INCREASED RISKS OF IMPACT ON THE ENVIRONMENT OF POTI AND KULEVI SEA PORTS

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Abstract: *Based on the status of the maritime country of Georgia, we studied the increasing risks of the pollution by the ballast water and wastewater volume increase in the sea caused by the volume of freight turnover of Poti and Kulevi sea ports. For this, we conducted research in two directions: on the sensitive areas of Kulevi and Poti pipeline terminals and ships in the port. We first examined ecological parameters: namely water relative temperature, water acidity (pH) and salinity (TDS) quantitative indicators as in the stationary, also in non-stationary conditions. The results of the laboratory survey of water samples indicate that the relative temperature (t1 / t2) of Poti (t1 / t2) 0,87 acidity (pH) 8.34, salinity (TDS) 15,60 Relative temperature of turbocharging (t1 / t2) 0,87, acidity (pH) 8.37, salinity (TDS) 15,12 Secondly, on the ships entered in the ports, we took as ballast and wastewater samples and analyzed in accordance with the legislation:*
1. Ballast water analysis from tanker "Metin K" from Kulevi, shows that increased nitrogen +6 mg / l, oilseeds +0.7 mg / l, nitrates 1,3 mg / l and nitrites- 0,35 mg / l
2Poti Port - N 5 Ventilation Examples of Weight Watchers Examples of Weighted Particles 4.0 mg / l, Ammonium 1,67 mg / l of ballast water analysis shows that the total amount of oil nitrogen is 0.6 mg / l, + 0.7 mg / L, nitrates 1,3 mg / ld nitrites - 0,35 mg / l.
As a result of these two studies, based on reliability and risk theory of Kulevi, the mean value of salinity (TDS) is equal to: 10,85, for Poti port, the mean value of salinity (TDS) is equal to 12,34.
In the theoretical and laboratory studies we have identified the risks of contamination of ports and waste water pollution.
KEYWORDS: *WASTEWATER, BALLAST WATER, RELIABILITY, RISK.*

1. Introduction

The transport infrastructure of Georgia is unimaginable without the development of marine ports, especially for the sea ports of Batumi, Poti and Kulevi. They have a crucial role in shipping of marine cargoes. The development of ports should be proportionate to other transport infrastructure of Georgia. Therefore it is necessary to develop a scientifically justified program for the development of Marine Infrastructure of Georgia, which once again indicates the goal of our research to study the risks of polluting the pollution of the Poti and Kulevi sea ports by increasing the volume of cargo turnover.

2. Preconditions and means for resolving the problem

It should be noted that the necessity to provide ecological safety of marine ports under the strategic direction of the country, located on the Black Sea, which is directly related to the scientific study and prediction of the ecological problems of the Black Sea. In addition, as it is known, the ecological environment of the Black Sea depends mainly on the amount of oxygen (%) and bacteria, salinity (TDS), water acidity (pH), air (t1) and sea temperature t2 (C0). Special attention should be paid to the study of the number of oxygen in the vertical layer of the sea (depth 100 m), where the photosynthesis process is active and promotes the viability of the flora and fauna. Taking into consideration all this, the scientific research of the Black Sea ecological issues and its prediction allows us to evaluate the main ecological parameters in the Black Sea, specify their quantitative and qualitative characteristics, new vulnerable areas of the sea coast, which at the next stage will allow us to fully evaluate the Black Sea ecology problems and ecological safety measures of coastal areas and surrounding areas are planned.

In the theoretical study of the thesis the study of the main ecological parameters of the Black Sea are presented. The use of conducted studies in practice will enable us to assess the ecological security of Kulevi and Poti ports and adjacent territories located within the boundaries of Georgia, which is one of the main strategic and economic priorities of Georgia's economic and social development. We conducted surveys in two directions: on the sensitive areas of the Kulevi and Poti pipeline terminals and ships in the port.

The aim of the first research carried out in 2015-2017 was to take samples of water samples in the seaside zones and measuring the main parameters:

1. Fixing the water (t1) and air (t2) temperature;
2. Water acidity (pH);
3. Determination of quantitative indicators of salts (TDS).

First of all, on ships arriving in ports, we took as ballast and wastewater samples and analyzed in accordance with the legislation:

Table 1. *Analysis of Ballast Waters from the Tanker –* "Metin K" in Kulevi Port

N	Showings	sample	Norm
1.	Oxygen dissolved in water	8,1 Mg/L	6,0 Mg/L
2.	pH	7,9	6,5–8,5
3.	Salinity	15,9 Mg/L	19,0–22,0‰
4.	Weighted particles	2,0 Mg/L	30 Mg/L
5.	copper	0,9 Mg/L	0,001 Mg/L
6.	Iron	0,06 Mg/L	0,005 Mg/L
7.	Nitrates	1,3 Mg/L	40 Mg/L
8.	Nitrites	0,35 G/L	0,08 Mg/L
9.	Ammonia	0,05 G/L	0,39 Mg/L
10.	Common nitrogen	1,6 Mg/L	50 Mg/L
11.	Common phosphorus	0,2 Mg/L	0,0001 Mg/L
12.	Biochemical demand for oxygen	5,7 Mg/L	it must not be 3 Mg/L
13.	Chemical demand for oxygen	15 Mg/L	15 Mg/L –30 Mg/L
14.	Oil pipelines	0,7 Mg/L	0,05 Mg/L

