. the confiscation of important machines and manufacturing instruments in the factories by the Soviet army, was done in September-November, 1945. This was the heaviest loss for Anshan Iron & Steel Co. The third instance of damage followed immediately after the withdrawal of the Soviet army from Anshan. In the extremely cold winter, the Chinese people who lived in the vicinity of the company gathered wooden goods for fuel, and stole equipment from the factories and sold them in the black market. The Soviet army encouraged the Chinese people to do more plundering, and recorded scenes of looting in their films(Pauley[1946]pp. 10, 26). After many bloody battles between the Nationalist army(国府軍) and the Eighth Route Army(八路軍), the Nationalist army occupied Anshan in April, 1946(Matsumoto[1995d]). The Nationalist army established a Northeast Correspondent's Office, Economy Division(經濟部東北特派員辦公處=東特處)in Shenyang(瀋陽)in the beginning of April 1946. By establishing the Anshan Office(鞍山辦事處)of the Northeast Correspondent's Office as an annex to the division on April 15, the Nationalist army started the recovery work(Ziyuan

Weiyuan-hui[1947]p. 15). However, the Eighth Route Army re-attacked Anshan on May 24, 1946 and occupied the city on the next day, by which the Anshan Office was obliged to be relocated to another place for the time being. The office was re-established in Anshan on June 3, but the Eighth Route Army exploded part of the facilities of Showa Iron & Steel Works. This was the fourth instance of war damage to the company.(For the further details see Matsumoto[1995b, c, d].)

Most of the destroyed or looted machines and manufacturing instruments were the pivotal constituents of the production facilities, and were the highly advanced machinery of that time. Many working sites were not used, and some sites including mining stations were destroyed almost to annihilation(Matsumoto [1995c]).

### (2) Dismantling of the Anshan Iron & Steel Co.

The Z.W. again started to rebuilt the factories in July, 1946. The First Reconstruction Plan(FRP was the first and the last plan of the Z.W.)was supported by Japanese technical experts. The repairing speed was much faster than the Z.W. expected until May 1947. The Eighth Route Army made the fifth attack. The Nationalist Army sent the reinforcements and reoccupied the cities in July, 1947, Siping(四平)for example. The sixth attack of the Eighth Route Army began in October, 1947. Reconstruction work was broken three times during the period of Z. W.(1946.5-6. 1947.6-7, 1947.10.-). The FRP was scaled down by these breaks.

Anshan was besieged by the Eighth Route Army in December, 1947. The labors of the company were thrown into agitation. The final street fighting began

in February, and Anshan Iron & Steel Co. fell into disorder. The Eight Route Army occupied Anshan in the latter part of March (Matsumoto[1991]c, e).

### (3) Flexibility of the Communist Party's leadership

In March, all leading members of the Z. W. who desired to go back to the Nationalist Party's districts were given a pass and funds for their journeys. They founded the temporary office (鞍鋼臨時辦公處) in Beijing to consider the remedies. The office was closed on October 1, 1949.

Undoubtedly the Eight Route Army planned to use the technical experts and managers of the Nationalist Party on a larger scale after the victory. But it can also be said that the attitude of the Eight Route Army was considerably generous. Sun Yueqi (孫越奇), the Vice president of the Z.W., told later that he was very impressed to hear the news about the released leaders. A favor for Socialist China spread among the Z.W. In 1949, many members of the Z.W., including Sun, rose up against the Nationalist Party (「保產保廠起義」). This was the only rebellion made by the ministry of the Nationalist Government (Zheng • Cheng • Zhang [1991], Ishikawa[1991]).

## 3. Mining and Ore-concentrating Departments

We should pay special attention to the degree to which the mining and ore-concentrating departments were damaged, and how they recovered, because the degree of damage was tremendous, and a special condition was noted with the mining facilities in Anshan in relation to poor mine disposal.

