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METALLURGICAL SECTOR IN POLAND BEFORE AND AFTER TRANSFORMATION RESTRUCTURING

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ABSTRACT: The aim of this article is to present the key elements of changes in steelworks plants in Polish metallurgical sector before and after restructuring process. Restructuring of metallurgical enterprises in Poland and in other countries in which economic transformation took place, was understood as the process of adjustment of enterprises to new conditions of market economy. The aim of this publication is to present the range of changes introduced in metallurgical sector in Poland in time of market transformation. Prepared publication consists of two parts. In the first part there is a presentation of situation in Polish metallurgy of iron and steel and sector restructuring in conditions of central planning economy. The second part presents the achieved effects of restructuring in steelworks in Poland. The paper has author's original character; it is a result of many years of research and observations of changes occurring in metallurgical sector in Poland. This paper may be helpful to scientists from other countries for the comparative analysis in the field of restructuring transformations in metallurgy in time of market transformation.

KEYWORDS: transformation restructuring, radical changes, metallurgical sector

INTRODUCTION

Restructuring of metallurgical enterprises in Poland and in other countries in which economic transformation took place, was understood as the process of adjustment of enterprises to new conditions of market economy, so-called transformation restructuring. Changes in particular areas of the economy had deep and radical character. The range of restructuring included all sectors of industry. Before restructuring the processes of privatisation took place in enterprises. Repair assumptions were fixed by public administrative bodies in government repair programs in the form of the proper legal bills. Government defined a list of enterprises which were especially important for the economy and marked directions of changes for them deciding about their privatisation. Restructuring was supported by the assets from national budget and by the European Union (in time of accession). Applying a given time period for each of the governmental programs of metallurgy restructuring it was stated that transformation restructuring in Polish metallurgy of iron and steel was conducted in years 1992-2006. After its completion the metallurgical enterprises were strengthening the existing effects of changes, functioning in the conditions of market economy and taking into account the dynamics of changes in business cycle.

METALLURGY IN POLAND BEFORE TRANSFORMATION RESTRUCTURING

In time of system transformation the enterprises of public sector in Poland had to adjust to new requirements of market economy. Restructuring was supposed to eliminate the irregularities in structures of functioning in particular enterprises which blocked their development on the market. Enterprises owned by the state or by the cooperative societies which dominated in Poland were transformed into private enterprises [1]. Before restructuring in Poland there were 26 metallurgical companies. They were all owned by the state. Production in steelworks was defined as "unwanted" that is unnecessary from the point of view of market criteria. Industrial capacity of steelworks was not fully used. In 1989 the use of industrial capacity was on the level of 49% (Figure 1). The use of the calendar time of work of machines and devices in metallurgy in Poland was on the level of 52.5% in rolling teams and 71.1% on sintering conveyor belts (data from year 1989) [2].

Overall production capacity of steelworks before restructuring was over 20 million tonnes of steel per year. The highest level of steel production was achieved in 1980 and it equalled 19.5 million tonnes of crude steel. In 1960 about 92% of steel was produced in open hearth furnaces, ten years later in 1970 it was 97%, and in 1980 only 46.7%. Open hearth furnace type of production was conducted in 18 metallurgical enterprises which was 70% of all steel producers[4]. In the 80s steel was casted into traditional casting moulds (index of 93% of overall production of crude steel) [5]. Process of production of ingots was conducted in a small amount with the use of Continuous Casting of Steel

(CCS) devices. First statistic data presenting CCS involvement in production of semi-products in Poland was noted in 1979 and it was a participation of 3.3% [6]. In the 80s the use of CCS in production of semi-products was almost 5% of all produced semi-finished products (Figure 2).

