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3 March 1971

Dr. John Hardt
Research Analysis Corporation
McLean, Virginia 22101

Dear Doctor Hardt:

Enclosed are two copies of the draft report on The 1970 Estimate Costs for Soviet Construction which is submitted for publication in The ASSTC Bulletin. Dr. Greenslade has already talked to you on the phone about this.

The report is now fully cleared for publication. As you will notice on the cover sheet, I wish to have my affiliation with the Central Intelligence Agency noted in the publication.

Very truly yours,

Enclosure:
As stated (2)

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THE 1970 ESTIMATE COSTS FOR SOVIET CONSTRUCTION

by

Central Intelligence Agency

3 March 1971

The 1970 Estimate Costs for Soviet Construction

Introduction

The Byulleten' Stroitel'noy Tekhniki (Bulletin of Construction Technology) for October 1970 reports the results of the revision of "estimate" unit costs of construction in the USSR in the form of indexes of the new unit cost compared with 1956 unit cost.^{1/} These new unit costs are based on (a) new 1969 norms for labor and material inputs; (b) new construction material prices of 1 July 1967; (c) amortization rates introduced 1 January 1963; (d) new 1969 rates for supply handling charges, overhead costs, and planned profits; and (e) wage rate changes through 1968. The new indexes of cost are significantly higher than some preliminary indexes published earlier in 1969. The Bulletin article also indicates the effect of the 1969 wage increases on the estimate costs. This memorandum examines the extent of the changes and their possible applications.

Background

1. The USSR does not publish data on construction activity at actual or current costs. The value of construction, published in the annual statistical handbooks (Narodnoye khozyaystvo SSSR) is in 1956 estimate unit costs.*

2. Estimate costs are rather precisely defined in the Soviet Union.** They are calculated from base year wage rates (mostly piece rates) and materials prices, combined with physical norms for labor and materials inputs and specified profit and overhead rates. These norms are carefully specified for a large number of construction components, such as a cubic meter of brick wall or concrete foundation, etc. Physical norms were established on 1 January 1956 and were not revised until 1 January 1969.

3. Prices, wages and productivity, of course, have changed since 1956. In addition, estimate costs vary from actual costs in the same way that contract estimates vary from actual costs in the U.S. There is considerable evidence that actual costs diverge, mostly upward, from estimate costs for many, if not most, construction projects. Furthermore,

* Often referred to as 1 July 1955 prices. The estimate costs of construction were effective 1 January 1956 and include: 1 July 1955 prices and 1 January 1956 wage and physical input norms. Minor revisions may have been carried out in later years, for example, a reduction of the overhead cost norm in 1958. However, the estimate cost values of construction-installation work for earlier years in successive annual Narkhoz handbooks from 1958 on were not revised except in the Narkhoz for 1965. In that volume all prior years, 1950 to 1964 were reduced somewhat less than 1% allegedly to account for the lowering in 1962 of unit rates on several types of construction-installation work.

** Smetnaya stoimost' stroitel'no-montazhnykh rabot (estimate cost of construction-installation work).

actual costs almost certainly diverged from estimate costs between 1956 and 1968. Supplements to estimate costs to take account of specific wage or price changes have been allowed and paid to the building contractors in the form of budgetary reimbursements.

Recent Revisions of Prices, Norms and Wages

4. The first comprehensive revision of the 1956 construction norms was promulgated in 1968 to take effect 1 January 1969. A preliminary announcement in 1969 indicated that the norms combined with the accumulated wage* and price changes raised average estimate unit costs of construction for 1969 approximately 15.5 percent above 1956 estimate unit costs.^{2/} The use of the figure of 15.5 percent in drawing up the 1969 plan is confirmed by the recently released 1969 statistical handbook (Narkhoz).^{3/} However, the article in the Bulletin of Construction Technology of October 1970 gives a revised set of estimate costs which average about 22 percent above 1956 estimate costs. Apparently, a more careful calculation showed that construction costs rose more than was indicated by the preliminary estimate in 1968. The figure of 15.5 percent is approximately accounted for by the 1967 materials price and freight rate increases alone.

