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STUDY ON THE IMPACT OF PRODUCT ON THE GROUND DUE TO OPERATION OF STATION ASPHALT GURENI GORJ

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Abstract

Sorting station and production of asphalt mixtures, the city-Peştişani Gureni activity is to dosing, heating and drying aggregates, followed by mixing them with bitumen and filler to obtain asphalt mixtures. The main sources of soil contamination inside the site are: storage and handling of fuels and fuel, particulate emissions from the manufacturing process technology mix asphalt and maintenance cars. To assess soil contamination with heavy metals in 2011 were collected and analyzed soil samples from the 0-30 cm depth in the following collection points: inside the station mixtures near the aggregate dryer and reservoir near fuel. The soil samples were chemically analyzed by semiquantitative emission spectral analysis method and were determined as indicators of As, Ba, Cd, Cr, Cu, Pb, Mn, Zn, Ni. Concentrations obtained were compared with normal values, alert thresholds and thresholds for intervention and results have been interpreted.

Key words*: soil pollution, heavy metals*

INTRODUCTION

Sorting station and production of asphalt mixtures, the city - Peştişani Gureni activity is to dosing, heating and drying aggregates, followed by mixing them with bitumen and filler to obtain asphalt mixtures.

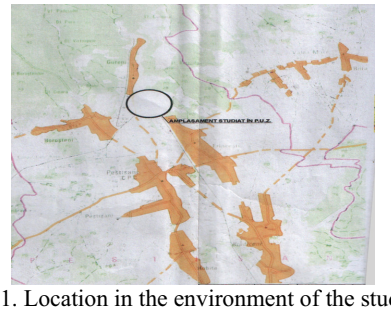

Fig. 1. Location in the environment of the studied zone

The neighborhoods of location are: to the north, Gureni village, to the south, Peştişani village, to the east, Bistriţa river and Frâncești village, to the west, Boroşteni village.
The ensemble of the station includes:
- current water providing ensemble;
- proper sorting station;
- sorts storehouse (the paddocks);
- asphalt station.

Current water providing ensemble: the water source neccesary to the sorting station activity is the Bistriţa river and forms the recycled water.
Sorting station: aims to getting of different granulation sort (Fig. 2) and assures the processing of a 60 mc/h ballast volume for which is consumed a 120 mc/h water quantity.

Fig. 2. Sorting station

Sorting station is composed of:
- *Ballast receiving bunker*, it is provided at the top with a ramp for gross aggregate instalation supply. At the bottom is provided with shut and adjustment device of belt supplying.
- *Conveyor belts*, assure the transport of mineral raw material (ballast) in gross status from the supplying bunker to the proper sorting

station and of the sorts achieved by the station to the sort paddocks.
- *Separation sieve*, made of iron grill, it assures the cobble separation, that means the (1) 100 mm fractions, of the gross ballast.
- *Selection sieves*, made of perforated metal, make the ballast sortation on planned fractions, by vibration, under the stream of water.
- *Grainmeter*, directly supplied by a conveyor belt with coarse material obtained by sortation. In the grainmeter enter the coarse material where takes place the balbotage and from where results the small granulation material.
- *Sorts distribution and reception bunker* has 3 bins and spouts to the conveyor belts.
- *Screw feeders binder*, it is using for the exhaust and final washing of the 0-3 mm sort in the aggregate scrubbing stream. It is a steel profiles, board profiles and board-made construction, made of a snec (snail) mounted into a dish, provided with a drive group and a lower bearings. The material is introduced into the binder through the bottom of dish, the use being evacuated through the top. The washing residual water is eliminated through a drain pipe.
- *Storage belts*, consist of belts which transport the finished material, according to the sort dimension, to the storehouses furnished for storage.

Sort storehouses (paddocks). As a result of wet milling process of the ballast, the resulted sorts are stored on a concrete platform, in different paddocks for each grainmetric fraction and separated by concrete diaphragms for preventing their mixture and for easing their selective loading into the means of transport.

Asphalt station. Aims the production of asphalt mixtures (Fig. 3).