Table 2.*Analysis of ballast waters taken from the tanker "Seaespress" in the Kulevi port*

N	Showings	Sample	Norm
1.	Oxygen dissolved in water	8,4 Mg/L	6,0 Mg/L
2.	pH	7,9	6,5–8,5
3.	Salinity	16,7 Mg/L	19,0–22,0‰
4.	Weighted particles	2,0 Mg/L	30 Mg/L
5.	copper	0,7 Mg/L	0,001 Mg/L
6.	Iron	0,09 Mg/L	0,005 Mg/L
7.	Nitrates	1,35 Mg/L	40 Mg/L
8.	Nitrites	0,4 Mg/L	0,08 Mg/L
9.	Ammonia	0,07 Mg/L	0,39 Mg/L
10.	Common nitrogen	1,9 Mg/L	50 Mg/L
11.	Common phosphorus	0,21 Mg/L	0,0001 Mg/L
12.	Biochemical demand for oxygen	5,9 Mg/L	it must not be 3 Mg/L
13.	Chemical demand for oxygen	15,8 Mg/L	15 Mg/L –30 Mg/L
14.	Oil pipelines	0,5 Mg/L	0,05 Mg/L

Table 3.Poti Port - N 5 Watershed Water Supply Sample 2017.04
Table 4. Poti Port- anker "Cassiopea Star"– Agricultural fecal water sample taken from the clearing plant from the pipe 2017. 02

water t◦	12◦ C
Colour	Colorless
smell	1 Bal
Sediment	No
Transparency	Transparent
Weighted particles	4,0 Mg/L
Dry balance	–
Chlorides	–
PH	8,5
Residual chlorine	–
Ammonium	1,67 Mg/L
Nitrates	–
Oxygen soluble in water	5,9 Mg/L
water t◦	10◦ C
Colour	yellow
smell	5 Ball
Sediment	Yes
Transparency	Turbid
Weighted particles	58 Mg/L
Dry balance	–
Chlorides	–
PH	5,3
Residual chlorine	13,0 Mg/L
Ammonium	–
Nitrates	–
Oxygen soluble in water	3,8 Mg/L

"Results of laboratory chemical research on Poti and Kulevi water pollution are given in the following tables (1, 2, 3, 4). Pollution indicators are comparable to international standard standards as well as surface water pollution sanitary norms, with all metallic content not exceeding the permissible concentration concentrations (black, cold, water, cadmium, copper, bullet).

Secondly, the research of the "Poti (landing-stage) Water and Air Relative Temperature Forecast" was carried out during the 4 seasons of 2017. The average value of relative temperature is equal to:

$$1) \quad t_1/t_2=\frac{\sum_{i-1}^{n}(t_1/t_2)_i}{N}=\frac{\sum_{i-1}^{50}21.54}{50}=0,87$$

The average value of relative temperatures during the 4 seasons of 2017 for the Kulev berth is equal to:

$$2) \quad t_1/t_2=\frac{\sum_{i-1}^{n}(t_1/t_2)_i}{N}=0,87$$

"Water Potential (TDS) Forecast" - One of the most important features of the Black Sea ecological parameters is the determination of salinity of sea water, which basically determines the state of flora and fauna. The statistical order obtained as a result of the survey results in 50

points - the law of distribution of salinity change in the Black Sea by using reliability and risk theory. "The mean value of salinity of Poti berth (TDS) is equal to:

$$1)(TDS)=\frac{\sum_{i-1}^{n}(TDS)_i}{N}=\frac{\sum_{i-1}^{50}(689.13)_i}{50}=15.60$$

The average value of salinity (TDS) during the 4 seasons of 2017 at Kulev berth is equal to:

$$2)(TDS)=\frac{\sum_{i-1}^{n}(TDS)_i}{N}=15.12$$

"The prediction of sea water acidity (pH) of Poti (sea level)" - The surveys carried out in the Black Sea waters of Georgia, whose statistical rank has also been 50 points, allows for a sea water acidity (pH), the mean value of which is:

$$1) \ pH=\frac{\sum_{i-1}^{n}(pH)_i}{N}=\frac{\sum_{i-1}^{50}396,25}{50}=8,37$$

During the 4 seasons of 2017 for the Kulevi berth. Acidity (pH), the average value of which is equal to:

$$2) \ pH=\frac{\sum_{i-1}^{n}(pH)_i}{N}=8,34$$

3. Conclusion

As a result of the works carried out by the reliability and risk theory, the average value of salts (TDS) for the Kulevi berth is equal to: 15,12 mg / dm3 and acidity - 8,34; For Poti Port, the average value of salinity is 15,60 mg / dm3 and acidity - 8,37.

In the theoretical and laboratory studies we have found that the risks of contamination of ports and ballast waters are expected to increase.

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