

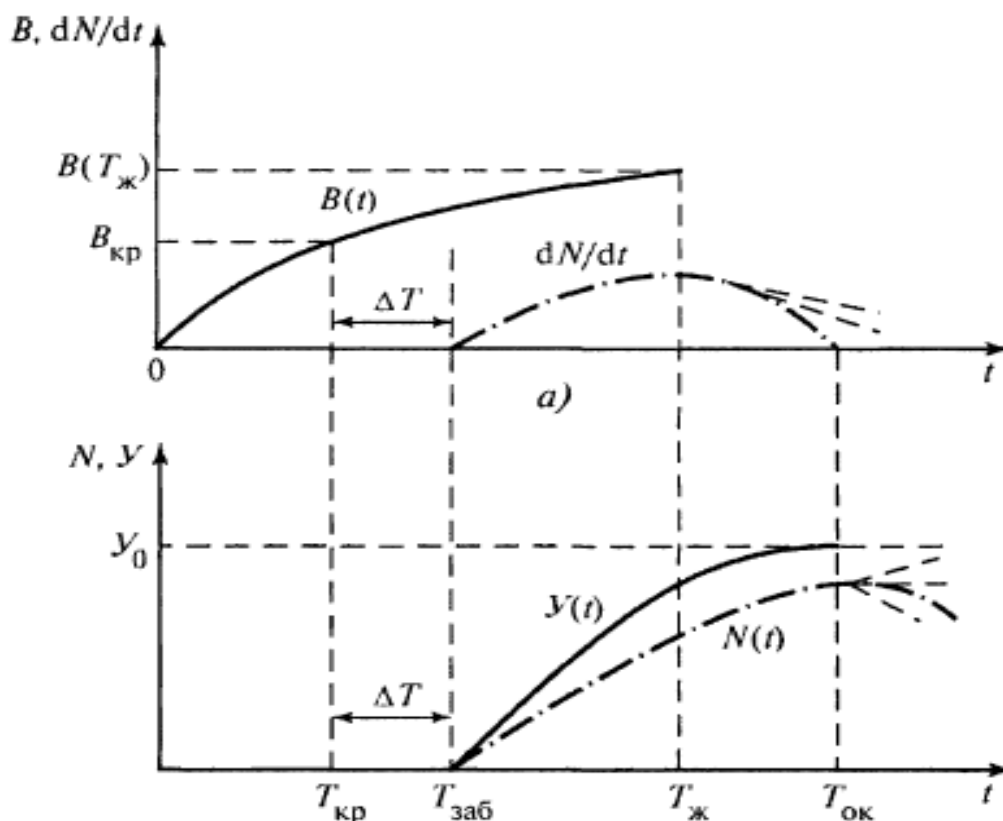


Рис. 1. Загальні залежності моделі екологічного страхування ПП

ЛІТЕРАТУРА

- [1]. Борисенко В.Д., Кисетов Ю.В. Математическая модель расчета нетто-тарифа при страховании морских судов, Збірник наукових праць НУК.- Миколаїв: НУК.-2004.-№4 (397).-с.92-97.

Reducing the Risks of Negative Impact on the Environment of Industrial Enterprises

Yu. Kisetov,

Admiral Makarov National University of Shipbuilding

Abstract. The role and place of environmental insurance of industrial enterprises is analyzed, the main theses of the insurance model for the short-term and long-term impact of the enterprise's activities on the environment are formulated.

Keywords: environmental insurance, model of environmental insurance.

УДК 621.43.068

THE CARBON DIOXIDE PROBLEM IN INTERNAL COMBUSTION ENGINES

Kapitonov P.P.¹, Leybovych L.I.², Patsurkovskiy P.A.³

¹Director of Teodora Ltd.,

teodora@gmail.com

²PhD, Associate Professor, Admiral Makarov National University of Shipbuilding, Mykolaiv, Ukraine,

recycle.lev@gmail.com,

³PhD, Associate Professor, Admiral Makarov National University of Shipbuilding, Mykolaiv, Ukraine,

pavlo.patsurkovskiy@nuos.edu.ua

Abstract. Growth the number of internal combustion engines increasing carbon dioxide emissions. The scheme of installation of the exhaust gases purification from carbon dioxide is presented.

Keywords: carbon dioxide, emissions, high voltage electrochemical cell, electrochemical reactor.

The carbon dioxide (CO₂) concentration in dry air is 0.02-0.045 vol. % (250-450 ppm).

The industrial revolution [1, 2] of the last 100...200 years has led to a sharp increase of carbon dioxide concentration in the air of the Earth's atmosphere (fig. 1) and it causes global warming.