5. During 1969 pay rates for workers in construction were increased. Announcements suggest that the average hourly rate for workers was increased approximately 25 percent. This consisted, apparently, of an actual 12 percent

* In 1968 minimum wage increases affected the wage levels of the lowest two categories of workers (primarily unskilled).

increase in piece rates and an increase in productivity norms which, if fulfilled, would result in a 25 percent hourly increase. The Bulletin article indicates that the 1969 wage increases would add some 2.4 percent to overall estimate costs. This suggests that the 12 percent increase in labor costs applies only to direct construction labor, which accounts for 15 percent of total cost, and machine operators and some other workers, which account for another 5 percent of construction costs. The total of 20 percent times the 12 percent labor cost increase gives an overall construction cost increase of 2.4 percent.* This wage correction factor handled as a supplement can be applied to the index of 122 to derive effective estimate cost index for 1970 about 125 percent of 1956 (see Table 1, appended).

Branch and Republican Differentials

6. The Bulletin article gives the new, corrected estimate cost indexes for a large number of branches of the economy, and for the individual Union Republics. The variations are not very startling. Among branches, the estimate costs corrected for 1969 wage increases vary from 115 to 132, with an average of 125 (see Table 1, appended).

7. It is interesting that indexes for a number of rather sensitive industries, including aviation, defense, electronics industry, medium machine building, are also given. These show no significant variation from other branches. The defense industry index is 124.

8. The republic cost indexes are not for all construction within the republic, but only for those activities under

* Total labor costs are said to be 31 percent of construction costs, but apparently only two-thirds of the workers got the wage increases. 4/

the administrative jurisdiction of the republics that are carried out from state centralized investment (See Tables 2 and 3, appended).

9. The estimate costs of construction for most sectors of the economy increased most in Kazakhstan, Turkmenistan, and Moldavia and least in Lithuania, Belorussia, and the Ukraine.* The greatest increases occurred in developing republics which started from a small industrial base. Rapid expansion of industrialization and a resultant increase in the amount of construction in these areas has placed heavy demands on labor, equipment and materials. Construction labor pools were small. Thus, it became necessary to recruit large numbers of inexperienced workers. Unskilled or poorly trained workers had to be used in jobs normally requiring skilled workers, with a resultant lowering of labor productivity and rise in construction costs. Estimate costs of construction were also increased as a result of a revision of the building codes following several major earthquakes in the 1960's. The stricter codes require the use of more materials, labor, and equipment in some of these areas.

10. Increases in cost of construction in the RSFSR, with its vast expanse and varying climatic conditions, tends to be close to the average for the USSR in most economic sectors. The RSFSR transport construction sector, however, showed a sharp increase. The shifting of a greater share of transportation construction to the more inaccessible areas -- the Far North and the Far East -- was one factor in this increase. The greater share of improved roads and facilities being built in the RSFSR was another.

* The Republic indexes can be used to estimate the current cost of construction in the various regions. The 1956 estimate cost of construction varied greatly among the various territorial zones of the USSR. The costs were lowest in the Western European part and highest in the Far North and Far East.^{5/} The differing indexes of cost by Republics indicate that the territorial differences may be increasing.

Applications of the Indexes

11. The new indexes of estimate costs presumably take account, via the new norms, of any increases in construction cost which were not formerly covered by supplements. In this sense the 1969 and 1970 indexes, 122 and 125, may be an approximation of the increase in current costs since 1955/56.* Be that as it may, the index of 125 can be applied to the Soviet series for construction said to be in 1956 prices, which appears in Narkhoz,^{6/} to convert these to 1970 estimate costs. Thus the value for 1969, which is 36.7 billion rubles in 1956 estimate costs, becomes 45.9 billion in 1970 estimate costs.**

12. By the same token the ruble-dollar ratio for construction which was originally in 1956 estimate cost rubles and 1955 dollars can be converted to 1970 ruble and dollar costs by the index of 125 for ruble costs and the Department of Commerce index of US construction costs, 1970 over 1955, for dollars.^{7/} By estimating the supplements to Soviet estimate costs for intermediate years, a series of current cost ruble-dollar ratios can be derived. These are shown in the table below. It should be noted again that the Soviet cost index is not actual cost but current estimate cost.

* An index of actual cost (fakticheskaya sebestoimost') of construction-installation work in prices of the corresponding years is presented in the annual handbooks.^{8/} However, there isn't enough information available to us concerning what this index includes -- or excludes -- to allow using it with any degree of confidence. Although we know materials costs increased substantially in 1967, the actual cost index decreases slightly each year since 1961. Possibly the 1967 increases in materials costs, and other costs, which were reimbursed from the budget by means of supplementary payments, were not calculated in the contractors costs.

