Next 1 Page(s) In Document Denied

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Subject: Further Coefficients of Construction Work

TABLE OF CONTENTS

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Further Coefficients.

Coefficients of productivity in housing construction.

1. Labor

a/ The number of man-hours per one square meter usable area in apartment house construction (in Poland) 60 hours

Same as above - (in West Germany) 21.4-31.8 "

b/ The number of man-hours per one cubic meter enclosed space in apartment houses built by the Ministry of Construction in 1958, partially without plastering facades 9.2 "

Same as above - (in Poland before World War II) 7.5- 8.0 "

2. Value of work

Value of work carried out by one worker in basic construction work on apartment houses built by the Ministry of Construction in 1958 114,000 zlotys

One worker engaged in basic production produces per year, i.e. working 2,150 hours, about 265 cubic meters which is one small $2\frac{1}{2}$ room apartment

Coefficients of use of building materials in construction. (~~continuation~~)

1. Coefficients of use of steel in construction

a/ According to Trybuna Ludu, 10 May 1959, (Gomulka's speech on the occasion of Metallurgical Workers Day) 33 tons of steel are used per 1 million zlotys (1959 prices) of outlay for construction work. (this is an average for all types of construction).

b/ According to Trybuna Ludu, 13 January 1959, the following amount of steel is used for the following installations per one room of housing:

15 kg for sanitary installations

9 kg for gas installations

44 kg for central heating installations

and 153 kg of cast iron for central heating, radiators, etc.

The above figures do not embrace such installation equipment (objekty instalacyjne) as bathtubs, gas stoves, sinks, etc.

2. Use of timber

According to Trybuna Ludu, 17 May 1959, the average use of timber per million zlotys of total construction costs in industrial construction dropped from 53.7 cubic meters in 1956 to 36.9 cubic meters in 1958. (in 1958 prices.)

Coefficients of use of building materials per cubic meter of apartment houses.

According to an article written by Josef Oberski, "Economy of industrialized construction, based on studies of costs on the building site" published in Inwestycje i Budownictwo, no 5, 1959, on page 21:

a/ Apartment house built by traditional method per cubic meter:

Timber for scaffolding, frames etc.	cubic meters	0.0063
Bricks	pieces	62.0
Cement	kg	22.7
Steel	kg	1.36

b/ Apartment house built by industrialized method grade I:

Timber for scaffolding, frames etc.	cubic meters	0.0035
Bricks	pieces	56
Cement	kg	29
Steel	kg	0.94

c/ Apartment house built by industrialized method grade II:

Timber for scaffolding, forms etc.	cubic meters	0.0022
Bricks	pieces	10.0
Cement	kg	14.8
Steel	kg	0.31

However the above figures only give the consumption of these materials on the building site itself. In reference to timber and bricks these figures are good, but in reference to cement and steel they do not take into account the use of these materials at the shops and plants where the prefabricated elements are manufactured.

If we add these materials used in the factory of prefabricated elements the figures will be:

Total use of cement for 1 cubic meter of apartment house:

in traditional construction	30 kg
in industrialized construction grade II	63 kg

Use of steel for 1 cubic meter of apartment house:

in traditional construction	3.84 kg
in industrialized construction grade II	6.30 kg

In order words the industrialized construction saves timber and bricks but instead uses more cement and steel as follows:

Saving of timber amounts to	65%
Saving of Bricks	84%
Increase of use of cement	110%
Increase of use of steel	58%

For this reason the prices of timber were increased three times from 1957 and bricks by about 50% in order that savings should exceed the value of the increase of cement and steel and that the industrialized construction should seem to be no more expensive. But this measure did not help because at the same time the plants for prefabricated elements increased the prices of their products and industrialized construction is again more expensive. The plants on their part had to increase their prices because they were working on deficit, which again hampered the development of industrialized construction, and so a vicious circle arose.

Coefficients of construction costs

It is very difficult to give the real costs of construction in Poland, and for this reason, when trying to determine the coefficients of costs attention should be paid to the following factors:

a/ Cost - own cost and selling price. If not specified, the coefficients refer to own cost of the construction enterprise omitting its profit or losses.

b/ Unit - to which the cost refers. In housing construction it can be:

1 cubic meter of the constructed cubature of the building

1 square meter of the usable area of the apartment

1 room

1 apartment

c/ System of prices, which can be a state price or free market price. If there is no remark in this respect, it may be assumed that it is the state price system.

d/ Comparable and current prices.

The 1956 prices are accepted as comparable prices. Besides that are used: 1957, 1958, and 1959 prices.

e/ The following three methods of construction are distinguished in housing construction: traditional method

industrialized method grade I (only ceilings)

industrialized method grade II (ceilings and walls)

Coefficients:

(1) Own cost of 1 cubic meter of apartment house in 1956 prices:

Built by traditional method	347	zlotys
Built by industrialized method grade I	371	"
Built by industrialized method grade II	373	"

(2) Selling price of 1 cubic meter of apartment house in 1958 prices:

Built by traditional method	404	zlotys
Built by industrialized method grade I	448	"
Built by industrialized method grade II	489	"

(3) Own cost of 1 cubic meter of apartment house in Warsaw in 1958 prices:

Built by traditional method 380 zlotys

Built by industrialized method grade II from 404 - 433 zlotys

(4) Cost of 1 square meter of usable area of an apartment according to the official selling prices to the owners of Building Saving Books from 1 Dec 1958:

2,596 zlotys

(5) Cost of 1 room according to prices in (4) 44,561 zlotys

(6) Cost of 1 average apartment i.e., composed of $2\frac{1}{2}$ rooms according to prices in (4) 109,377 zlotys

(7) Free market price of a small one-family house per square meter usable area (without lot) in 1957 prices, depending on the standard of equipment, 2,600-4,100 zlotys

Average free market price with average standard of equipment, 3,350 zlotys per square meter usable area.