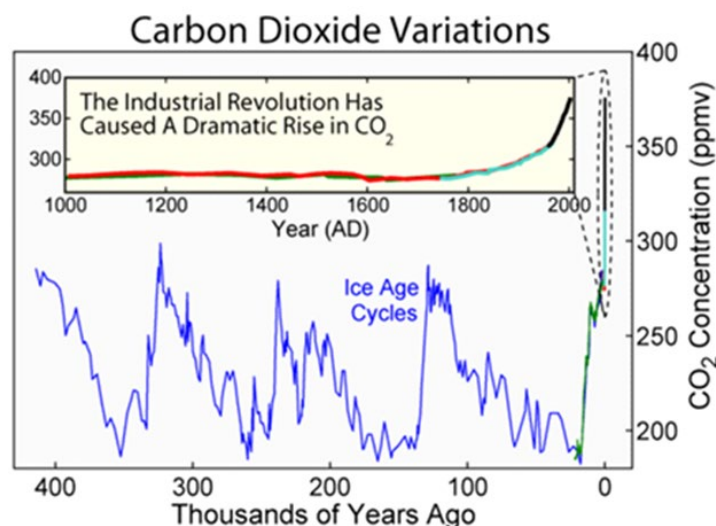


Fig.1. The carbon dioxide concentration in the air of the Earth's atmosphere

Internal combustion engines are one of the biggest sources of carbon dioxide in the atmosphere. Electric generators with a diesel drive are located in all countries of the world (Fig. 2), practically [3].

The parametrs of diesel fuel are shown in table 1.

Table 1. The average parametrs of diesel fuel

Parametr	Dimension	Value
Diesel density	kg/l	0,845
Usage coefficient	-	0,9
Carbon concentration	%	87
Range of fuel consumption	l/h	6,4...14,3
Conversion factor for the amount of CO ₂ obtained from the 1 kg of carbon combustion	-	3,67

The results of calculations for diesel fuel parametrs presented in table 1 show that annual CO₂ emissions from DG35, DG43 and DG70 are in the range from 136 to 304 tons/year. An elementary calculation shows that even small diesel generators emit hundreds of kilograms of carbon dioxide into the atmospheric air.

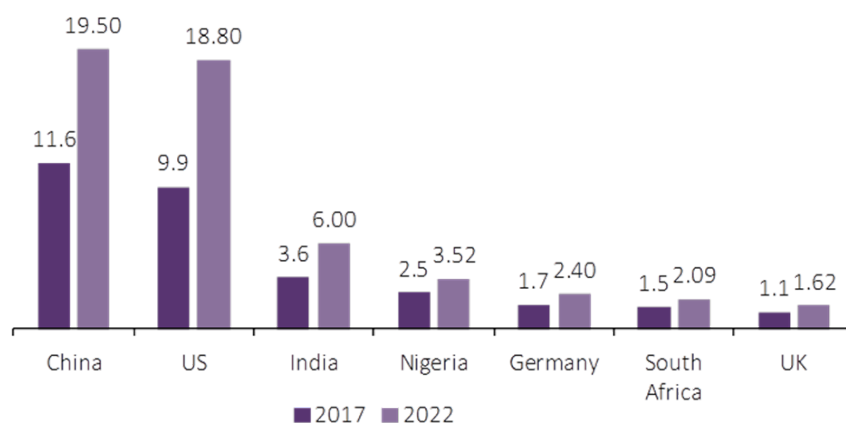


Fig.2. The diesel generators – key countries' market volume (GW) in 2017...2022 [3]

The authors propose to use a high voltage electrochemical cell in order to reduce CO₂ emissions. The schematic diagram of installation of the exhaust gases purification from carbon dioxide is presented on fig.3.

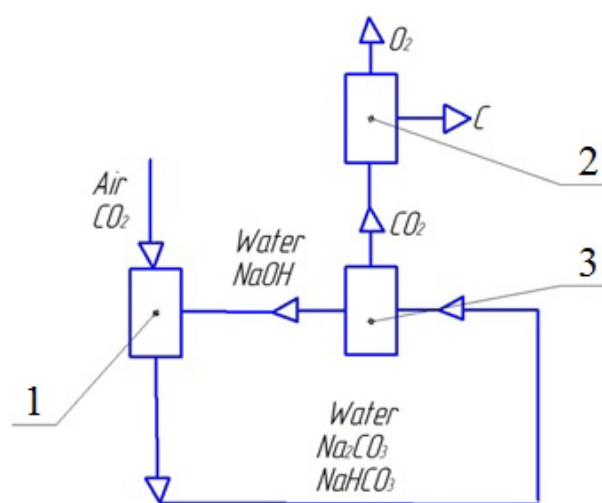


Fig.3. The schematic diagram of installation of the exhaust gases purification from carbon dioxide:

1 – absorber, 2 – high voltage electrochemical cell, 3 – electrochemical reactor

To summarize, the sharp increase of carbon dioxide concentration in the air is a catalyst of global warming process. The scheme of installation of the exhaust gases purification from carbon dioxide is presented.

REFERENCES

- [1] [1]. Lüthi, D., Le Floch, M., Bereiter, B. *et al.* (2008). High-resolution carbon dioxide concentration record 650,000–800,000 years before present. *Nature*, 453, 379–382. DOI: <https://doi.org/10.1038/nature06949>.
- [2] [2]. Carbon dioxide in Earth's atmosphere. Available from: https://en.wikipedia.org/wiki/Carbon_dioxide_in_Earth%27s_atmosphere.
- [3] [3]. Global diesel generators market to reach value of \$115.1bn in coming years. Available from: <https://www.power-technology.com/comment/global-diesel-generators-market-reach-value-115-11bn-coming-years>.