### (1) Mining department :

(a) In the period of Manchukuo, the labor management was cruel and full of racial prejudice, and Chinese were forced to work in the departments. For this reason, great resentment developed among the Chinese people, and at the time of the last stage of the World War II, many Chinese laborers attacked the mining facilities and the Japanese people who worked there. Also after the collapse of Manchukuo, the mining department was especially affected by the repeated upheavals.

At the same time, the suspension of drainage functions and the power failure caused a flood in the mines, and made it more difficult to resume the mining work. In addition, the Soviet army removed important facilities and aggravated the situation. The facilities removed from the major mining sites were as follows : 6,400 tons in Dahushan (大孤山), 1,100 tons in Gongchangling (弓長嶺), and 470 tons in Yingtaoyuan (櫻桃園) (Pauley[1946]p. 98).

Table 3 shows the degree to which the production capacity of the individual mining stations was affected. In the major mines such as Dahushan, Yingtaoyuan, and Gongchangling, the production capacity was greatly reduced to a level as low as 10 to 40 percent of the normal one. In the Dahushan mining site, it was lowered by 93%. The reason was that all 3 air compressors, 6 of the 11 hoisting machines, 6 of the 11 crushers, 7 of the 9 electric shovels, and 2 of the 3 liquefied-oxygen machines had been taken away by the Soviet army.

In Yingtaoyuan, the fall in production capacity was 84%. Here, it was believed that there had been no confiscation of the facilities by the Soviet army although the damage from looting by "violent residents" was a harsh one (N.K.C.[1956a]p.



Table 3 Extent of Damage to the Mining Sites

	equipment	1,000 tons, percentage of damage		
		original status	loss	%
Gongchangling (rich ore)	capacity(ton)	1,250	850	68
	air compressor	19	7	37
	hoisting machine	8	4	50
	crusher	8	2	25
Yingtaoyuan (rich ore)	capacity(ton)	250	210	84
	air compressor	6	6	100
	hoisting machine	8	6	75
	crusher	2	2	100
Dahushan (lean ore)	capacity(ton)	3,000	2,800	93
	air compressor	3	3	100
	hoisting machine	11	6	55
	crusher	11	6	55
	electric shovel	9	7	78
	liquefied-oxygen	3	2	67
Ore-raosting	capacity(ton)	2,300	2,100	91
	furnace	23	0	0
Concentration	capacity(ton)	990	810	82
	magne. separator	11	6	55
Middling Concentration	capacity(ton)	220	220	100
	ball mill	3	3	100
Sintering	capacity(ton)	1,000	1,000	100
	furnace	10	10	100
Buriquetting	capacity(ton)	400	150	38
	furnace	10	0	0

source: Umene[1946]p. 37, Z.W.[1947]p. 24.

27). However, it is demonstrated that Yingtaoyuan suffered from damage caused by the Soviet army (Pauley[1946] pp. 98-101). All the air compressors and crushers were lost, and 6 hoisting machines out of 8 were also lost. Notwithstanding that the damage in Yingtaoyuan was evaluated as 470 tons in the amount of equipment removed and was rather small compared with that of the other 2 major mines, the war damage brought about by the repeated battles was quite severe. The fall in production capacity was more distinct than in Gongchangling.

Even in Gongchangling, where the war damage was relatively slight, the production capacity fell to 68%. 7 of the 19 air compressors, 4 of the 19 hoisting

machines, and 1 of the 8 crushers were taken away by the Soviet army. All the hoisting machines were lost, and 5 locomotive cranes and 6 air compressors were also lost (N.K.C.[1956a]p. 27).

(b) As is explained in the above, Showa's mining department lost its production function in the second half of the 1940s. There are very few sources to elucidate the recovery process of this department. However, from the fact that the concentration department and pig-iron manufacturing/rolling department resumed operations, we can deduce that the production capacity of the mining department recovered within several years.

(2) Concentration department

Table 4a Extent of Damage to the Crushing Shops

1954. 7.

