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USSR Report

TRANSPORTATION

(FOUO 1/82)

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MOTOR VEHICLE

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METHOD FOR PLANNING ROAD CONSTRUCTION IN WESTERN SIBERIA

Moscow NEFTYANAYA PROMYSHLENNOST' SERIYA "NEFTEPROMYSLOVOYE STROITEL'STVO" REFERATIVNYY NAUCHNO-TEKHNICHESKIY SBORNIK in Russian No 9, 1981 (signed to press 9 Sep 81) pp 2-5

[Article by P. G. Purtov and V. A. Rybakov (Giprotyumenneftegaz [State Institute for the Design of Oil and Gas Enterprises in Tyumenskaya Oblast]): "On the Procedure for Forming a Basis for Building Roads During the Conquest of West Siberia's Oilfields"]

[Excerpt] Substantial funds are invested each year in developing the road net of West Siberia's oil-recovery regions. During the past 10 years expenditures for building motor-vehicle roads was 13 to 20 percent or more of the total capital investment for building oilfield facilities for Glavtyumenneftegaz [Main Administration for the Oil and Gas Industry of Tyumenskaya Oblast]. Since the start of the conquest of the oilfields, more than 1,200 kilometers of hard-topped roads have been put into operation. However, the requirement for such roads is much greater. Failure to provide enough roads of high passability slows the pace of buildup of the oilfields, leads to additional capital construction costs, increases operating expenditures, mandates a larger motor-vehicle fleet, and promotes premature wear of transport equipment.

The lag in road construction in West Siberian oil regions can be explained by the high rate of growth in the amounts of oil recovered, the large scale of construction work in areas with a poorly developed economy, inadequate development of construction organization capacity, and a lack of local labor resources.

One of the most important measures necessary for developing a large fuel and power complex is the planning of capital construction in accordance with the resources and capacity of construction organizations, that is, avoiding the emergence of disproportions. Moreover, additional steps must be taken to expand sharply the scale of capital construction. Main attention should be paid to increasing the production of building materials and to reinforcing construction organizations with personnel and the required equipment.

Improvement of planning work is of great importance. For this purpose, it is desirable to prepare drafts of the plan for the main directions for economic and social development for 10 years, with breakdown by year for the first 5-year period but as a whole for the second 5 years (for capital investment), and also to introduce a system of scientifically sound technical and economic norms and standards.

Ministries and agencies should engage in making up draft plans. Branch-of-industry institutes are doing the basic work of determining the prospects for development of the branch. Giprotyumenneftegaz is engaged in making up integrated schemes for developing and siting oil-recovery enterprises and facilities in West Siberia, including determination of the requirements for roads and their engineering categories. The essence of the method, which can be used also in other oilfield regions of the country, consists in making up a scheme for development of the road net for a long-term period, which is coordinated with plans for developing the region's oil industry. The content. structure and method of preparing the scheme are as follows.

1. The prospects for developing the oil industry in the region, that is, the geological-engineering nature of the fields and the main parameters of their development, are determined: the number of producer wells put into operation; the inventory of producer wells; the amounts of oil recovery and drilling; and the fields that are producing at the start of the plan period, as well as those that are to be introduced during the plan period. For the longer term, promising areas and structures are taken into account.

2. The characteristics of the transport network adjacent to the oil-recovery region are given: the railroads; navigable waterways; ports and docks; airfields with runways; and the highways that link the oil-recovery region with industrial centers, ports, railroad yards, airports and large populated centers. The throughput of the transportation routes and the possibility of expanding them and increasing their number are evaluated. Then an outline map is prepared and the transport lines are plotted.

3. The condition and development of the road net in the oil-recovery region are evaluated. The characteristics of the existing network of roads are given: name; length; engineering category; by whom and when the design and budget-estimating documentation was approved; the cost of construction--total, and specific cost per 1 kilometer of road; and the purpose of the road. Data on the total length and the dynamics of the amounts of construction of the roads are cited. The extent to which the oil-recovery region and individual oilfields are provided with roads is evaluated. The capacity (potential) of construction organizations engaged in the erection of roads is cited, and the potential for supporting road construction with building materials is indicated.

