

Digital Device Fenometer F-1680 for Noise Measurement at Kosovo Mines

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Abstract

A long time ago, digitization has proven that it will help mankind. Rapid development and quality of digital equipment has helped to define actions and our daily chores and to improve them in the workplace including noise and vibrations. Kosovo is rich with coal electrical energy and fuel produces coal, for total extraction of coal per year, which projected 9.5×10^6 t / year of coal, this amount meets the needs of PP "Kosova A " and points "Kosova B " which later is put into operation in 1983 with a capacity of 2x339 MW. Existing coal reserves are sufficient for the needs of Kosovo. Two power plants Kosovo A and Kosovo B and the supply of coal created a big bang for the community living near the two power plants. By 2016, the total thickness of the earth will increase, which should reactivate the devices to remove excess heights. During this period of the earth measures cornice in the empty spaces in both White and Mirash mines. In this period they will relocate villagers and Shipitulle East Mirena. Within the period 2018-2022, the thickness of the earth will rise throughout the front so it will create a big noise and this noise should be measured and fingerlings that noise exceeding permissible standard settings, then around mine sites. They must leave eventually. The purposes of the scientific paper are the measurement of noise of the digital appliances that are hauled F- 1680 and analyze the extracted coal mine, where the mining of large appliances are hauled key. The method of measurement is made with digital device called FONOMETR device type 1680, Japanese production which serves for the measurement of noise and vibrations. Results and analysis are made noise throughout the mine location with 162 measurement points which are presented by diagrams and tables.

Keywords: excavators, production, sound, Digital Equipment F - 1680, Community.

1. Introduction

For various reasons (low readiness, reliability small and age of equipment, etc.) KEK has to import electricity in order to fulfill customer needs which in her absence and the high price in the region causes an additional difficulty for corporate. To supply more secure and not dependence on imports of electricity to the Republic of Kosovo only solution remains coal! Existing coal mines, Bardh and Mirash are exhausted. Therefore we need a new field which will be able to make two points to supply coal at least until 2024. Modelling and geological research, made in 2010, has proved generally, Sibovc field will be able to meet the requirements for coal as fuel for the next thirty years. According to the Law on Noise Protection No.02 / L - 102 Kosovo. The purpose of this law is to avoid, prevent or reduce prioritized basis of harmful effects, including annoyance, due to exposure to environmental noise. Even in KEK mines develop noise which is not bearable for residents who live near power plants A & B. The purpose of this paper is to analyze and measure the noise in certain locations where they live and where they operate heavy machines for exploitations. Allowable limit external noise in settlements for these categories of vehicles technique is:

- Passenger cars and 84 dB combined
- transport vehicles and buses to move to 3.5t, 85 dB,
- transport vehicles and buses to move more than 3.5 t, 89 dB

2. Kosovo Basin and History

Kosovo coal deposits are approximately 10,000 meters, thus forming one of the largest deposits of lignite in Europe, includes about 850 km². In Kosovo basin morphological forms an extended valley where changes in quotas do not exceed 80 meters. Centrally situated along the river Sitnica followed by a more hilly terrain approaching Çiçavica

mountains, Goleshi and Sar. Basin is surrounded by a raised relief with Kopaonikmassive, Kozi, Zhegovc ,east Lisic massif in southern Montenegro and Çicavica, Goles, and SharriCarnaleva west and northwest. The surrounding mountains reach heights of 900 to 1600 m.

Sources have revealed for more than a hundred years and the first use of small scale began in 1920 years. It is said that the first use of underground mining started in at least five locations. Groundwater exploitation continued until 1966, coal extraction is concentrated in the area, in surface White and Mirash mines.

Using large scale, surface mining exploitation is set in the years since the 1950s and the first, "Mirash" began production in 1958. Power generation has begun in Kosovo A power plant (Plant A) in 1962. in the period from 1962 to 1975, the plant has expanded to aktual4 capacity.