	1945. 8.	1945. 11.	1954. 7.	No. 1 Cru. Shop	No. 2 Cru. Shop	No. 3 Cru. Shop	Dahushan Cru. Shop	E. Anshan Cru. Shop
crusher	3	3	3	4/4(100%)	0/3(0%)	0/3(0%) 1/4(25%)	0/3(0%)	0/3(0%)
s.c. crusher	6	6	6				0/3(0%)	
roll crusher	3	3	3				0/3(0%)	
jaw crusher 40 hp	4	3	3					
jaw crusher 100 hp	4	0	0					
cone crusher s.t.	3	0	0		3/3(100%)			
cone crusher s.b.t.	6	0	0		6/6(100%)			
jig	9	9	9				0/9(0%)	

source : N.K.C.[1956a]p 31.

note : s.c. crusher = simons corne crusher.

Table 4b Extent of Damage to the Concentrating Shops

1954. 7.

	1945. 8.	1946. 11.	1954. 7.	No. 1 c.s.	No. 2 c.s.	No. 3 c.s.	Dahushan c.s.
1st b.m. 100-120HP	8	8	8	0/8(0%)	4/4(100%)	3/3(100%)	5/5(100%) 5/5(100%)
1st b.m. 180HP	4	0	4				
1st b.m. 350HP	8	0	3				
2nd b.m. 350HP	5	0	0	0/4(0%)			
2nd t.m. 250HP	4	4	4				
2nd t.m. 320HP	4	0	4		4/4(100%)		
2nd t.m. 350HP	3	0	3			3/3(100%)	
middl. classifier	4	0	4		4/4(100%)		
m. separator 5HP	96	96	96	0/96(0%)	38/38(100%)	52/52(100%)	55/55(100%) 50/50(100%)
m.separator 10HP	93	0	38				
m. separator 10HP	102	50	52				
m. dehydrater	69	24	69	0/24(0%)	19/19(100%)	26/26(100%)	
selection tank	276	96	276	0/96(0%)	76/76(100%)	104/104(100%)	
tailings thickner	11	9	9	0/4(0%)	0/2(0%)	0/3(0%)	2/2(100%)
dolco pump	26	18	18	0/8(0%)	0/4(0%)	0/6(0%)	8/8(100%)

source : N.K.C.[1956a]pp. 30, 32.

note : c.s.=concentrating shop, b.m.=ball mill, t.m.=tube mill, middl.=middling, m.=magnetic.

Table 4c Extent of Damage to the Sintering Shops

1954. 7.

	1945. 8.	1945. 11.	1954. 7.	No. 1 s.s.	No. 2 s.s.	No. 3 s.s.	Dahusan s.s.
f. o. thickner	14	4	12	0/4(0%)	4/4(100%)	4/4(100%)	2/2(100%)
fine ore drier	3	0	0				3/3(100%)
dolco pump	12	4	12	0/4(0%)	4/4(100%)	4/4(100%)	
oliver filter	11	5	11	0/5(0%)	6/6(100%)		4/4(100%)
dolco filter	11	3	7	0/3(0%)		4/4(100%)	
vacum pump	5	4	9	0/2(0%)	1/1(100%)	0/2?(0%)	
compressor	6	2	6	0/2(0%)	2/2(100%)	2/2(100%)	2/2(100%)
small sinter.	6	0	0	6/6(100%)			
attached fan	6	0	0	6/6(100%)			
dust pump	6	0	0	6/6(100%)			
dust collector	6	0	0	6/6(100%)			
large sinter.	4	0	4		2/2(100%)	2/2(100%)	
attached fan	4	0	4		2/2(100%)	2/2(100%)	
dust collector	8	0	8		4/4(100%)	4/4(100%)	
spider crusher	4	0	4		2/2(100%)	2/2(100%)	
back mill	6	6	6	0/6(0%)			
drum mixer	2	2	2	0/2(0%)			

source : N.K.C.[1956a]pp. 30, 33.

note : sinter.=sintering furnace, s.s.=sintering shop, c.s.=concentrating shop.