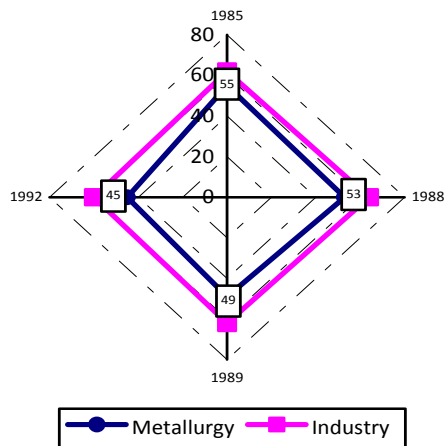


Figure 1. Use of the production capacity in Polish metallurgy and industry before restructuring [3]

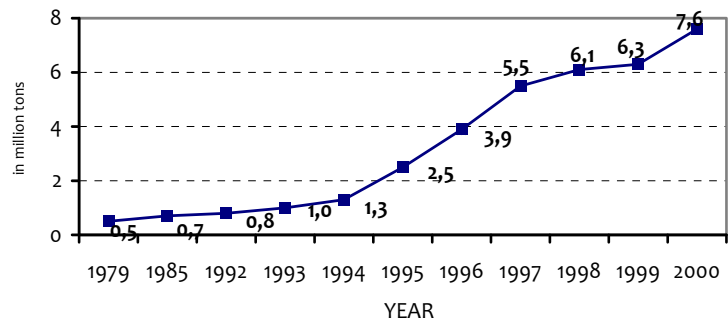


Figure 2. Continuous Casting of Steel in Polish steelworks [7]

Production of rolled products was performed in 13 enterprises in Poland which in 1989 produced overall 974 896 tonnes of ready products (ready products included also semi-finished products at that time) [4]. The participation of production of flat products (metal sheets) in overall production was about 30%. Table 1 presents the size of metallurgical production in Poland before restructuring.

Table 1. Metallurgical production in Poland before restructuring [8-11]

Year	Pig iron (in million tonnes)	Crude steel (in million tonnes)	Hot rolled products (in million tonnes)	Tubes (in million tonnes)
1950	1.5	2.5	1.7	0.121
1960	4.6	6.7	4.4	0.366
1965	5.7	9.1	6.1	0.508
1970	7.3	11.8	8.1	0.723
1975	8.2	15.0	11.1	1.146
1980	12.0	19.5	13.6	1.133
1985	9.8	16.1	11.8	0.992
1986	10.6	17.1	12.3	1.027
1987	10.5	17.1	12.4	1.038
1988	10.3	16.9	12.4	1.053
1989	9.5	15.1	11.3	0.971
1990	8.7	13.6	9.8	0.567
1991	6.5	10.3	8.0	0.519
1992	6.5	9.8	7.6	0.520

Table 2. Technology in metallurgical enterprises before restructuring [14]

Year	Hearth furnaces	Marten's furnaces	Electric furnaces		Converter-oxygen furnaces
			Arc furnaces	Induction furnaces	
1950	21	68	13	21	-
1955	24	88	6	7	-
1960	26	93	30	11	-
1965	27	96	33	11	-
1970	24	90	33	12	2
1971	23	88	37	12	2
1972	22	85	37	12	2
1973	21	85	38	12	2
1974	21	85	42	14	2
1975	21	85	47	15	3
1976	22	85	51	16	4
1977	27	83	50	13	5
1978	27	80	49	12	5
1979	21	79	48	12	5
1980	21	79	50	13	5
1981	19	73	60	14	5
1982	20	72	60	14	5
1983	20	70	59	13	5
1984	19	70	58	13	5
1985	19	68	57	13	5
1986	20	68	57	13	5
1987	20	65	57	13	5
1988	19	61	57	13	5
1989	18	59	57	13	5
1990	15	52	57	13	5
1991	13	39	57	15	5
1992	13	37	54	13	5

In the 70s the steelworks had more than twenty open hearth furnaces with average volume of over 700 m³ (in the late 70s the increase of useful volume in furnaces was noted down and equalled up to 980 m³) [12], there were more than eighty open hearth furnaces (average time of one melt was about 8 hours), over 60 electric furnaces (average time of one melt was 4 hours in arc furnace and about 2 hours in induction furnace) and 5 furnaces of converter-oxygen type [13]. The proportion of arc furnaces to induction furnaces was 3:1. First converter-oxygen furnaces were applied in 1970. Average time of one melt in those furnaces is over 0.7h [8]. In the 80s the number of big furnaces slightly dropped (the furnaces of huge volume remained in use and the useful volume grew to 1000 m³) [9], the number of open hearth furnaces dropped to 68, the number of electric furnaces increased, particularly of arc type (in 1981 there 10 more started to be used) and the number of converter-oxygen type furnaces remained the same. Details concerning the number of particular metallurgical furnaces before restructuring were presented in table 2.