(8) Free market price of an average individual house of 80 square meters usable area in 1957 prices (without lot, etc.) 270,000 zlotys

(9) Free market price of the same average individual house of 80 square meters usable area -- including lot, cost of land, connection to water supply, gas and electricity network, cost of documentation, preparation of building site, sometimes a small shed in the yard (the full investment outlay for a small house) in free market 1957 prices: 365,000 zlotys

One square meter usable area, depending on standard of equipment, from 3,900-5,200 zlotys

-- average standard 4,550 zlotys

(10) Free market price of a larger one family house, about 125 square meters usable area, cost including land at 1957 free market prices 570,000 zlotys

(11) The smallest one family house of 50 square meters usable area in free market 1957 prices:

of average standard	226,000 zlotys
with lowest standard of equipment	194,000 zlotys

(12) The same as in (11) house, but built with the aid of the state in the form of selling building materials at state prices:

with lowest standard of equipment	154,000 zlotys

(13) Small individual house of 80 square meters usable area at free market prices:

average standard	365,000 zlotys
lowest standard	275,000 "

The same house built with materials bought at state prices:

lowest standard	219,000 zlotys

(14) Cost of an apartment in an apartment house of a tenants' cooperative society in state 1957 prices:

	50 square meters usable area	146,000 zlotys
	80 " " " "	219,000 "
the smallest	42 " " " "	128,000 "

(15) Skeleton structure of an apartment house in 1957 prices:

Steel construction per ton of steel:	5,500 zlotys
Reinforced concrete construction per cubic meter (having approximately 100 kg steel)	1,380 zlotys

(16) Average selling price per square meter of floor space of factory production hall, in rough finish poles and roof (in 1956 prices) in reinforced concrete:

in monolithic construction	300 zlotys
in prefabricated construction	340 "

(17) Average cost of prefabricated reinforced concrete elements including transport to the building site on a distance not longer than 15 km per cubic meter:

selling price in 1956 prices	660 zlotys
selling price in 1957 prices	960 zlotys

Individual cost of some construction projects

a/ Selling price of cement factory per ton of yearly production capacity

average	1,000 zlotys in 1958 prices	
In particular: Cement Plant Wierzbica	1,180	"
" " Pokoj	980	"
" " Chelm	820	" (under construction)
" " Wiek II	1,030	"
" " Zeran	1,030	"
" " Nowa Huta	1,030	"

Remark:

Per one long ton of yearly production capacity it is necessary to assemble the following amounts of machinery and equipment:

average	18-19 kg	
In cement plant Wierzbica	21.5	"
" " Pokoj	19.5	"
" " Chelm	15.8	"

On average the newly constructed cement plants in Poland have a yearly production capacity of 300,000 tons.

b/ Selling price of a coal mine, in 1958 prices per 1 million tons of yearly mining capacity, 1 billion zlotys, i.e., 1 million zlotys for 1,000 tons of mining capacity.

c/ Selling price of 1 classroom of an elementary school in 1958 prices:

535,000 zlotys

d/ Cost of preparation and connection of 1 hectare of housing lots to public services including water, sewers, electricity, gas and streets: 2,000,000 zlotys

e/ Investment outlay for an aluminum foundry including electric power station supplying current for electrolysis, based on example of aluminum plant in Skawina per 1 ton of yearly production capacity of metallic aluminum in 1956 prices:

	23,100 zlotys.	
The same without electric power plant	15,200 "	first section
	10,800 "	second section

f/ Investment outlay for a rubber tire factory based on the factory built in Debica, in 1956 prices, per ton of tires 17,000 zlotys

g/ Investment outlay for 1 MW production capacity of an electric power station (without additional installations) 3,500,000 zlotys

Capital investment outlay per blue collar worker

Average capital investment outlay in 1956 prices per blue collar worker employed in a new factory amounted:

In electric power producing industry	2,917,000 zlotys
fuel and coke industry	700,000 "
steel metallurgical industry including mining ores	1,200,000 "
nonferrous " "	775,000 "
machine industry	108,000 "
chemical industry	535,000 "
building materials industry	112,000 "
paper industry	300,000 "
textile industry and clothing industry	143,000 "
foodstuff industry	137,000 "
leather, fur and shoe industry	33,000 "

On average, it was calculated in 1956 prices that capital investment per 1 blue collar worker in a new factory amounted to 275,000 zlotys. To this should be added so-called additional cost for housing for this employee on a basis of 1.56 persons for one room, and that every employee has to support from his wages 1.2 persons (according to estimates of the State Economic Planning Commission) which amounted (in 1956 prices) to 56,000 zlotys

The total capital investment outlay in 1959 prices per one blue collar worker including additional costs on average 400,000 to 460,000 zlotys.

Costs of transportation construction

a/ Cost of one kilometer of railroad line, without large bridges but including small bridges and culverts, in 1956 prices from 2,900,000-3,000,000 zlotys

b/ Electrification of existing railroad line including signal system per kilometer, in 1956 prices 800,000 zlotys

c/ Cost of an airfield: for one square meter of ready concrete unreinforced paving (sublayer 40 cm, surface 20 cm) in 1956 prices 600 zlotys.