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10 March 1965

COST OF CONSTRUCTION AND CAPITAL INVESTMENT IN SELECTED PLANTS OF THE SOVIET AEROSPACE INDUSTRY: SARATOV AIRFRAME PLANT NO. 292

CIA/RR EP SC 65-3

(ORR Project No. 33.4496A)

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FOREWORD

This publication is not an industrial analysis of Saratov Airframe Plant No. 292 or its activity but is intended to be used in conjunction with other reports as an aid in such analysis and as a source of supplemental data. The term aerospace industry refers to major plants for the fabrication and assembly of missiles, aircraft, and related engines. Common construction cost inputs and a common construction capital investment ratio have been used in all computations. The basic methodology used to cost the facility was set forth in an earlier publication, CIA/RR EP SC 64-16, Cost of Construction and Capital Investment in the Dnepropetrovsk Missile Development and Production Center, 30 October 1964, TS CHESS RUFF/NO FOREIGN DISSEM.

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COST OF CONSTRUCTION AND CAPITAL INVESTMENT IN SELECTED PLANTS OF THE SOVIET AEROSPACE INDUSTRY: SARATOV AIRFRAME PLANT NO. 292*

Summary and Conclusions

The total cost of construction of Saratov Airframe Plant No. 292 is estimated to be US $39 million, or 22 million rubles.** Based on the estimated relationship between the cost of construction and total fixed capital assets for this industry,*** total capital investment (which includes cost of construction) at this plant is estimated to be $88 million, or 49 million rubles.

The major volume of construction activity was carried out before April 1943. After the initial period, renovation, demolition, and/or alteration of existing facilities was the main activity through the late 1950's. Since the beginning in 1960, production facilities have been expanded by the addition of at least four new buildings.

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* The estimates and conclusions in this publication represent the best judgment of this Office as of 15 February 1965.

** Throughout this publication, dollar values are given in 1963 US dollars, and ruble values are given in new rubles expressed in 1955 prices. Dollar values in 1963 prices have been deflated to 1955 prices and then converted to new rubles in 1955 prices at the 1955 ruble-dollar ratio of 0.71 ruble to US $1 for all industrial construction.

*** For a detailed methodology, see source 1/. (For serially numbered source references, see the Appendix.)

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I. Introduction

Saratov Airframe Plant No. 292 is located in the USSR, approximately 3 nautical miles (nm) southwest of the center of Saratov and about 3,000 feet west of the Volga River. This plant is connected by taxiway to Saratov Airfield South, 0.5 nm to the south, and also is served by major roads and rail spurs. The area within the plant boundary fence is approximately 270 acres.

The plant layout used in this publication and the identification of the major buildings, by type, are shown in the chart.* The share of the total building cost allocated to different types of buildings is tabulated below. Buildings adjacent to Saratov Airfield South are not included in this publication.

Type of Building	Percentage Share of Total Cost of Buildings
Engineering/administration	7
Forge and foundry	2
Machineshop/workshop	22
Assembly	56
Storage	3
Powerplant and/or heating plant	7
Miscellaneous/unidentified	3
Total	100

Saratov Airframe Plant No. 292, originally named Kombain Zavod, was built in 1931-32 for production of agricultural machinery and produced only farm implements until 1938, when partial conversion to production of aircraft took place. In March 1952, Plant No. 292 received additional equipment for production of aircraft from Plant No. 165 in Dnepropetrovsk. Although production of aircraft at Plant No. 292 has been continuous since 1938, consumer goods also have been produced periodically by the plant. 2/ The volume and value of construction as

* Following p. 4. Unless otherwise indicated, identification and dimensions of the buildings are from published NPIC reports and from reports of this Office.

25X1D allocated over time and shown in the table* are in accordance [redacted]

II. Method of Estimating the Cost of Construction and Capital Investment

A. Conditions in the Construction Area

The basis for estimation of dollar costs in this publication was the cost prevailing in 1963 for an area in the US having climatic conditions comparable to those of Saratov. Northern South Dakota was selected as such a region.