Table 5 The Damage to the Blast Furnace Department

1,000 tons, percentage of damage

		capacity	loss	%
blast furnace	capacity(ton)	1950	1950	100
	furnace	9	9	100
sponge iron plant	capacity(ton)	80	80	100
	blower	13	8	62
	gas washer	15	7	47
	kiln	4	4	100

source: Umene[1946]p 37, Z.W.[1947]p 24.

Table 6 Reason for the Damage to the Blast Furnaces

blast furnace	p. capacity (per day)	reason for the damage	time of recovery /order
No. 1	400 tons	explosion by E.R.	Sep., 1948/ 1
No. 2	400 tons	explosion by E.R.	end of June, 1949/2
No. 3	550 tons	removal by S.A.	Dec., 1957/ 8 or 9
No. 4	600 tons	explosion by E.R.	Jan., 1950/ 3
No. 5	700 tons	removal by S.A.	July, 1955/ 7
No. 6	700 tons	removal by S.A.	Dce. Sep. 9.30./ 6
No. 7	700 tons	removal by S.A.	Dec. 9., 1953/ 5
No. 8	700 tons	removal by S.A.	March 9., 1953/ 4
No. 9	700 tons	removal by S.A.	Dec., 1957/ 8 or 9

source: N.K.C.[1956a]pp. 39-43.

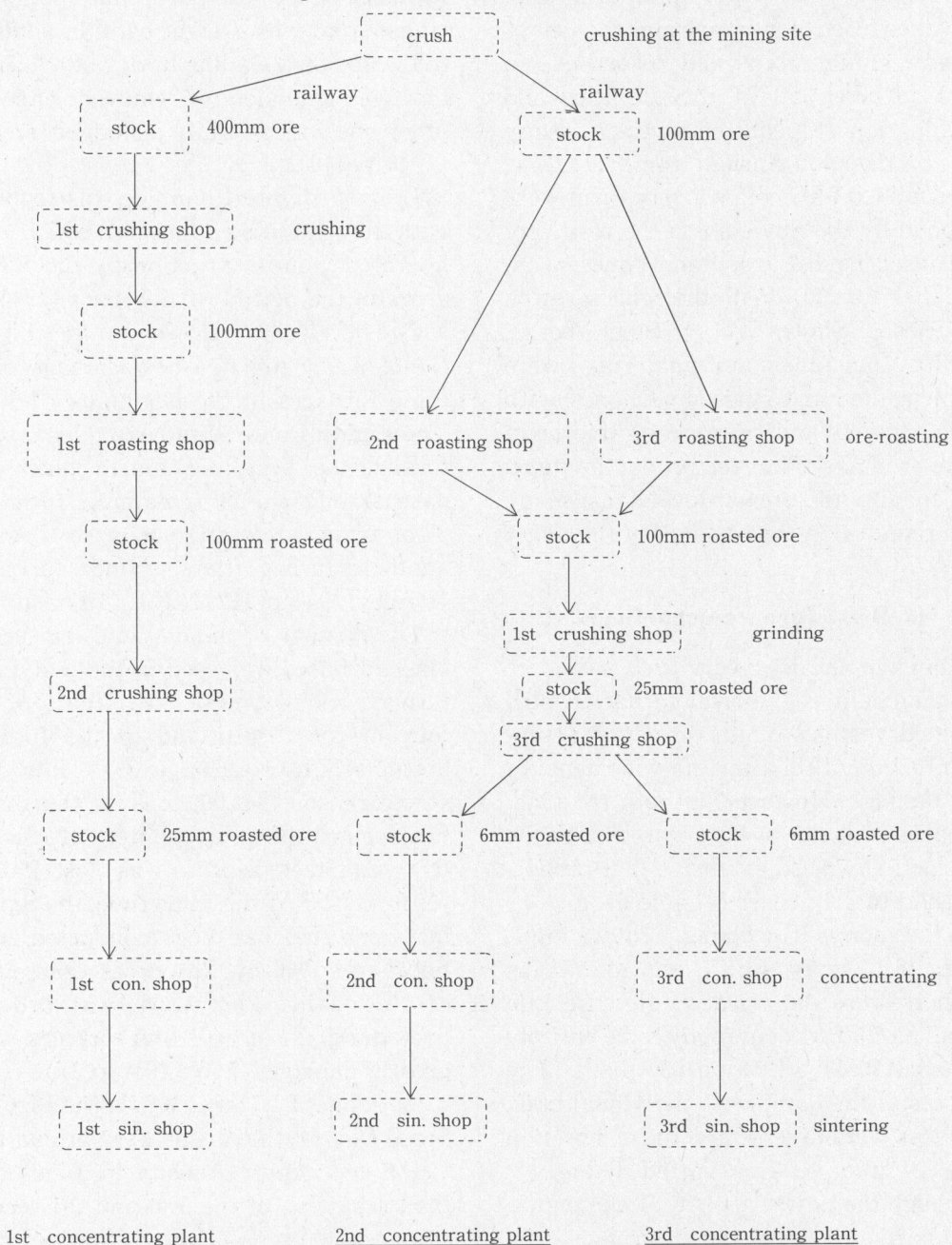
note: production capacity of No. 3 furnace is corrected from 500 to 550 ton-per-day. See Umene[1946].