Before restructuring in Polish steelworks the applied manufacturing devices had high wear index (in many steelworks the wear of tangible assets exceeded 85 % of their value). Gross value of tangible assets in production in state owned enterprises showed a decreasing tendency. In 1989 the degree of wear of tangible assets in metallurgy equalled 77.8 % and was 32.3 % higher than the degree of the use of assets in public industry as a whole (Figure 3) [3]. About 35 % of production lines in steelworks were amortised in 100 % [5]. Before restructuring, the financial expenditure on innovative features in metallurgical sector was relatively low, lower than for industry as a whole. Innovations (new products and modernised ones) in percentage approach of sales value of metallurgical products in Poland equalled only 2%, when, in case of electro-technical sector, precision devices sector and means of transport sector it was 20% [3].

Table 3. Employment and steel production in Polish steelworks before restructuring [9-10, 15-21]

Year	Employees (in thousand persons)	Steel production per one employee in year (tonnes)
1950	87.8	28.6
1955	120.6	34.8
1960	109.8	60.8
1965	133.4	68.1
1970	149.2	79.1
1971	150.0	84.9
1972	153.9	87.6
1973	151.1	93.0
1974	158.0	92.2
1975	158.7	94.5
1976	170.5	92.0
1977	172.0	103.7
1978	173.4	110.8
1979	187.1	102.7
1980	185.5	105.0
1981	183.6	85.6
1982	169.4	87.3
1983	164.7	98.6
1984	157.4	105.0
1985	156.0	103.4
1986	159.5	107.5
1987	154.7	110.8
1988	157.8	106.9
1989	144.0	104.8
1990	147.0	91.8
1991	123.0	83.7
1992	106.0	92.4

different institutions and legal entities. State-owned enterprises in central planning economy did not have any encouragement to introduce technological, organisational or cost-reducing changes. They assumed many aims, often contradictory or politically influenced. Mentioned weaknesses were enforced by the monopolistic position of those enterprises in economy. It should also be pointed out that their position in the economy was artificially maintained (there was no threat of bankruptcy) due to a big influence of produced added value. Traditional industry produced over 85 % of added value [22]. In the 70s in Poland some new steelworks were created, i.e. Steelworks Katowice (Katowice Steelworks) located in Dąbrowa Górnicza, which needed high financial expenditure. Debt in the sector of iron and steel metallurgy in Poland in investment credits was 357.9 billion zloty in 1989, in

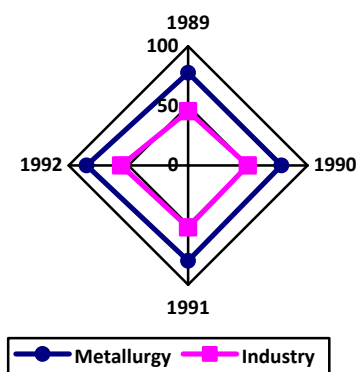


Figure 3. Degree of wear of tangible assets in Polish metallurgy and in public industry [2-3]

In 1988 the metallurgical industry employed 150816 people, in the following year 144022 people. The employment level was too high in reference to the size of production and resulted in low level of efficiency (less than 100 tonnes of steel per year per one employee) - table 3. The ratio of employees on white-collar positions in comparison to blue collar ones was unfavourable. In 1985 per 1000 blue collar workers there were 251 people working on white-collar posts. In 1989 per 1000 employees on blue-collar positions there were 263 white-collar workers (increase by 12 people in comparison to year 1985). Among the employees there were mainly people with vocational education who were 70 % of staff in steelworks in Poland. Employees with upper-secondary education were 23% of total and those with a university degree were only 3 %. In terms of age, the biggest age group among staff were people between 31 to 50 years old [3, 15].

Before restructuring steelworks in Poland were in debt, owing money to

comparison to debt level in 1985 it was 2,5 times increase (debt in investment credit in 1985 was 145.9 billion zloty). Steelworks were in debt not only because of investment credits but also because of unpaid financial liabilities towards contractors. Steelworks were receiving turnover credits to pay off debt as well as seasonal and legal tender credits together with credits to pay off permanent needs.