Data on climate and soil for Saratov indicate that the upper layer of sediments generally consists of silt, silty sand, and silty clay to a depth of 20 feet. This upper layer is successively underlain by alternating beds of limestone, sandstone, conglomerates, and shale with a total thickness of more than 500 feet and then by argillaceous sandstone with an average thickness of 150 feet. 4/

A construction season in this area of approximately 7 months (from 15 April to 15 November) was considered appropriate on the basis of climatic and precipitation tables. This assumption is consistent with published Soviet data which state that supplementary expenditures must be paid to compensate for the special conditions of production in wintertime -- 152 calendar days (or roughly 5 months) of the year. 5/

The ground is frozen in the winter months with a maximum frost penetration of 6 feet. The annual precipitation averages 15.52 inches, almost 65 percent of which occurs in the warm period. Drainage problems affecting construction are seasonal, as the water table varies from about 20 feet below the surface in spring (April and May) to about 100 feet in summer and fall.

B. Physical Facilities Constructed 6/

The major buildings appear to be constructed either of steel frame and sheet metal or of brick. Types of roof vary both in design (gable, flat, and monitor) and in materials (concrete and sheet metal).

* P. 7, below.

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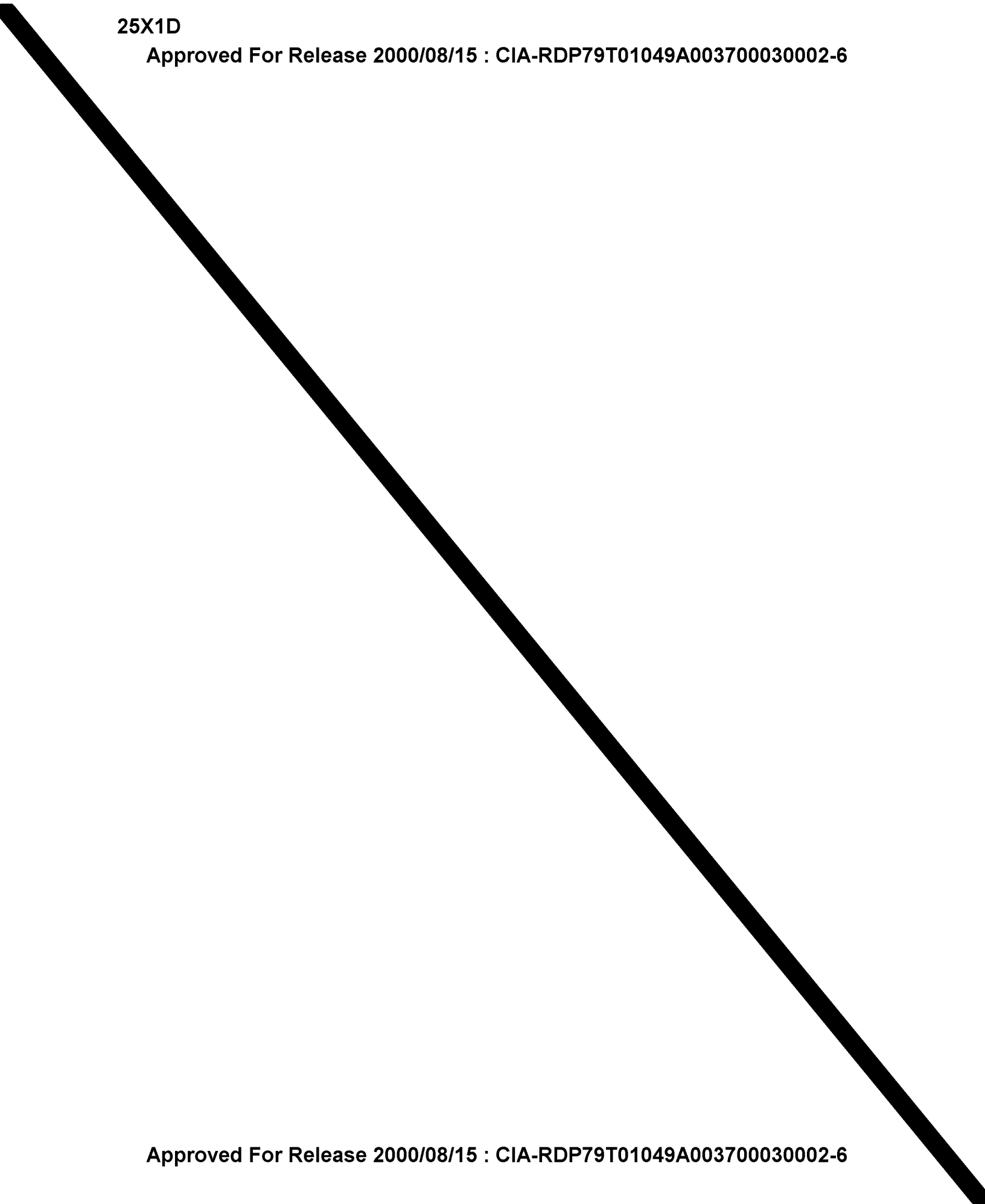