2.1 The work of the two power plants

Second Power Plant, he TC - B went into operation in 1985. Exploitation surface coal mining has requested that in earlier periods of leave the retractable wastelands outside surface mining. In this manner it is formed at least seven foreign tuck which mines surround today. White existing coal mines and Mirash, located west of Pristina, under the existing dynamics of production they will be exhausted in 2011. For this reason, the main objective is to provide a plan for the supply of fuel for existing power plants in Kosovo "A" and "B". PKX for Sibovc -SW focuses on the supply of coal to existing power plants in the amount of 9 mt/year. The plan covers the period from 2007 until 2024, when all generating capacity reaches the end of their operational life. The total demand for coal in the area of SW Sibovcit- reaches 123 million tons, an amount that is about 15 % of all lignite reserves may in the Sibovcit 4 exploitation.

For the area of Sibovc -SW to have a clear picture it is necessary to make a situation analysis of geological, hydrological and other basic data that are needed for the opening of the mine. Another important task is the protection of the new mine from surface water, groundwater and environmental protection. For this reason it became that the program and implementation of the 20 wells constructed piezometer for Sibovc -SW area where tests are done hydrogeological characteristics, hydrology, groundwater quality, surface and soil. Coal layer thickness in Sibovc varies between 60 and 70 meters. In the southern part the thickness is slightly larger and in some countries it may reach up to 80 meters. Along the western border, where disorders appear there is a drop in layer thickness to 40 meters and thickness of 5 meters wide coverage is 110m4.



a. GPS mapped

b. The factual situation in the field

Figure 1.0: Soccer mine near power plants

3. The Objective of Scientific Work

The activity with which to make new mine Sibovc -SW will have positive and negative impacts around it. As shown adverse impacts expected on the environment will be:

- Impact on the Air
- Noise and vibration
- Geology, hydrogeology and ground

- Flora and fauna
- Landscape
- Socio - economic

These impacts need to be considered during the process of production and mine closure. Many of these negative effects can be eliminated or greatly minimized by acquiring equipment, technology and well operation during the manufacturing process. Making permanent and verifying the parameters identified in meteorological and hydro stations, monitoring and mitigation proposal parameters have negative impact on the environment and their behavior on the allowed values. On the other hand the new mine should have a positive social impact in the region and new areas of work opportunities⁴.

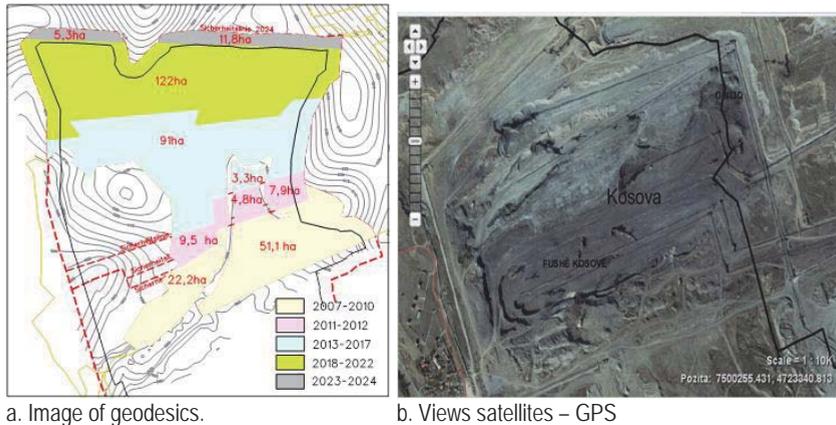


Figure 1.2: Position mine Kosovo where noise measurements are made

Table 1: Presentation of the amount of excavated overburden in Sibovce Main Mining equipment (MME) which Planned to make waves from 2006 to 2024.

	Demand for land in Sibovc SW					Creating final leaflets
	Digging million m ³ / wasteland	Security Zone	channels	Infrastruktura	Total	
2006-2010	128	36	15	Home / land	179	50
2011-2012	35	4	2	Home / land	39	141
2013-2017	133	16	4	Home / land	149	16
2018-2022	102	14	2	Home / land	116	142
2023-2024	14	4	6	Home / land	18	34
Total	412	74	29	Home / land	501	383

4. Mining Sibovc Borders South West

Mine boundaries are selected taking into account these factors:

- The management of mineral old line
- Bringing allowed in villages
- The thickness of the layer of coal at the border exploitation
- Required general slope of geotechnical perspective
- Requirements regarding the length of the scale and direction of slopes