Steelworks with highest debt was Huta Katowice. Its income from all activities in year 2000 was 3893 million zloty but the gross financial result was in minus and equalled -300.1 million zloty. The investor, L. Mittal on purchase of Polish Steelworks declared to take over the debt (991 million zloty). Steelworks Katowice owed banks 285 million zloty (in year 2002). Polish Steelworks had a debt in Polish Railways Cargo (PKP Cargo) in the amount of 540 million zloty, within which only Steelworks Katowice owed them 376 million zloty. Other steelworks in Poland were also in debt, i.e. Steelworks Ostrowiec before takeover by Spanish capital group Celsa had debt in the amount of 707 million zloty. Total debt of all steelworks in Poland was 9.5 billion zloty and Polish Steelworks had 1.2 billion zloty of debt [23]. Steelworks in Poland were supported by state money. Among subsidised metallurgical enterprises, in the first one hundred there was Steelworks Katowice (in years 1988-1989 steelworks got 40274 million zloty). The share of subsidies in total in sold products manufactured in these enterprises in 1988 was 55zloty per each 1000 of sold production and in 1989 it was 12 zloty. In the late 80s subsidy for metallurgical sector was 3211 billion zloty [3].

Mentioned technological, staff and financial problems did not constitute all the problems connected with malfunctioning of metallurgical enterprises in time of transformation of economy system in Poland. The range of presented deformations differed depending on the enterprise and those mentioned here are considered the key de-stimulants of development in metallurgical sector in conditions of market economy. There was a necessity then to perform repair restructuring in metallurgical sector in Poland to adjust the functioning of enterprises to the needs of the market.

METALLURGY IN POLAND AFTER TRANSFORMATION RESTRUCTURING

The aim of transformation restructuring in the period of economic transformation from central planning economy to market economy was adjustment of enterprises in terms of legal, organisational, technological and economic issues to new conditions of market economy. Restructuring period of metallurgical sector in Poland began from "Study of iron and steel metallurgy restructuring in Poland" conducted in years 1992-2002. Restructuring program in Polish iron metallurgy prepared in 1996 was entitled "Industrial policy for years 1995-1997". In 1998, Polish government accepted another program, meeting the requirements of the standards of European Union and its integral part was "Metallurgical social package" which made reduction of employment easier. Next versions of the restructuring programs in metallurgy in Poland were simply called: "Update 2001", "Update 2002" and "Modification 2002". In 2003, a repair program for metallurgy was prepared and called "Restructuring and development of metallurgy till year 2006". In year 2007 a report of European Commission was issued concerning the end of the process of repair restructuring in metallurgy in Poland [24].

In the aspect of ownership restructuring a significant event in Polish metallurgical sector was the creation of Polish Steelworks in May 2002 by combining four steelworks together: Steelworks: Cedler, Florian, Katowice and T. Sendzimira [25]. On the 1st of January 2003 the above mentioned steelworks became branches of a new enterprise called Polish Steelworks (Polish abbreviation PHS). On the 21st October 2003, the representatives of the Polish government accepted LNM Holdings N.V. as strategic investor in privatisation process of Polish Steelworks. The enterprise was transformed into ISPAT Polska Stal SA (IPS SA). New name was functioning until 5th March 2004 [26]. On 17th February 2005 the enterprise created on the basis of PHS changed the name again, this time for Mittal Steel Poland SA. Another important consolidation event on the world steel market was reaching an agreement (on 25th of June 2006) concerning joining two biggest capital groups Mittal Steel and Arcelor. On 29th May 2007, a new brand name of steel producer was introduced on the market and it was called ArcelorMittal [15, 27]. Foreign capital took over a significant part of the production capability in metallurgical sector in Poland (Figure 4).

One of the areas of restructuring in Polish metallurgy was applied technology of steel manufacturing and processing technology of metallurgical products. Production steel with the use of

