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BOOK REVIEW OF
TEXTBOOK ON FIRE PREVENTION

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TEXTBOOK ON FIRE PREVENTION

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ABSTRACT: The book "Principles of Fire Prevention in the Petroleum and Petro-Chemical Industry" is reviewed. The textbook, consisting of six parts, presents the basic concepts and physical-chemical principles of the process of combustion, presents a description of various types of production as concerns their fire danger and expounds the principal measures used to eliminate causes for the incidence and spread of fires, evacuation of personnel and materiel in case of fire, effective methods for putting out fires, etc. However, the book contains a number of defects: certain obsolete norms are included, the latest fire prevention methods are omitted, and certain areas are inaccurately covered. Specific faults are listed.

In 1965, Khimiya Press published a textbook entitled Osnovy Protivopozharnoy Tekhniki v Neftyanoy i Neftekhimicheskoy Promyshlennosti [Principles of Fire Prevention in the Petroleum and Petrochemical Industry]. The author of this textbook is V. A. Goncharyuk. The Ministry of Higher and Secondary Specialized Education of the USSR has approved this textbook for petroleum specialties in higher educational institutions. /62[1]

This textbook is needed for such production areas in which fire represents a danger as the petroleum and petrochemical industry.

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We should note that this textbook contains a number of essential defects. For example, some obsolete norms are included, the latest fire prevention methods are not included, and some questions are improperly discussed.

It is stated on page 11 that the reasons for fires are separated into immediate and primary. The state fire inspectors do not make this distinction.

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[1] Numbers in the margin indicate pagination in the foreign text.

Also, on this same page, fires are classified into five groups. This is also not quite correct. In section 2, chapter III, "The Classification of Production Processes According to Degrees of Fire Danger and Explosion Danger," the production processes included in the oil refining and petrochemical industry, which are in classes A, B, C, D and E as concerns their fire danger, should have been briefly listed.

It is stated on page 152 that the usage of automatic water sprinkler devices in production areas allows the floor area separated by fireproof walls to be increased by 50%. We should note that, according to an order of the State Construction Administration of the USSR No. 185 of 31/10/64, when production areas are equipped with sprinklers or automatic drenchers, the floor area separated by fireproof walls can be increased by 100%.

It is also stated in the textbook that metallic supports beneath apparatus, in order to avoid deformation in case of fire, are protected so that the limit of fire resistance of the design is no less than three hours. This is not quite true. According to PTUSP 02-62, supports for apparatus containing over five cubic meters of liquid petroleum products at each level must have a fire strength limit of no less than two hours for the columns and one hour for the tanks, crossbars and couplings.

In the section "Fire Walls and Fireproof Zones," it is stated that a fire wall should have a fire resistance limit of five hours. First of all, according to the construction norms and rules P-A.5-62, the word "fire wall" is to be replaced by the word "fire resistant wall" [brandmauyer and protivopozharnaya stena respectively -- Tr.], and the limit of its fire resistance should be no less than four hours, not five hours as stated in the textbook. Also, fire resistant walls should extend no less than 60 cm above a flammable roof and no less than 30 cm above a nonflammable roof. With nonflammable flooring and roofs, the fire resistant walls need not extend through the flooring and roof and need not extend above the roof, regardless of the flammability group of the roof. The numerical data presented on this problem are clearly obsolete.

On page 154 (Figure 47), a useless picture of a fireproof zone and water curtain is presented, since at the present time buildings with this type of flooring are not being constructed for the petroleum refining and petrochemical industries.

On page 157 in chapter III, "Special Fireproof Barriers," nothing is said concerning breather valves operating simultaneously with the fireproof barriers installed in reservoirs. This chapter should have contained information on nonfreezing breathing valves which have recently been introduced.

In section 4 of this chapter "Water Curtains" it is stated that water sprinklers which create water curtains are used to protect the surfaces of reservoirs from the effects of radiation in case of burning of a flammable liquid in a neighboring container. The norms now in effect do not call for

this measure, and in fact it is not used in practice.

On Figure 55 (page 166) a water curtain is shown set up before a petroleum pumping building. This is not called for by the norms, and in practice this protection of petroleum pumping stations is not used at oil refineries.

On Figure 57 (page 167) the damming used in storing easily flammable liquids in reservoirs is shown not quite correctly. It should be performed in correspondence with the requirements of section 29 "Norms and Technical Conditions for the Planning of Storage Enterprises and Farms for Easily Flammable Liquids NiTU 108-56)." According to §46 of PTUSPO 2-62, particular /63 requirements are placed on subterranean reservoirs containing petroleum and fuel oils.

In section 2 of chapter I in the fourth portion of the book, "Evacuation of Personnel and Materiel in Case of Fire," it is stated that the evacuation exit is that exit leading to a neighboring room in which no production processes with fire danger categories A, B or C are being performed. At the present time, according to SNiP P-M.2-62, evacuation through category C is permitted, as long as there are no less than two exits, each of which leads to an individual, separate room with direct exit or exit through a corridor, vestibule or stairwell to the outside.

The total width of doors in production buildings and stairwells along evacuation roots shown on page 170 does not correspond to the demands of SNiP P. a. 6-62 and the corresponding sections of the SNiP.

Page 171 shows the demands for fire stairwells. Actually, these demands do not match the applicable norms presented in SNiP P. a. 6-62 and SNiP P M. 2-62.

Figure 60 (page 173) shows the installation of a vertical fire escape ladder for a three story building. Actually, no such norms for fire escape ladders for three story buildings exist.

In section 1 of chapter II in the fifth portion of the book, "Instruments, Equipment, Devices and Machines for Extinguishing Fires," the author writes that the OP-3 fire extinguisher is used primarily to extinguish flames of easily flammable liquids. We must note that at the present time this type of fire extinguisher is no longer being produced by our industry, being considered an obsolete design.

In the section "Fire Trucks," the usage of the type 2 SMN-20 cement mixer truck for foam fire extinguishing purposes, which can be successfully used in the petroleum industry for the extinguishing of fires in large reservoirs, should have been mentioned. This vehicle, carrying ten to twelve tons of foam powder, can provide sufficient chemical foam to put out fires on petroleum product reservoirs of up to 5,000 cubic meters. Thus, as concerns the quantity of foaming powder in its container, it can be used to replace four type PMZ-16m vehicles, and as concerns foam output rate, can replace

six type PG-50 portable foam generators.

On page 199, Table 23, which shows water expenditure for outdoor fire extinguishing, cannot be used, since it is taken from "Fire Prevention Norms for Construction Planning of Industrial Enterprises and Populated Areas (N102-54)" published in 1959. As this textbook was being composed and published, a new table became effective in the Construction Norms and Rules P-G3-62 "Water Supply. Norms for Planning." This table contains a number of new normative statements.

Page 201 contains a reference to PTUSP 01-51, which was replaced in 1963; the reference should be to PTUSP 01-63.

The book should mention a number of important problems such as the fire danger of shelves, pump-compressor stations, pouring and filling devices, and should describe modern methods of storage of easily flammable and flammable liquids, as well as compressed gases in storage areas.

The book will be considerably more useful if the author eliminates these defects in the second edition.

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