(a) Most of iron ore throughout the Anshan district was composed of lean ore, which implies that recovery of the concentration facilities had a great significance. Around August 1945, Showa had in its compound 3 concentration plants as well as a concentration plant which was located at the foot of Dahushan. Also at the foot of East Anshan, a crushing shop was located as a single station. The descriptive records concerning the damage are very complicated. One source deals with a crushing shop (the first-third crushing shops), reduction (the first-third ore-roasting shops), concentration (in a strict sense, the first-third concentration plants), middling concentration shop, sintering site (the first-third sintering shops), and briquetting shop as independent factories, respectively. In another source, these factories are described as workshops associated with the concentration plants (the first-third con-

centration plants) in a wider sense. Fig. 1 illustrates a relationship among the concentration plants in a wider sense and the one (concentration shop) in a strict sense and the individual working places. Readers are advised to refer to Matsumoto[1995c] with respect to the difference between the two definitions together with the information concerning the operation in the first-third concentration plants.

With regard to the war damage in the concentration department, that due to the removal of facilities by the Soviet army was very severe. The amount of factory assets taken out reached 3,780 tons (Pauley[1946]p. 101). The damage in the mining department was noted exclusively in the excellent second and third mining plants and Dahushan concentration shop. Table 4a, b, and 5c give the details of the above facts (corresponding to the work procedure).

Fig. 1 Flow Chart of the Concentrating Department



source: N. K. C. [1956a] p. 36, N. K. C. [1956b] p. 18, Showa Iron & Steel Works, *Niju Nenshi*, p. 76.



(b) Nearly all the materials and machines used for repairing the shops were manufactured and procured in China. Almost all of the facilities and machinery parts required for the recovery were produced in Anshan Iron & Steel Co. and supplied for itself, some of them were supplied by the Soviets and the rest were purchased from Europe and America (N. K.C.[1956a]p. 30). With the concentration facilities of Showa Iron & Steel Works, the lost machines and materials were supplemented by Chinese-made ones, with some Soviet- and European/American-made products. Thus the production function equal to the prewar level had already been regained in the first half of the 1950s.

#### 4. Blast furnace department

##### (1) Damage and Recovery

The chain of blast furnaces still retained vestiges of its former structure even in June, 1946 after the 4 incidents of war damage. However, in both the blast furnaces and the sponge-iron plants the destruction was so extensive that production had utterly ceased (Table 5).