** The new indexes are calculated from centralized state construction but probably can be applied to total construction without serious error.

Ruble Values of Ruble-Dollar Ratios for Cost of Construction

Year	US Cost Index	Ruble-Dollar Ratio, Constant Soviet and Current US Cost	Soviet Estimate Cost Index	Ruble-Dollar Ratio Current Soviet US Cost
1955	100	0.71	100	0.71
1956	106	0.67	100	0.67
1957	110	0.65	100	0.65
1958	111	0.64	100	0.64
1959	113	0.63	100	0.63
1960	114	0.62	103	0.64
1961	116	0.61	103	0.63
1962	119	0.60	103	0.61
1963	121	0.59	103	0.60
1964	124	0.57	103	0.59
1965	128	0.55	103	0.57
1966	132	0.54	103	0.55
1967 Jan-Jun	136	0.52	103	0.54
1967 Jul-Dec	140	0.51	115.5	0.59
1968	146	0.49	115.5	0.56
1969	158	0.45	122	0.55
1970	167	0.43	125	0.53

NOTE: The 1955 Ruble-Dollar Ratio was calculated on the basis of a number of comparable US and USSR projects. US projects were in or were converted to 1955 dollars and USSR projects were in 1 January 1956 estimate costs converted to post 1 January 1961 rubles. The US Cost Index is the Department of Commerce Composite Cost Index reported in Commerce's Construction Review shifted to a 1955 base. The Ruble-Dollar Ratio, Constant Soviet and Current US Cost is calculated by dividing the 1955 ratio (0.71) by the US Cost Index. The Soviet Cost Index is explained in the text below. The Ruble-Dollar Ratio in Current Soviet and US Costs is calculated by multiplying the Constant Soviet Cost ratios by the Soviet Cost Index. Unrounded data were used for the calculation.

13. The index of current estimate cost (the third column in the table above) was derived as follows. From 1955 to 1960 estimate costs were essentially constant. From 1960 to mid-1967 scattered evidence suggests a supplement to estimate costs of about 3 percent. In mid-1967 the new industrial prices took effect and these included new construction material prices (and also new transportation costs). It is assumed that the index of 115.5 for 1968 covers these price increases and applies also to the second half of 1967. On 1 January 1969 the new physical norms took effect. The new wage rates did not take effect for most of the country until late in 1969. Therefore, it is assumed that the wage increase affects only 1970. The index for 1969 is thus 122 and for 1970, 125.

14. The limited quantitative data published on the Ninth Five Year Plan (1971-1975) reveal that the current unit values being used for investment are higher than those used in the 1969 and 1970 plans. The differences are shown in the following tabulation of total capital investment for 1969:

	<u>Billion Rubles</u>	<u>Percent</u>
In 1956 constant prices	63.4 ^a /	100.0
In 1969-70 planning prices	70.2 ^a /	110.7
In 1971-75 planning prices	73.4 ^b /	115.8

a. Narkhoz 1969, p. 501

b. State Plan Fulfillment for 1970, Moscow, Izvestiya, 4 Feb. 1971, Morning Edition, pp. 1-2. Capital investment in 1970 was 80 billion rubles -- 109 percent of 1969. Therefore, capital investment in 1969 was 73.4 billion rubles.

The increase in the currently used prices over 1969-70 planning prices -- 4.6 percent -- is in large part due to the rise in unit costs in the construction-installation component of gross capital investment. The indexes in Table 1 relate only to the construction-installation component of investment and should not be applied to total investment.