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C. Costing and Capital Investment

The methodology used in estimating the cost of construction is detailed in a previous publication on the Dnepropetrovsk Missile Development and Production Center. 7/ Buildings and structures were costed on a building-by-building basis. The cost of heavy construction, consisting of sanitary and storm sewers, water supply, roads, railroads, fencing, electrical distribution, and fine grading, is estimated on the basis of plant size, [redacted] and published reports. 8/ The costs of construction, distributed over time, are shown in the table.

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Capital investment was determined from the total cost of construction of the plant for each time period. The amount of construction work as a share of fixed capital assets is known for a number of Soviet industries as of 1 January 1956. The share of construction in fixed capital assets used in this publication is the same as that of the Soviet automobile industry* -- 44.7 percent. 9/

III. Limitations of the Data

The limitations of the available data are such that a further expenditure of time and effort could not improve significantly the estimates made in this publication. Assumptions have been made, the validity of which cannot be checked, regarding the labor force, vertical dimensions, details of design, materials and equipment used, and the rate of construction. On the basis of a belief that errors in the assumptions will tend to balance out, a probable range of error of plus or minus 20 percent has been estimated.

Particularly troublesome problems, which made necessary most of the assumptions, were as follows:

1. The reliability of dimensions, particularly the vertical dimensions;

* Data are not available on the ratio of the cost of construction to fixed capital assets for the Soviet aviation industry. Of the data available, those relating to the automobile industry are estimated to be most applicable. Although the reported figure of 44.7 percent has been used, it should not be construed to mean that the figure is accurate to a tenth of a percent.

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2. The lack of valid information relative to the size of the construction and production labor force;

3. The lack of information on the magnitude of those facilities that normally are underground; and

4. The lack of firm data on location of sources of supply and on the time allowed by Soviet authorities for completion of each phase of construction.

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USSR: Cost of Capital Investment and Construction in Saratov Airframe Plant No. 292 a/
Selected Periods, Pre-April 1943 - July 1964

	Thousand 1963 US $				Total	
	Pre-April 1943	April 1943 - December 1959	January 1960 - November 1962	December 1962 - July 1964	Thousand 1963 US $	Thousand New Rubles b/
Capital investment c/	48,085	17,242	13,412	8,787	87,526	49,188
Of which:						
Construction	21,494	7,707	5,995	3,928	39,124	21,987
Building	18,868	7,140	5,954	3,898	35,860	20,153
Heavy	2,626	567	41	30	3,264	1,834

a. For purposes of estimation and comparison, the data shown here have not been rounded. The data, however, are believed to be accurate as to the general magnitude.
b. Expressed in 1955 prices.
c. Derived from costs of construction.

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APPENDIX

SOURCE REFERENCES

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2. CIA. CIA/RR RA-14, Estimated Floorspace of Saratov Airframe Plant No. 292, Jul 57, p. 2. S.
25X1D 3. [redacted]
4. CIA. CIA/RR GB 64-45, Climatic and Soil Data on Saratov, Nov 64, p. 4. C.
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7. CIA. CIA/RR EP SC 64-16 (1, above).
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