In the sponge-iron plants, 4 rotary kilns, 8 of 13 blowers and 7 out of 15 gas washers were damaged. A gigantic kiln as tall as 60m was cut ready to be entirely removed (Pauley[1946]pp. 93, 107). The degrees of the damage to individual blast furnaces were diverse and the completion time of the repairs varied (Table 6). Although the Soviet army took the important parts of the 6 blast furnaces, the furnace bodies (4 pillars of the turret, iron skin, iron belt, and inclined tower for insertion) were left on the spot without being rectified. Mud guns, hoisting equipment, turbo-blowers, hot stove burners, pig-iron casting machines, and pig ladles as the attached equipment of the blast

furnaces were the parts that could be transported with freight cars. In addition to the above, a loading bridge of a loading bin was completely removed and the other one was partially dislodged (Pauley [1946]p. 110).

Just the slightest damage was reported with the remaining 3 furnaces which were liberated from destruction by the Soviet army in the period of February, 1946 (N. K.C.[1956a]p. 39). However, the Eighth Route Army inflicted new damage upon these furnaces in the beginning of June. The Eighth Route Army exploded a blast furnace (the first and fourth blast furnace) among the 3 remaining furnaces. The army also attempted to destroy another furnace (the second furnace) (Pauley[1946]p. 112, N.K.C.[1956a]p. 40).

The damage of the first and the second blast furnaces was seen in the individual furnace bodies (one or two pillars of the four of the turrets) and in the furnace bottoms (N.K.C.[1956a]p. 39). For the above reason, 342,000 tons of the blast-furnace-installing capability of Showa Iron & Steel Works was lost (Pauley [1946]p. 92). At the same time, the repairing work that had been conducted since February, 1946 by Resources Committee of Nationalist Party (Z.W.) was brought to nothing, generators and turbines were greatly damaged (Z.W.[1947]p. 15).

No sooner had the Z.W., Anshan Iron & Steel Co. of the army of Nationalists' China reoccupied Anshan in June, 1946 than repairing of the first and the second furnaces (400 tons of production per day, respectively) was started. The committee drew up a plan of re-starting the operation of the blast furnaces on September 1, 1947 at the production level of 200,000 tons per year (Z.W.[1947]p. 15), and exclusively devoted itself to repairing the hoisting machines of the first blast fur-

nance, and inspecting the bricks in the air-heating furnaces, etc.(N.K.C.[1956a] p. 39). Rapidly, the repairing of the first furnace was completed in March, 1947(Z. W.[1947]p. 27). Their repairing of the second furnace was almost completed by the end of 1947. However, since the Nationalist army was forced to withdraw from Anshan in February, 1948 due to the aggression of the Eighth Route Army, the battle became fierce before the start of blasting, and the 2 furnaces never restarted operation(Matsumoto[1995c]).

The Eighth Route Army occupied Anshan replacing the Nationalist army, and set to work re-constructing the first, second and fourth blast furnaces whose damages were slight.

The first kindling was done with the second blast furnace in June, 1949, with the first blast furnace in September, 1949, and with the fourth blast furnace in January, 1950, respectively. After that, the repairing work of the blast furnaces was interrupted for about 2 years. Thus the growth in capability for manufacturing pig iron, which had been improved compared with the capability of steel production or rolling, was curbed(to be discussed later).

In March, 1952, the reconstruction of the eighth blast furnace was started. The repairing work was completed in March, 1953. In December, 1953, the seventh blast furnace was repaired. In September, 1954, the sixth was repaired. Repair of the fifth was made in July, 1955(N.K.C.[1956a]p. 39). These repairing projects were advanced by the Soviet Union's aid for the first five-year plan, i.e. as part of the special construction of 141(156)items. However, until the second half of 1953, the aid from the Soviet union had not been substantial. As far as the reconstruction of the eighth furnace, only ten techni-

cal advisors were sent by the Soviets. For this reason, 10,500 mistakes were made just in the designing process. The original repairing plan was forced to be delayed for almost three months(N.K.C.[1956a] pp. 168-9).