TABLE 1

Indexes of Soviet Estimate Unit
Cost of Construction a/

1956 = 100

<u>Industry, Branch, Ministry or Office</u>	<u>(1)</u>	<u>(2)</u>	<u>(3)</u>	<u>(4)</u>
	Indexes Announced in 1969 b/	Indexes Announced in 1970 c/	Correction Factors for 1969 Wage Increases	Corrected Indexes of 1970 Estimate Cost d/
Electro-energy	116	122.5	102.2	125
Petroleum Extraction Industry	116	120	102.1	123
Petroleum Refining Industry	117	124.5	102.7	128
Petro-Chemical Industry	n.a.	121	102.4	124
Gas Industry	118	122	101.7	124
Transport of Petroleum & Petroleum Products	116	124	101.7	126
Coal Industry	117	120	101.7	122
Peat Industry	114	119	102.5	122
Ferrous Metallurgy	117	123	102.5	126
Non-ferrous Metallurgy	116	129	102.5	132
Chemical Industry	115	122	102.5	125
Heavy, Energy, and Transport Machine Building	117	123	102.4	126
Electro-technical Industry	115	121	102.4	124
Chemical and Petroleum Machine Building	114	123	102.4	126
Machine Tool and Tools Industry	115	121	102.4	124
Industry of Interbranch Production	115	120	102.4	123
Instrument Building	114	119	102.4	122
Automobile and Bearing Industry	116	118	102.4	121
Tractor and Agricultural Machine Building	117	120	102.4	123
Construction, Road and Communal Machine Building	114	120	102.4	123
Machine Building for Light and Food Industry and Household Appliances	114	119	102.4	122
*Aviation Industry	116	120	102.4	123
*Shipbuilding Industry	115	122	102.4	125
*Radio Industry	114	120	102.4	123
*Electronic Industry	115	118	102.4	121
*Defense Industry	116	121	102.4	124
*Machine Building	n.a.	122	102.4	125
*General Machine Building	115	125	102.4	128
*Ministry of Medium Machine Building	n.a.	123	102.4	126
*Ministry of Defense, USSR	n.a.	122	102.4	125
Timber and Woodworking Industry	116	132	102.7	136
Pulp and Paper Industry	116	123	102.5	126
Construction Materials Industry	115	126	102.4	129
Construction and Industrial Structurals and Details	114	123	102.4	126
Of which: Metal Structurals Plants	n.a.	124	102.4	127
Light Industry	113	122	102.5	125
Food Industry	115	122	102.5	125
Meat and Dairy Industry	115	122	102.5	125
Fish Industry	114	121	102.3	124
Micro-biology Industry	114	122	102.3	125
Flour Milling and Mixed Feeds Industry	116	125	102.3	128

TABLE 1
(Cont.)

Indexes of Soviet Estimate Unit
Cost of Construction a/

1956 = 100

<u>Industry, Branch, Ministry or Office</u>	<u>(1)</u> Indexes Announced in 1969 b/	<u>(2)</u> Indexes Announced in 1970 c/	<u>(3)</u> Correction Factors for 1969 Wage Increases	<u>(4)</u> Corrected Indexes of 1970 Estimate Cost d/
Medical Industry	114	116	102.3	119
Local Industry	113	120	102.5	123
Services to the Population	114	119	102.5	122
Geology and Exploration	115	120	102.2	123
Agriculture	114	123.2	102.9	127
Agriculture	n.a.	124	102.9	128
Water Economy Construction	n.a.	122	102.9	126
Forest Economy	115	123	102.2	126
Water Economy	116	122	102.2	125
Railroad Transport	116	126	102.3	129
Sea Transport	114	127	102.3	130
River Transport	115	127	102.3	130
Construction of All Union				
Automobile Roads	n.a.	123	102.3	126
Automobile Transport and Road Economy	115	123	102.5	126
Air Transport	114	124	102.3	127
Communications	113	120	101.9	122
Trade	114	119	102.5	122
Material Technical Supply and Sales	114	121	102.3	124
Housing Construction	114	121	102.5	124
Communal Construction	115	123	102.5	126
Subways	119	125	102.4	128
Education and Culture	114	120	102.4	123
Health	110	120	102.4	123
Science	114	122	102.4	125
State Security Committee, USSR (KGB)	n.a.	122	102.4 e/	125
Main Administration of State Material Reserves (GUGMR)	n.a.	120	102.4 e/	123
Other Ministries and Offices, USSR	n.a.	120	102.4	123
Construction carried out from non- centralized sources of financing	n.a.	119	102.4 e/	122
Of which: capital repair	n.a.	112	102.4 e/	115
Unweighted Arithmetic Average	<u>115.5</u> f/	<u>122</u>	<u>102.4</u>	<u>125</u>

* Defense related industries.

- a. Based on state centralized capital investment.
- b. See source 2/
- c. Source 1/
- d. Column (3) times column (2)
- e. Not specifically given. The value given for "other branches".
- f. Given in the Soviet source - may be a weighted average.