Fig. 3. Asphalt station

The asphalt station components are:
- *The aggregate predispenser*, is composed of a aggregate welded chassis and 4 storage bunkers for 4 aggregate granulations. It makes the volumetric predosage of the mineral aggregates with the natural moisture.
- *The conveyor belt*, has the role to download the aggregates from the collectors of the predispenser, in order to pick up and drain them into the loading hopper of the dryer.
- *Aggregate dryer machine*, makes the heating and the drying of the aggregates at the moisture and the temperature required by the asphalt mixture preparation technology.
- *Concrete mixing tower*, has the following functions: the download of the hot aggregates from the dryer and the lifting to the download level into the storage bunkers, the storage of the hot aggregates in 4 bunkers corresponding to the 4 sorts in order to enter them in the recipe, the weighing of a dose of filer, needed for a sharge, additional over the aggregates, the weighing of a bitumen dose for a sharge, the downloading of the bitumen into the mixer, the mixing of the components.
- *Bunkers with skip*, makes the reception of the mixture from the mixer of the mixing tower, the transportation and the downloading into the mixture storage bunker, as well as the downloading of the mixture into the mean of transport.
- *Dust filter*, is designed for the fume with high dust content, resulted from the drying process of the aggregates and of the sucked gases from the sieve bin of the mixing tower.
- *CAB command*, makes the technological cycle of preparation of the asphalt mixture in the automatic regime.
- *Aggregate drying injector*, works on the basis of G.P.L. or on the basis of easy fuel as C.L.U.
- *Bitumen tank*, has the following functions: storage, heating, loading, decanting, recirculation (bubbling) and delivering of the bitumen to the mixing tower.
- *Pneumatic installation*, includes all the motor circuits of the mixing tower mechanisms and of the dust filter.
- *Filter tank*, includes 2 storehouses of 60 t each, provided with electric engine powered vibrator.

- *GPL fuel tank*, has the following functions: storage, transition from liquide state to gaseous state of the fuel and its delivery to the asphalt station injectors.
- *Fuel homes*, has the following functions: storage and delivery of fuel (CLU) for the asphalt station burner and the diesel supply of the auto-equipments of the production base [1].

MATERIAL AND METHOD

Most part of the platform is covered with a fine sort aggregates layer originating from the dust depositions of the technological processes.
The sources of soil contamination from the enclosure of company location are: storage and handling of the fuels, particles emissions from the technological process of manufacture asphalt mixture and car maintenance.
Due to the rough handling of the fuels, at the platform surface highlighted traces of petroleum products from the fuel storehouse location.
From the point of litological and pedogenetic view, the soil vulnerability to pollution, and as well as of the groundwaters, is reduced. [1]
In order to evaluate the soil contamination with heavy metals, during the 2011 year, were harvested and analysed soil samples, from the 0-30 cm depth with the help of a carotier tube.
The samplings were made into the mixture station, i 2 points: by the aggregate dryer and by the liquid fuel tank (CLU) (Fig. 4).
The soil samples were chemically analysed by semiquantitative emission spectral analisys method and were determinated as indicators of As, Ba, Cd, Cr, Cu, Pb, Mn, Zn, Ni.

Fig. 4. The liquid fuel tank

RESULTS AND DISCUSSIONS

The concentrations obtained during the analysis were compared with the normal values, with the threshold alert, with the threshold of intervention (Table 1).

Table 1. Content of metals in soil in the year 2011

Metals analised	Normal values (ppm)	Threshold alert (ppm)	Threshold of intervention (ppm)	Determinated value (ppm)	
				Aggregate dryer	Liquid fuel tank
As	5	25	50	0	0
Ba	200	1000	2000	500	200
Cd	1	5	10	0	0
Cr	30	300	600	15	20
Cu	20	250	500	8	12
Pb	20	250	1000	14	18
Mn	900	2000	4000	300	400
Zn	100	700	1500	0	0
Ni	20	200	500	7	15

The results of determinations highlighted the followings:
- there was not recorded surpasses of the normal values in the point from inside of mixture station, except the Ba concentration.
- the thresholds alert are not surpassed for any determinated elements [2] .

CONCLUSIONS

Sorting station and production of asphalt mixtures, the city-Peştişani Gureni activity is to dosing, heating and drying aggregates, followed by mixing them with bitumen and filler to obtain asphalt mixtures.
The main sources of soil contamination inside the site are: storage and handling of fuels and fuel, particulate emissions from the manufacturing process technology mix asphalt and maintenance cars.
The results of determinations highlighted the followings:
- there was not recorded surpasses of the normal values in the point from inside of mixture station, except the Ba concentration.
- the thresholds alert are not surpassed for any determinated elements [3].

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