5. Exploiting Technology

Technology exploitation in mine Sibovc -SW will be similar to that of existing mines and a part of this equipment will be used at the new mine Sibovc -SW. So it will be based on continual exploitation ETP systems, it is discontinuous in special

cases and aid mechanisms. In the first five years they are scheduled to work four excavators with three conveyor systems and flatten, but coal also foresees 3 4 excavator systems with an initial production of 3.4 , 6 , and 9 million / ton / year 20,134. Coal layer thickness in Sibovc varies between 60 and 70 meters. In the southern part thickness it is slightly larger and in some countries may reach up to 80 meters. Along the western border, where disorders appear in layer thickness drops to 40 meters. Alternating coverage and thickness of 5 meters wide 110 meters. Overburden storage measures will be implemented in existing mining areas that the Bardhit4 makes respectively⁴.

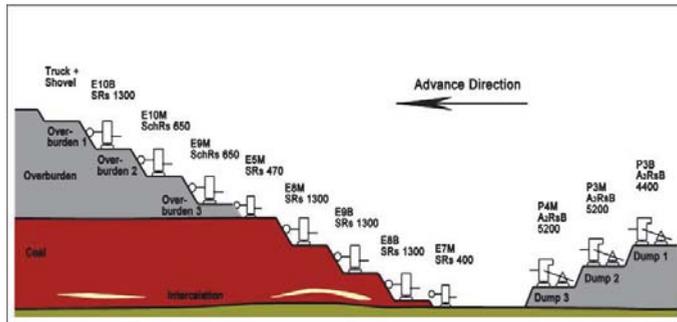


Figure 1.3. Schematic representation of excavators who create noise and vibrations.

Table 2. Creating noise and vibrations through the excavation and transport mechanisms

The mechanism for the excavation	
excavators	rotor excavators
type	ScRs1300 : 650 : dhe 315
Number of excavators	10
Theoretical capacity- Q teo.	4000 m ³ /h
Folding mechanism	
folded	folded continuous
Type	A ₂ R ₂ B
Number paler	3
Theoretical capacity- Q teo.	4400 and 5200 m ³ /h
conveyors	B-1400,1600

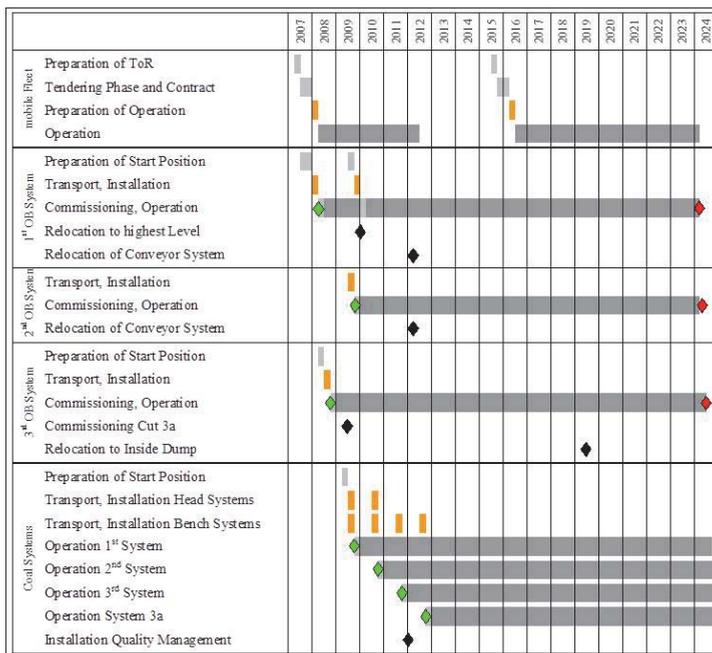
Table 3. Basic characteristics of power plants "Kosovo A" who create noise in KEK.