4. The basic principles for developing the road net in the oil-recovery regions are determined. Classification of the road network into interoilfield, intraoilfield and access roads to individual facilities and to well clusters is made the basis for developing the road network. A strategy of the transport service for the various regions and groups of wells is planned, and the basic directions for freight traffic volume are chosen, giving consideration to the existence of transport routes, as confirmed by design documentation. The road net that is erected in a region being developed for the first time should combine maximum effectiveness with the shortest length and the least cost of construction. The following conditions satisfy the indicated principle:

new, developing fields should get reliable year-round transport links with base locations, communities, rotating-duty settlements, bases for production-equipment servicing, and the existing network of transport ties of the oilfield region, from the very start of drilling-over work, when the greatest requirement arises for construction and industrial freight;

the fields that are most important for carrying out the mandated plans for oil recovery--and among them are those located in situations least favorable for transport service--will receive preference when priorities are established for transport ties;

when priorities and the amounts of construction are established, preference should be given to highways over intraoilfield roads and access roads, since the former serve the larger number of customers and are of decisive importance for transport development of the region;

annual growth in amounts of road construction should be uniform to the extent possible in order that the buildup in capacity of road-construction subunits may be smooth; and

studies on erection of the network of intraoilfield roads and access roads previously performed must be refined, since the original indicators for the development of some fields may have been changed or refined.

5. The technical and operational characteristics of the roads and the indicators that characterize the length, the traffic intensity of the transport equipment and the engineering category of the road are determined. The length of the roads depends upon the scheme for developing the oil industry and for the regional siting of the oilfields, production facilities and supply bases, railroad yards, docks and river ports, airports and communities. The length of each specific road is established as the result of surveys or by the desk method in accordance with the appropriate cartographic and aerial-photography information, taking selection of the shortest distance into consideration.

Traffic intensity on a road I_{Σ} is determined by a summing up of the traffic of freight transport $I_{г}$, rotating-duty (passenger) transport $I_{в}$ and special $I_{с}$ transport:

$$I_{\Sigma}=I_{г}+I_{в}+I_{с};$$

average daily intensity of freight transport traffic is

$$I_{г}=\frac{Q_{общ}}{T\cdot q_{ср}\cdot K_{г}\cdot K_{п}} \text{ motor vehicles/day,}$$

where $Q_{общ}$ is the total amount of freight hauled on the road in the year being computed;

T is the number of workdays for freight transport per year (T = 300 days);

$q_{ср}$ is the average long-term freight-load carrying capability of a truck ($q_{ср}$ = 9.5 tons);

$K_{г}$ is the utilization coefficient of a truck's load-carrying capacity ($K_{г}$ = 0.9); and

$K_{п}$ is the utilization coefficient per truck run ($K_{п}$ = 0.55);

the intensity of traffic for rotating-duty personnel transport is:

$$I_a = \frac{N_a \cdot K_a}{q \cdot \gamma \beta} \text{ motor vehicles/day}$$

where N_a is the daily number of rotating-duty personnel haulings on the road in the year computed;

K_a is the share of buses in rotating-duty personnel transport (for West Siberia $K_a = 1$);

q is the average seating capacity per bus, persons (q = 20-32);

γ is the utilization coefficient of seating capacity ($\gamma = 1$); and

β is the vehicle-run utilization coefficient.

The intensity of traffic for special transport in West Siberian oilfields is 6-10 percent of the intensity of the freight transport traffic. In the calculations it is assumed that $I_c = 0.08 I_г$ vehicles per day.

The amount of freight hauling is determined by direct computation of the requirements for freight for all stages of the operating cycle during assimilation of the oilfields (drilling, the building of oilfield facilities, and oilfield operation) in accordance with the norms for expenditures for freight and indicators for the amounts of drilling, construction and production operations. For each road the amount of freight haulage is found, totaling up the requirements for freight for all customers (the oil, construction, timbering and other branches).

$$Q_{общ} \sum_{j}^{n} = 1 g_j \cdot Z_{pj} (1 + K_{пр}) \text{ thousands of tons,}$$

where n is the number of freight customers;

g_j is the standard for freight consumption for the j-th customer;

Z_{pj} is an absolute indicator that determines the total freight requirement for the j-th customer (the amount of drilling, the introduction of producer wells, the inventory of producer wells, and the volume of SMR [construction and installing work] and so on);

$K_{пр}$ is the coefficient that considers freight for other customers (10-30 percent, depending upon the significance of the road in supplying the region), bases for ATK's [automotive transport offices], PTO's and K's [production-equipment sections and offices] and RMM's [machinery repair shops], nonindustrial construction, and other agencies and branches of the national economy.

The amount of hauling of rotating-duty personnel by road depends upon the reported number of workers necessary for daily service at all workplaces at the oilfields associated with the given road, and upon the principles of organizing the

rotating-duty personnel hauling. The daily number of haulings of rotating-duty personnel by road in the computed year (persons) is:

$$N_{\text{в}} = \sum_{j=1}^{n} r_{\text{сп}} \cdot K_{\text{сн}} \cdot K_{\text{р}} (1+K),$$

where $r_{\text{сп}}$ is the scheduled manning of workers necessary for servicing the field, for construction work, drilling, and so on;

$K_{\text{сн}}$ is the coefficient for converting the scheduled number of workers to the reported number ($K_{\text{сн}}$ = 60 percent);

$K_{\text{р}}$ is the coefficient that considers the delivery of rotating-duty personnel to work and return ($K_{\text{р}}$ = 2); and

K is the coefficient that considers the daily haulings of rotating-duty workers (K = 1/16)*.