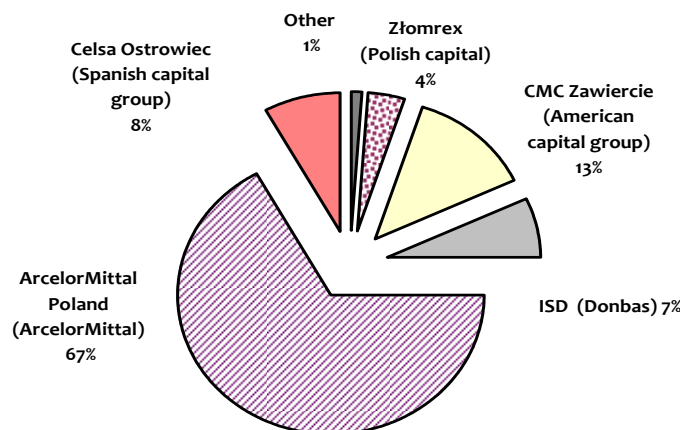


Figure 4. Metallurgical market in Poland after restructuring [28]

open hearth furnaces was systematically reduced. At the beginning of the 80s of 20th century even 40 % of steel came from open hearth furnaces, in the 90s it was about 30 % [3]. This process was terminated in May 2002 (Figure 5).

Production of steel after restructuring was conducted in oxygen converters and arc electric furnaces. The size of steel production was adjusted to the needs of the market (needs of housing constructions, infrastructural building, car industry, machine industry, production of household devices and metal industry). One of the effects of technological restructuring in Polish metallurgy is also the development of Continuous Casting of Steel technology (CCS). The participation of this technology type in crude steel production, semi-finished products (ingots) in 1985 was only 4.9 % and today the CCS technology is the basis to produce semi-finished products in every steelworks, it replaced casting of steel to traditional casting moulds (ratio of casting steel to traditional casting moulds before restructuring was 93 %).

Production of each of the products was adjusted to the demand on the market, increasing the amount of processed products in comparison to semi-finished products (ingots). Production of crude steel in Poland was dropping to reach the lowest level of 7.1 million tonnes in 2009. In the period of technological restructuring the production of hot-rolled products decreased by 40 % (the maximum value from 1988 was compared with production in 2011). Production of steel pipes varied from 0.3 to 0.4 million tonnes in analysed period, ratio of production size of pipes without seam to size of production of pipes with seam was almost 1:1 with slight advantage of the second type ones. Production of metal sheets and cold strips varied from 1.239 million tonnes of products in 1990 to 0.572 tonnes in 2009. Production of galvanised metal sheets increased twice in the analysed period, just as the production of closed cool roll-formed sections. In restructuring period new production lines were opened for production of metal sheets with organic coatings (increase from the level of 0.07 million tonnes to 0.24 million tonnes) [29].

An important restructuring area for Polish metallurgy was limiting employment in the sector. In years 1990-2011 over 120.000 people lost their jobs in metallurgical sector. It should be underlined, however, that a part of those workers found employment in newly formed companies. Figure 5 shows changes in number of employees in metallurgical sector in Poland in years 1990-2011. In 2011 in metallurgical sector there were 25 630 employees, half of whom employed by ArcelorMittal Poland enterprise, which is 12 300 people (amount in the end of year 2011). Celsa Ostrowiec employs about 2000 workers and ISD Steelworks Częstochowa employs 3.5 thousand workers. Together with the reduction of employment the work efficiency increased. There is 300 tonnes of crude steel produced per one worker per year. Professional profile of the employee working in metallurgical enterprise has changed recently. A number of employees with university degree increased and new professions appeared i.e. information technologist, expert in logistics, expert in marketing. Organisational structures in metallurgical enterprises have changed by creating so-called ordered integrated departments according to categories of manufactured products, i.e. long products and flat products [30-31].