UNIT / Blocks	A1	A2	A3	A4	A5
Manufacturer of Kazan	Babcock	Babcock	RAFAKO Polonia	RAFAKO Polonia	RAFAKO Polonia
Manufacturer of turbine	Westinghouse (Inxh. Amerik.)	General Electric	LMZ-Rusia	LMZ-Rusia	LMZ-Rusia
Generator manufacturer	Westinghouse	General Electric	Elektro-tjaz-maz Ukraine	Elektro-tjaz-maz Ukraine	Elektro-tjaz-maz Ukraine
Since the beginning	1962	1964	1970	1971	1975
Technology	steam boiler	steam boiler	steam boiler	steam boiler	steam boiler
Case fuel	lignite	lignite	lignite	lignite	lignite
Case fuel starting	Gas oil	Gas oil	Gas oil	Gas oil	Gas oil
thermal Entry (MW)	250	480	770	770	770
Power generator (MW)	65	125	200	200	210
Cooling towers	Forced ventilation	Forced ventilation	Forced ventilation	Forced ventilation	Forced ventilation
Location	OBILIQ, Pristina	OBILIQ, Pristina	OBILIQ, Pristina	OBILIQ, Pristina	OBILIQ, Pristina

Table 4. The basic characteristics of power plants "Kosovo B" that create noise in KEK

UNIT / BLOCK	B1	B2
Manufacturer of boiler	Sten Industrie-France	Sten Industrie-france
capacity	1000t/h;177bar; 540°C	1000t/h;177bar; 540°C
Type of boiler	pirgor	pirgor
Turbine manufacturer	MAN- Germany	MAN- Germany
Kapacity	1000t/h;177bar; 540°C	1000t/h;177bar; 540°C
Type of turbine	condensing	condensing
Generator manufacturer	Alstom atlantique-france	Alstom atlantique-france
Since the beginning of the work - a fast start	1983	1984
Teknology	- steam boiler Type pirgor	steam boiler -Tipi pirgor
Case fuel	Lignite	Lignite
Strat case fuel	Mazut	Mazut
thermal entry (MW)	850	850
Generator power (MW)	339	339
Cooling towers	natural ventilation	natural ventilation
Location	Kastriot, Pristina	Kastriot, Pristina

Mining Activities Page



6. Measurement of Noise and Vibrations in the KEK Mines

The noise level in the Republic of Kosovo is regulated by the Law on protection against noise No. 02 / L - 102 and AI. Noise existing mines produce major mining equipment (PKX) and auxiliary. Sensitive places identified by noise are: residences, schools, land - in agricultural activity, etc. These areas will be affected further by raising the noise level of which will be generated by new mining operations. High level of noise directly affects the senses of hearing and the human nervous system. The level of noise in the settlements , within the area of future exploitation , ranging from 36 to 43 dB, based on EU standards are allowed outside value exploitative close less than 2 km, the noise level is from 35 to 54 dB, according to EU standards, are permitted values. Some measures have provided greater value than the

permissible because different meteorological conditions (greater speed of the wind, the 2,30m / s etc.)

Initial efforts have already been made by the INKOS to measure the noise level around existing mines as well as within the scope Sibovc SW. These measurements should be continued and intensified to create the basis for further evaluation information. Additional noise measurements should be made in the surrounding villages to create the basis for subsequent assessments about increasing noise caused by mining equipment and noise caused as a result of the change of the road for traffic.

Also in the space -SW Sibovc field off mining equipment caused the vibrations which are harmful to the workers who absorb it. Even vibrations must be taken into account during the construction of legislation³.



Figure 1.4. Type Fonometr 1680, Japanese production " INKOS " JSC

This is kind of digital appliances are hauled in measuring noise parameters, all data is in digital form and the results of the measurements are accurate. This device specifies all the information necessary to carry out efficiently and under standardized conditions for determining and verifying noise emission characteristics of electric cars. This digital equipment is necessary to compare the noise emitted by machinery as well as to control it.

Using ISO 1680: 2013, it is a code that provides noise emission characteristics within the limits of the methods of measuring noise.

With this equipment we have three types of measurement methods:

- 📏 precise methods
- 📏 Engineering methods
- 📏 Community survey methods

Method Engineering is the most widespread and most accurate in the field, and in this scientific work we used the method of measurement engineering.

From the following table we present the results of measurements of noise in the vicinity of TC - Kosovo A & B. Measurements are made: Day, evening and night.

Table 5. Tabular presentation of the results of measurements of noise in dB (total of 162 measurements were made).