Indexes of Change of Construction Costs by
Sector of the Economy, by Republic a/

1956 = 100

Union Republic	Housing	Education	Health	Culture	Sales and Restaurant Facilities	Science and Administrative Buildings	Services to the Population	Communal Services	Local Industry
RSFSR	121	120	119	119	120	121	121	123	118
Ukraine	117	114.5	113	116.5	116	117	116	121	114
Belorussia	116	117	116	115	115	115	116	121	114
Uzbek	122.5	122.5	122.5	121	121	120	117	124	120
Kazakh	128	124	124	124	121	123	121	125	126
Georgia	123	121.5	125	122.5	117	121	120	124	120
Azerbaydzhan	118	118	116	116	116	118	116	123	115
Lithuania	116	114	121	120	115	117	115	124	114
Moldavia	123	122	122	122	122	121	122	125	121
Latvia	118	119	117	119	118	119	118	123	117
Kirgiz	120	122	122	119	120	119	119	123	118
Tadzhik	124	121	122	120	120	121	119	120	120
Armenia	120	122	122	122	121	121	121	122	120
Turkmen	123	124	123	123	120	121	121	125	123
Estonia	122	122	121	121	121	122	119	123	120

a. Source 1/. Not corrected to include 1969 wage increases.

TABLE 3

Indexes of Change of Construction Costs for Capital Investment
Allocated to the Council of Ministers of the Republics a/

1956 = 100

Union Republic	Agriculture		Facilities for Industrial Sales to Agriculture		Water Economy	Construction Materials: Industry	Construction and Construction Components	Automobile Transport and Road Economy	River Transport	Air Transport	Transport and Supply of POL Products	Communi-
	Rural											
RSFSR	124	124	123	123	123	123	127	127	126	126	125	120
Ukraine	119	119	120	122	122	122	121	125	120	120	122	119
Belorussia	119	119	115	119	119	119	124	127	116	116	116	121
Uzbek	123	123	122	123	123	123	116	--	125	125	125	120
Kazakh	132	132	125	133	127	127	122	123	123	126	123	127
Georgia	123	117	121	126	126	123	124	--	124	124	120	122
Azerbaijan	119	119	120	126	126	118	123	--	116	116	124	118
Lithuania	119	116	116	118	118	119	116	127	124	124	--	120
Moldavia	119	119	122	128	125	125	126	120	114	116	122	120
Latvia	119	119	123	123	121	121	116	114	124	124	116	118
Kirgiz	119	119	124	120	120	118	119	127	124	124	120	123
Tadzhik	120	117	120	129	127	127	--	--	124	124	--	120
Armenia	121	118	121	126	118	118	116	--	124	124	124	123
Turkmen	122	118	120	126	126	126	122	--	118	118	126	119
Estonia	124	123	121	127	124	124	125	127	116	116	121	118

a. Source 1/. Not corrected to include 1969 wage increases.

SOURCES

1. Byulleten' Stroitel'noy Tekhniki (Bulletin of Construction Technology) No. 10, October, 1970. pp. 11-16. This journal is published monthly in Moscow by the State Committee of the Council of Ministers of the USSR for Construction Affairs (GOSSTROY USSR)
2. Yfremov, S. A.; Malyugin, V. I., and Turianskiy, M. A.; Novyye Smetnyye Normy i Tseny v Stroitel'stve (New Estimate Norms and Prices in Construction) Moscow, 1969, p. 32-3.
3. Narodnoye Khozyaystvo SSSR v 1969g. (National Economy of the USSR in 1969) Moscow, 1970. p. 503, footnote #2
Ibid., p. 522.
5. Sbornik ukрупnennykh pokazateley stoimosti zdaniy i sooruzheniy dlya pereotsenki osnovnykh fondov (Collection of Consolidated Indices of the Cost of Building and Structures for Revaluation of the Fixed Assets) published by the State Committee of the Council of Ministers USSR on Construction. There are 36 sborniks published in Moscow in 1958 or 1959. Each Sbornik relates to a different industry.
6. Narkhoz 1969, p. 502.
7. Construction Review, U. S. Department of Commerce, Bureau of Domestic Commerce, Vol. 16, No. 11, November 1970, p. 38 and Construction Statistics 1915-1964 A Supplement to Construction Review, January 1966, p. 58. The series was shifted to a 1955 base.
8. Narkhoz 1969, p. 523.