Socialist China had to prepare materials and capital, and design and produce the vital equipment of the blast furnaces by herself. The main pieces of equipment for the first, second, fourth and eighth blast furnaces were designed and produced in China(N.K.C.[1956a]pp. 168-9). In spite of these difficult conditions China succeeded in reconstructing the iron and steel industry by 1952. Therefore we believe that(i)the independent China had already acquired the ability to rebuild and operate a modern iron and steel industry,(ii)Chinese could utilize the legacy left by the puppet country, Manchukuo.

## (2)Reform of the Imbalance between the pig iron production and the steel production

Showa Iron & Steel Works, which had already been renamed as Anshan Iron and Steel Co., recovered its output of pig iron to the level of 700,000 tons in 1952. Although the output was still at a low level compared with the amount of 2,244,000 tons produced in 1943, the highest in the prewar time, the value is high enough in comparison with the highest outputs of steel ingots(770,000 tons in 1952, 560,000 tons in 1938)and rolled steel (760,000 tons in 1953, 750,000 tons in 1943) (N.K.C.[1956a]p. 4, 64, 75-6). After the war, Anshan Iron & Steel Co. did not need to export pig iron as the raw material for steel manufacturing. The necessity to create pig iron to make up for the iron and steel imbalance of Japan, had completely disappeared in Socialist



China. The situation here was quite different from Showa Iron & Steel Works in the period of Manchukuo. Their recovery of the blast furnaces was in progress corresponding to the recovery speed of the production facilities of steel ingots and rolled steel. Pauley[1946]estimated that 2 or 3 years would be required in order to allow the production capacity of the pig iron manufacturing facilities to fully return to the level of 1943(p. 110). But such a complete recovery of the furnaces in the early period was not necessary.

(3) Why the two types of images, serious damage and quick recovery, exist?

The production capacity of the blast furnaces of Showa Iron & Steel Works continued to be almost zero until 1949. The war damage in the iron manufacturing department was tremendous. However, the damage to the blast furnaces was mostly seen in important parts, and the furnace bodies themselves were left in a state capable of repair and re-utilization.

(a) Theodore L. Johnston, who was one of the members of Pauley's mission and was engaged in the survey of mining, concentration, and iron manufacture said, "In most cases the equipment removed is only a fraction of the whole installation but that fraction constituted a vital missing link that prevents the whole unit from operation(Pauley[1946])."

Johnston hereby placed emphasis on the following 2 points: (i) the various facilities that were taken away by the Soviet army were just a portion of the whole site. However, (ii) those items removed were the parts indispensable for the operation of the facilities, and the absence of such parts caused serious trouble in performing the operation of the

mining shops, concentration shops, and iron manufacturing shops.

Accepting the report of Johnston, Pauley[1946] was of the view that operation within six months was possible concurrently with 2 700-ton-per-day furnaces by temporarily utilizing the remaining facilities in the other blast furnaces. Also he was under the impression that the operation of one would be possible in three months. The repairing of the furnace was in progress to a considerable degree by the Soviet army(p. 110).

(b) Kiichi Saeki, the chief of clerical-work section(gyomu kacho, 業務課長) of Manchuria Iron & Steel Works, says in his memoir of the 1960s, "As far as I remember, Anshan and Benxihu(本溪湖) were never damaged at 100 percent. None of the facilities were removed to the extent of eradication. As you may be aware, large-sized facilities including blast furnaces can never be intentionally moved by dismantling them, although they could be destroyed. In case of an iron mill, indispensable facilities and machines are furnaces, compressors, blowers, etc. The integrated operation in the factory would have been disrupted in any of manufacturing stages, should even a single motor have been removed. This would probably nullify the capability of the furnace."(Yomiuri Shimbunsha ed.[1969]pp. 261-262).