Nr	Place of measurement	Date 01.02. 2015			Date 02.03. 2015			Date 03.04. 2015			Date 15.05. 2015			Date 16.06. 2015			Date 18.07. 2015		
1	School Shipitulle	38	40	41	47	41	40	40	40	40	35	38	41	54	38	41	48	40	39
2	Neighborhood	39	40	40	37	38	39	35	39	39	35	40	38	41	41	39	40	39	38
3	Neighborhood Mexhunaj	40	40	41	39	38	38	38	39	39	36	40	39	41	41	38	38	39	39
4	Mirena Quarter	42	42	43	41	40	40	36	41	42	40	42	41	44	40	42	42	41	41
5	Hade village	45	46	45	41	48	45	41	47	44	38	48	46	40	46	44	41	48	45

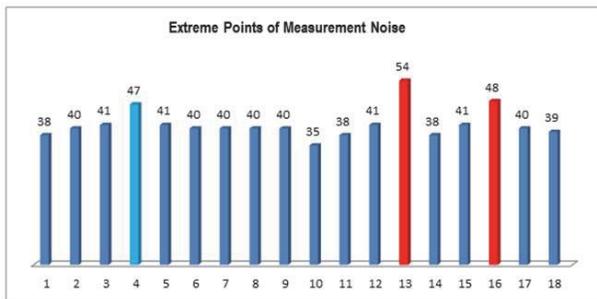
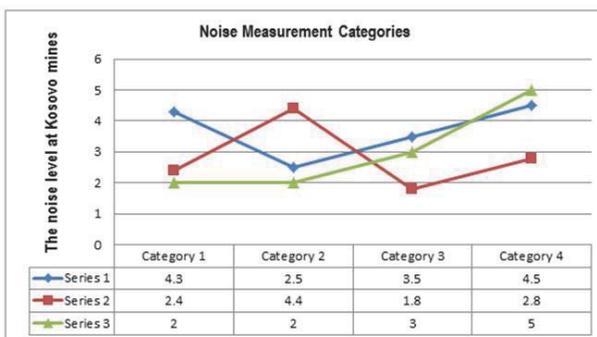


Diagram 1. Diagram of the outcomes of the measurements to the location of the place inhabited

Table 6. Maximum allowed values for certain locations

Location	Populated places	Industrial countries	mixed
Max allowed limits in dB	55	80	by day.....60 dB at night.....45 dB



7. Effects of Noise

When starting the new mine, it will increase the impact of noise, and it is expected to be similar to the noise of the existing mines. It will be present in the mine first and then around her. The source of this noise is: major mining equipment (excavators, belt conveyors, etc.) as well as auxiliary machines (bulldozers, engines and other internal combustion).

Noise abatement measures should consist of : better maintenance of equipment that produce noise at source , placement or construction curtains , the walls around the appliance and hermetic closure of the doors and windows in the settlements and other public facilities such as schools, clinics and other business facilities that accept noise. Workers who are mostly noise and vibrations subject you must use equipment that protect against noise.

7.1 The impact of the vibrations

Mechanical oscillator vibrations present troop movements materialize. They can be: external vibrations and ambient indoor.

External vibrations in the environment apart from the natural activity, tremors (earthquakes) of land, line by chemical processes inside the earth and the human factor and other factors perimeter. During mining activities,minima, transport of various materials, transportation Rotor excavators,conveyors,folding,bulldozers, loading spoons, other auto bearings. Indoor vibrations (at work) are in working activities for the benefit of the goods.

Measures to reduce the vibrations mainly lie in the straight and rational use of equipment and the maintenance of their best in order to maintain workers and residents living in area 4. In some countries, mining activities will reach close

to home areas. To assess the impact in the future should be carried out a basic analysis for the northern part of Hades, the respective locations surrounding the existing mines to be identified.



Photo 1.5. Impact of noise in residential homes - Hade

8. Conclusion

In the case where mining activities reach nearby villages then also presented obstacles to the noise and vibrations intensified. During noise measurements at these points is noticed a pronounced noise day especially during their example. Shipitules the school is 54 and 47 dB, while in Hade village mosque; noise from PKX reaches 48 dB. According to the measurements made and verified as night and day are observed in dB values are approaching standards to overcome noise but no measure has not passed the European standard noise.

Haden village and the village Shipitule, then two villages are located very close to the mine. Termination of the villages of mining operations will not be possible, but can be taken compensatory measures. This for example means planting trees and shrubs to reduce the visual impression. Both assessments must be intensified as could be implementable measures to reduce noise and pollution. These assessments will allow intensified development of appropriate solutions with a choice of plants for planting and the manner of planting.

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