12th International Research/Expert Conference
"Trends in the Development of Machinery and Associated Technology"
TMT 2008, Istanbul, Turkey, 26-30 August, 2008

ENVIRONMENT PROTECTION BY STARTING THE INTEGRAL PRODUCTION IN ARCELOR MITTAL ZENICA

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ABSTRACT
In this work presented are the measures and expected effects of the environment protection connected with the revitalisation and starting the integral production in Arcelor Mittal Zenica. The measures for emission decreasing and environment protection are based on the application of Best Available Techniques (BAT), and on the principles of more clean production to satisfy prescribed environmental standards and demands.
By the implementation of measures of the environment protection previewed by the plans of equipment adaptation, expected is an important decrease of pollutants emission from the plants and equipment of Arcelor Mittal Zenica, compared with the state before the year 1992. It is estimated that SO_2 emission will be decreased for more than 80% and the dust more than 65% compared with the state in the year 1988, with almost same production. By realising the expected decrease of the emission, decreased will be too the charge of ecological system with harming materials, which will provide the conditions for an acceptable functioning of the production equipment.
Keywords: emission, emission decreasing environment protection, adaptation plan.

1. INTRODUCTION
Based on existing documentation on development of ironwork, ascertained is that metallurgical production in Zenica has 115 years lasting tradition. Since the start until now the production has permanently grown by installing new and modern capacities. In the beginning of eighties of 20th century the steel production has increased up to 2 millions metric tons per year [1,2].
In the middle of 1992 the work of integral production line was stopped, respectively that of all metallurgical equipment, and the production in processing and power plants was importantly reduced. It resulted with the improvement of environment quality.
Now the large activities are in course to start again integral ironwork. The revitalisation and restart plan of integral production foresees production line activation in the middle of 2008, with reduced steel production capacity 842.503 t/year, of which optimal capacity 1.926.670 t/g will be reached in 2010 [3].
It is known that integral metallurgical production emits various pollutants in the atmosphere. The emission level and air pollution depend on applied technology, cleaning technical systems and the air protection precautions. Consequently, more efficient are the cited technologies, technical systems and measures less is the emission level of pollutants into the air.
Environmental legislative in B&H requires decreasing the emissions under permitted boundary values. Therefore, obligatory elaborated is the plan of plant and equipment adaptation to environmental regulations and standards, based on which assessed are the conditions for issuing the environmental licence. The adaptation plan is being done for the purpose of identification of the sources of emissions and of their impact on the environment, then to define the measures with periods for gradual decreasing the emissions into prescribed limits, respectively for an adaptation to environmental regulations and to best available techniques [4].

In accord with the law on environment protection, the plants and equipment must be constructed and functional in the way in which they do not jeopardise the environment and human health, and do not represent exceeded nuisance for the people living in the area of these plants influence due to emission of harming matters, waste water, noise etc. That is why during use of plant and equipment all corresponding prevention measures must be undertaken to prevent and diminish environment pollution, what does include an application of best available techniques [4].
In this work presented are the measures and expected effects of air protection, pertaining to the revitalisation and start of integral production in Ironwork Zenica. The measures for emission decrease and environment protection are based on the application of best available techniques (BAT) and on principles of more clean production to satisfy prescribed environmental standards and demands.

2. EMISSION INTO THE AIR DURING THE WORK OF INTEGRAL IRONWORK (BEFORE 1992)

In table 1. given are the data on yearly dust and SO_2 emission during the work of integral ironwork before the year 1992 [5,6].

Table 1. Dust and SO_2 emission during the work of integral ironwork before 1992.

Parameters	Period of measurement		
	1985.	1988.	1990.
Production of steel (t / year)	1.896.266	1.906.000	1.090.000
Coal consumption (t / year)	447.204	399.845	465.000
SO_2 Emission (t / year)	74.000	72.202	60.752
Dust emission (t / year)	20.206	12.200	6.532
Volatile organic matters (t / year)	4.638	4.534	3.078

3. MEASURES FOR AIR PROTECTION

With the realisation of the strategic investment plan of integral production revitalisation and start, it came to important strategic changes of the plant and equipment structure, since some plants and equipment were dismantled or changed for another purpose (open hearth steel plant, three blast furnaces, four coke oven batteries, rolling mill I and II complex), and some will be stopped during the year 2008 (power plant), all of that representing a complete ironwork of about 1 million t/year production capacity. At the same time effectuated were the reconstruction of two heating furnaces in the Forgery, achieving thus an energy save over 40% and the reconstruction of boiler number 1 in power plant, enabling the use of gaseous fuels and diminishing coal consumption to 5 t/hour, which importantly influences the decrease of SO_2 and dust emission [3].
Aiming further decrease of emission, the environment protection plan (adaptation plan) was maid, by which the measures are foreseen to decrease emissions into the air and its protection, of which we cite here some more important of them:

- building in the facility for separating H_2S from row coke oven gas,
- building in the system for coke pushing out free of dust,
- building in the facility for sealing connection heads on upward colons of coke oven plant,
- recovery of the system for dust removing on the objects of input-transport of coal and coke,
- separation of the naphthalene and ammoniac and building extension of facilities,
- reconstruction of exhauster's and chimney ventilator's electric separators in the agglomeration,
- introducing new technology for chimney gas cleaning in the agglomeration,
- automatization of the cleaning control system of waste gases (exhauster electric separators and gas ventilators),
- reconstruction of scrubber in the agglomeration,
- reconstruction of pouring platform and recovery of the cleaning system of blast furnace gas,
- removing the dust from pouring deck of blast furnace by technical system of covering the pouring channels and cleaning the waste chimney gases,
- automatization of the control system of bunker Estacada dust cleaner, electric separators and gas cleaners on the blast furnace,

- building the system of dust removing from gases by filling the converter and by tap-off from it in BOF steel plant,
- reconstruction and improvement of the system fro cleaning waste gases in BOF steel plant, aiming to reach the efficiency under 50 mg/Nm^3 of remained dust,
- reconstruction of boiler facilities in the power plant, by which are provided the conditions for substitution by gaseous fuels and more economic work of boilers, then an important decrease of SO_2 and dust emission,
- reconstruction and efficiency improvement of the work of electric – separators in the power plant aiming to reach efficiency under 50 mg/Nm^3 of remaining dust,
- reconstruction and automatisation of the work of heating furnace of rolling mill wire line,
- reconstruction of the furnace for heating and thermal processing in the forgery,
- introduction of automatic leading the production processes,
- introduction of continuous monitoring on six dominant sources of the emission into the air and sporadic monitoring on other sources, in accord with the monitoring plan and so on.

4. EXPECTED EFFECTS

By the realisation of cited plan and project the emission of pollutants will be importantly decreased. Expected SO_2 emissions by integral production are shown in table 2. and of the dust in table 3.

Table 2. Estimation of SO_2 emission

Source of SO_2 emission	2008.		2009.		2010.	
	Production	Emission	Production	Emission	Production	Emission
	t/year	t/year	t/year	t/year	t/year	t/year
Coke oven plant (from coke oven gas)	260.534	2.361	568.438	5.151	625.282	284
Agglomeration	482.924	1.507	1.053.654	3.287	1.159.012	3.616
Power plant (coal consumption)	112.320	4.774	112.320	4.774	60.480	2.570
Sub-total	**-**	**8.642**	**-**	**13.212**	**-**	**6.470**
Not identified sources AMZ - 5%	-	432	-	661	-	323
T O T A L	-	**9.074**	-	**13.873**	-	**6.793**

Table 3. Estimation of dust emission

Suspended dust source of emission	2008.		2009.		2010.	
	Production	Emission	Production	Emi-ssion	Production	Emission
	t/year	t/year	t/year	t/year	t/year	t/year
Coke oven plant	260.534	285	568.438	621	625.282	683,5
Agglomeration	482.924	594	1.053.654	1.296	1.159.012	1.426
Blast Furnace	789.524	492	965.906	602	1.062.497	662,5
BOF	458.333	137	1.000.000	367	1.100.000	330
EAF 100 t	357.500	32	*	*	800.000	72
EAF 15 t	26.670	355	26.670	355	26.670	355
Power plant (coal consumption)	112.320	230	112.320	230	60.480	124
Dust brought by wind km/year	-	148	-	243	-	263
SUB-TOTAL		**2.273**	**-**	**3.714**	**-**	**3.916**
Not identified sources AMZ		114	-	186	-	196
TOTAL:		**2.387**	**-**	**3.900**	**-**	**4.112**

From the results shown in tables 1, 2. and 3. visible is that an important decrease of pollutants emission into the air is expected. It is estimated that SO_2 emission will be decreased over nine times, and the dust for more than 66%, compared with the situation in the year 1988 by almost same production quantity [4].

5. CONCLUSION

The realisation of measures, previewed by the adaptation plan, will contribute to an important decreasing the emissions from metallurgical and power plant facilities into the air, which, together with precaution measures, will decrease emission levels to permitted limits.
It is estimated that SO_2 emission will be decreased over nine times, and the dust for more than 66%, compared with the situation in the year 1988 by almost same production quantity.
By expected decreasing the pollutants emission, the charge of environment with detrimental matters will be importantly decreased, by which the conditions will be provided for maintaining the air quality and people's health protection in the Ironwork Zenica surrounding.

6. REFERENCES

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