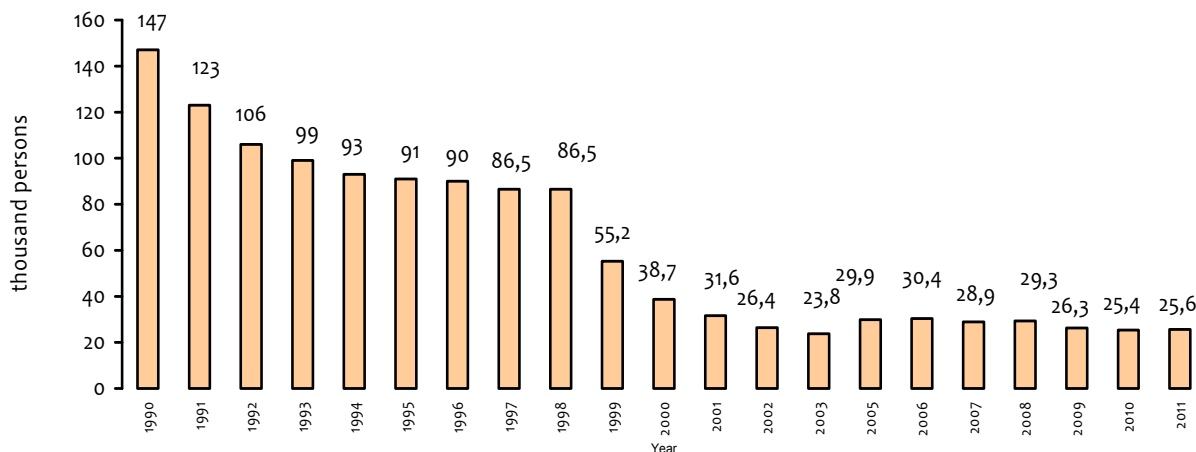


Figure 5. Level of employment in Polish steelworks plants [on base of reports Polish Steel Association in Katowice] Within the outsourcing activities the so-called beyond production assets - non-core business was excluded from the steelworks. The biggest amount of companies was separated from concern Polish

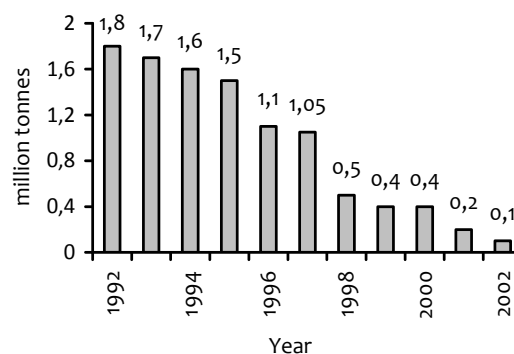


Figure 5. Marten's production in Polish metallurgical market [7]

Steelworks PHS, there were 138 in total which is 58 % of all separated companies within the idea of outsourcing (Figure 6). Another position on the list is Steelworks Częstochowa and Steelworks Zawiercie (14 companies from each) and it gives them 6 % each. Fourth position on the list is Steelworks Batory with 12 divided companies (5 %). Newly formed companies shaped new markets in Poland, i.e. markets of: steel constructions, steel distribution, design and technologies, supplies and repairs of metallurgical devices, maintenance of facilities and service of devices, metallurgical technologies, fireproof materials, energy services, purchase and processing of scrap metal, transport and shipping services, IT services and financial-capital services, medical services together with educational and training services [25].

Restructured steelworks in Poland reached financial liquidity in 2004 conducting not only the government programs but also internal business-plans. State help for the steelworks within restructuring was offered only until year 2003. Over 96% of state assets were given to two biggest steelworks: Katowice and Sendzimira. After year 2003 the help from the state was going according to legal regulations, international agreements and rules functioning in European Union (Poland's accession to the EU in 2004). Financial help for the steelworks was granted on the basis of so-called beneficiaries list, in a form of a single grant.

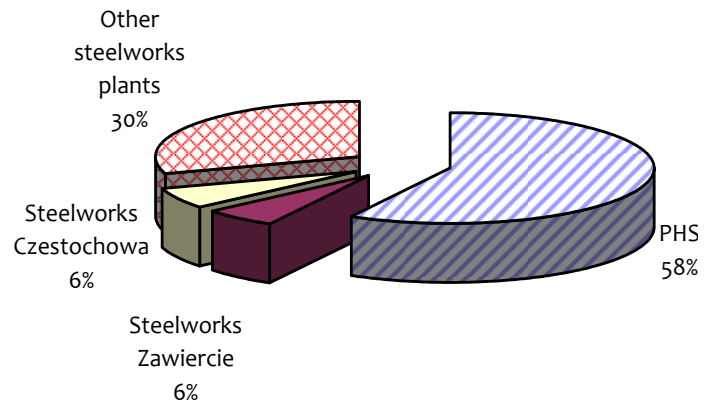


Figure 6. Outsourcing in Polish steelworks plants

CONCLUSIONS

Transformation restructuring made it possible for steelworks to function in conditions of market economy. It was radical restructuring and influenced all areas of functioning in steelworks. Besides government programs, each of privatised metallurgical enterprises conducted their own repair programs (business plans of steelworks). Privatised steelworks applied the methods of efficient management and reached financial liquidity. Production in steelworks underwent the process of adjustment to the needs of target sales markets.

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