(c) Krapp, the U.S. General Consul stationed in Shenyang, released a similar report based on the information of May 11-12, 1946. "Showa Iron & Steel Works has completely ceased its operation. According to the Chinese, the equipment and manufacturing instruments of 6 of the 9 blast furnaces have been taken to the Soviet Union. Although no inspection can be undertaken in detail due to restrictions of time, the furnaces evidently remain in

an original state in structure, despite the fact that removal of the equipment and manufacturing instruments was widely done. Although the equipment and manufacturing instruments in bar mills were dismantled, no confiscation has been made with them, and the first rolling mill and the by-product factories are left untouched. Things are quite the same in most of the various factories referred to above. Showa's 11 satellite enterprises ceased their operations, but almost all of the factories of these enterprises have been left intact, e.g. welded steel pipes, rolling corrugated steel plates, cement, electric wires, casting, truss-covered wires, etc. On the other hand from seamless pipe factories, all the machines including cranes have been taken. .... In consideration of Showa's business scale, the insistence that Soviets withdrew 70—80% of the equipment and manufacturing instruments is an exaggeration (Kashima [1990] pp. 222-223, retranslated and underlined by Matsumoto).

The above three descriptions explain how serious was the damage inflicted upon Showa Iron & Steel Works (Co.). However, it is also noteworthy that many of the structures and a series of facilities and machines remained untouched. A considerable part of the factories and offices of Showa Iron & Steel Works were left intact, and not a few machines and manufacturing instruments were left undamaged in the 1950s.

## 5. Conclusions

Showa Iron & Steel Works (Anshan Iron & Steel Co.) was occupied by Japan's Kanto-gun (the Guandong Army), the Soviet army, the Eighth Route Army, the Nationalist army, the Eighth Route Army, the Nationalist army and the

Eighth Route Army in this order. The management and operation of the company always fluctuated due to the unstable military demands of each power. In 1948 the company was placed under the third and final control of the Eighth Route Army. Following this, the endeavor by free and independent Chinese to rebuild the production capability was able to develop.

The machines and instruments for iron-manufacturing in factories from which the Soviet army had retreated, was in a state of destruction where no operation was expected. And during the civil war between the Eighth Route Army and the Nationalist Party, the facilities, especially iron-manufacturing stations were heavily destroyed again.

The reconstruction after the war damage was done in a short time. The facilities of the factories were soon ready to reopen. The peace and order for reopening was finally regained. By the first half of 1950s, such favorable conditions had developed and stabilized.

How the reconstruction of such serious damaged plants effected so rapidly? That is our next question. The flexible leadership of the communist party, the transfer of management know-how and technology from the Japanese or Chinese elite who had belonged to Manchukuo or the Nationalist Party, the accumulation of this knowledge by Chinese laborers etc., all these were important factors for an efficient repair, and should be investigated next.

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## Notes :

\* This paper was revised from Matsumoto [1995f]. Newly gathered materials and facts were



added, and some details about the war damage were abbreviated. The order of the descriptions was also rearranged.

1) In connection with the history after the war, several pieces of study have been in progress in 3 categories: (i) the history of Russo-Chinese diplomacy, (ii) the problem of facilities removed by the Soviet army, and (iii) the history of the iron and steel industry in northeast China.

In category (i), Ishii[1990] and Kashima[1990] traced the restitution negotiation concerning Japan's former facilities that was conducted between the Nationalist Party and the Soviet army.

As achievements in category (ii), Nishimura[1884], Yamamoto[1986], Nakagane[1986] and Tabata[1990] should be recommended. Tables 1 and 2 of this paper are made based upon those researches. However, no precise analysis with respect to the individual sector of the industry, i.e. the iron and steel industry has been made there.

In category (iii), the monograph edited by Okura Zaibatsu Kenkyu-kai[1982], Naikaku-soridaijin Kanbo Chosashitsu (the Cabinet Research Office) [1956a, b], and Xie & Zhang[1984] are worth mentioning. However, the description concerning the period after the war made by O.Z.K.[1982] just deals with an outline, whereas N.K.C.[1956a, b] is based on documentary evidence. The analysis attempted in Xie & Zhang[1984] places emphasis on the detection of the cruelty of exploitation and control in the period of Manchukuo and also upon homage to the liberalization movements.

These researches, have been done from a view point which is different to the one in this report.

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- cf. Some Japanese and Chinese titles are translated into English by Matsumoto.