The rated worker manning for each field is determined by the formula

$$r_{\text{сп}} = \Pi_{\text{б}} H + \Pi_{\text{э}} N_{\text{э}} + \frac{V_{\text{с}}}{\Pi_{\text{с}}},$$

where $\Pi_{\text{б}}, \Pi_{\text{э}}$ is the standard for the number of workers for drilling and for oil recovery (in accordance with industry or regional norms);

$\Pi_{\text{с}}$ is the norm for output per worker in oilfield construction work (according to output per day per worker in the region's construction organizations);

H is the amount of development drilling, meters;

$N_{\text{э}}$ is the active inventory of development wells; and

$V_{\text{с}}$ is the amount of SMR [construction and installing work] during build-up of the oilfield facilities.

The technical category of the roads is established in accordance with average daily traffic intensity. According to SNiP [Construction Norms and Regulations] II-D.5-72, when designating road categories for a common network, the calculated intensity is considered to be the intensity expected in the last year of the prospective period, and, for roads that service the technological hauling for the industrial enterprises, the calculated intensity is taken from a computation of their full capacity.

*Rotating-duty workers, who are sent to the oilfields from rotating-duty personnel settlements are hauled daily, full strength, by road, and one-sixth are hauled to the communities (based upon the terms for gradual exchange of all workers who stay in the rotating-duty personnel settlement, over a period of 6 days).

For roads that service oilfields, the highest traffic intensity is noted during the period in which the field is drilled over and oilfield facilities are built up, when the greatest amount of freight is required and the maximum amount of construction and installing work is being performed.

6. Road construction volume for the long-term period is determined on the basis of calculations made in accordance with the requirements of the region's oil industry and the principles for developing the road network. The computed requirement for road construction is compared with development during the preceding period, the roadbuilding-organization capacity that is necessary is determined, and measures for fulfilling the road construction program are planned.

A listing and the amounts of construction work adopted (consistent with the capacity of the roadbuilding organizations) for the construction of highways and oilfield roads and the necessary capital investment are cited. The dynamics of the planned amounts of construction of highways, intraoilfield roads and access roads by year and by five-year period are given.

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MOTOR VEHICLE

BRIEFS

TRAFFIC, TRAFFIC COMMISSIONS--On the basis of a regulation by the USSR Council of Ministers of 2 February 1976 an interim administration traffic safety commission was founded, to which belong first deputy chairmen of the union councils of ministers (chairmen of the republic traffic commissions) as well as deputies of many USSR ministries, republic committees and those of centrally placed top leaders. The number of personal (private) cars now exceeds 120,000 in the ESSR. Driver training qualification is inadequate, traffic discipline is often lacking. [By A. Salum, traffic commission secretary of the ESSR Council of Ministers] [Excerpt] [Tallinn TEHNIKA JA TOOTMINE in Estonian No 9, 1981 pp 24-25]

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OCEAN AND RIVER

SOVIET BOOK ON STATISTICS OF OCEAN TRANSPORT

Moscow STATISTIKA MORSKOGO TRANSPORTA in Russian 1979 (signed to press 22 Nov 79), pp 1-2, 240

[Annotation and table of contents from "Statistics of Ocean Transport," 2d edition, revised and expanded by M.I. Bruskin, Izdatel'stvo "Transport," 3,000 copies, 240 pp.]

[Text] Approved by the Administration of Educational Institutions and the Ministry of the Ocean Fleet as a teaching aid for students at higher ocean-going educational institutions who are specializing in operations and economic engineering.

The teaching aid reflects the basic principles in the overall theory of statistics, as well as containing a detailed exposition of the questions of the methodology and practice of the statistics of ocean transport. Special attention is devoted to questions of computing the system of indicators and evaluating the effectiveness of the operational activities of the fleet and ports. It cites examples that characterize the theory and practice of the statistics of ocean transport and the role and importance of an automated control system. The current edition discusses all the changes in the practice of statistical accounting which occurred after the publication of the first edition in 1971.

The book is intended for students at higher ocean-going educational institutions, and can also be used by workers in ocean transport in their practical activities.

Four illustrations, 75 tables.

Mikhail Il'ich Bruskin
Statistika morskogo transporta

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