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MEMORANDUM FOR: Mr. Theodore L. Thau, Chairman
Operating Committee
Department of Commerce

FROM:

SUBJECT: Response to Your Inquiry on the Automotive Machine
Tool Situation in the Soviet Bloc

Attached are two copies of a report on Trends in the Soviet Motor Vehicle Industry, which was prepared in response to your memorandum of 10 November 1964. Included in the report is an appendix which may be of special interest to such specialists in the Office of Export Control as Anthony Denkas.

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Trends in the Soviet Motor Vehicle Industry

I. Background

Recent Soviet interest in importing US grinding machines suggests renewed efforts on the part of the USSR to import US machine tools for the Soviet motor vehicle industry. Soviet interest in US machine tools and automatic lines has been long-standing; in 1960-62 a number of US firms filed applications -- a total of 112 cases valued at \$43 million -- with the Department of Commerce to export equipment destined for the Soviet motor vehicle industry. In ultimately denying all of these cases, Commerce stated that "equipment of this magnitude and advanced type would have contributed significantly to the automotive capacity of the Bloc."

The following report attempts to examine the impact of the denial in light of the performance of the Soviet motor vehicle industry subsequent to 1962. As background recent overall trends in Soviet machinery production are viewed. Next, the specific achievements and goals of the motor vehicle industry are set forth along with an analysis of the problems and difficulties encountered by this industry since 1962. Finally, domestic production and imports of machine tools have been evaluated with particular emphasis on the types of equipment denied in 1962.

II. Plans and Performance of the Motor Vehicle Industry

The Soviet Seven Year Plan called for an over-all increase in production of motor vehicles from 511,000 in 1958 to between 750,000 and 856,000 in 1965, an increase of from 50 to 70 percent. Production of trucks was to increase by 60 percent, cars by 70 percent, and buses by 179 percent. As shown in the tabulation below, Soviet output of motor vehicles has lagged seriously behind the forecast of the Seven Year Plan.

	(1000 Units)		Percentage Increase	
	<u>1958</u>	<u>1963</u>	<u>Achieved 1958-63</u>	<u>Planned 1958-65</u>
Motor Vehicles*	<u>511.1</u>	<u>587.1</u>	14.9	50-70
Buses	12.7	31.0	144.0	179
Trucks	376.2	383.0	1.8	60
Passenger cars	122.2	173.1	41.6	70

* Including trucks for the military.

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Output of trucks, the largest component of Soviet motor vehicle manufacturing, has virtually stagnated and will not even come close to fulfilling the Seven Year Plan goal. Output of trucks has improved only negligibly in 1964; most of the routine increment to production of motor vehicles in the first three quarters of 1964 was accounted for by improved output of passenger cars. Production of buses and passenger cars should fulfill or come near to fulfilling the goals of the Seven Year Plan.

The USSR has announced no plan data on the output of motor vehicles for the remaining years of this decade and beyond, although there may be some such announcement when the 1966-70 economic targets are released next year. However, in view of the higher priorities currently pressing the Soviet economy, it is doubtful if the automotive industry as a whole will receive increased priority in the next few years, although there may well be considerable effort to develop and produce special-purpose vehicles for the military and, perhaps, for agriculture.

III. Marked Slowdown in Over-all Machinery Output

Even as the Soviet motor vehicle industry has made little progress in recent years, there also has been a marked slowdown in the growth of virtually all other branches of the machine building industry as well. The Soviet economy has found it increasingly difficult to meet all the requirements of the military establishment, heavy industry, the space program, and the consumer. The average annual increase in the Soviet output of civilian machinery declined from 11 percent during 1956-61 to 10 percent in 1962 to 9 percent during 1963. Of 18 major types of machinery, more than one-half increased 10 percent or more during 1962, but during 1963 less than one-fourth increased at such rates. During 1963, when production of motor vehicles increased 2 percent, the output of equipment for petroleum refineries and of metallurgical equipment actually decreased, and the output of tractors and main-line diesel locomotives increased only 2 percent -- no better than the increase achieved in production of motor vehicles. Therefore, in attempting to identify the causes for the slowdown in production of motor vehicles, it is necessary to keep in mind that the Soviet machine building industries in general have been showing a marked slowdown. The Soviet leadership has imposed new priorities on industries that traditionally have been incapable of making rapid adjustments to new situations. These problems, combined with poor planning, snarled supply flows, and inadequate incentives make it especially difficult to pinpoint any single factor that is responsible for the poor performance of the Soviet motor vehicle industry in recent years.

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IV. Slowdown in Motor Vehicle Industry

The poor performance of the Soviet motor vehicle industry cannot be attributed directly to the denial of \$43 million worth of US automotive equipment in 1962. Numerous difficulties have troubled this industry during the past several years, which, taken together, far outweigh the importance of the denial of the US equipment. The crux of the problem in the Soviet automotive industry is fourfold: (1) Administrative and technical difficulties have hampered the Soviets as they try to replace with specialized production units the vertically integrated plants that have been long typical of the industry; (2) Attempts are being made to introduce a new generation of truck models into production; (3) The introduction of new, more efficient, automated equipment has disrupted somewhat the normal producing routines under which Soviet industry performs best; and (4) Requirements for specialized motor vehicles to meet Soviet missile and other military programs have been increased, and although not large in the aggregate, they do impose a drag on the industry by diverting resources and personnel. Although achievements have less than originally envisioned, specialization is not new to Soviet motor vehicle industry. Just before World War II, specialization of a sort took place until the war brought such plans to an abrupt end. After the war the need for immediate output and the limited availability of resources again postponed a revamping of the industry. It was not until the late 1950's and the beginning of the Seven Year Plan that specialization was seriously considered. Some progress has been made toward removing component production from vertically integrated plants of the Soviet automotive industry. To be successful, however, specialization of production requires the construction of new plants and the modernization of other plants for component manufacture. Many of these necessary investments have lagged.

Soviet industry, geared to long production runs of standard models, has had much trouble historically in introducing new models into production, especially when the newer models incorporated major qualitative improvements. In the Likhachev plant, one of the two largest in the industry, major emphasis has been placed on getting two new heavier duty trucks, the ZIL-130 (4.5 ton) and ZIL-131, into production. Both were on the drawing boards in 1957, and full production was to have begun in 1961. However, the first indications of mass production did not appear until October 1964. The Likhachev plant has increased production modestly, but instead of new trucks, the plant continues to produce mainly intermediate-capacity vehicles that are

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basically the same as those produced for years.

Nearly the same situation is in effect at the Gor'kiy plant, where the new GAZ-53 (3.5 ton) has been scheduled to go into production. Plans for this model were completed in 1959, and production was to start shortly thereafter. As of January 1964, however, only a few prototype models had been produced. Production at Gor'kiy has been on the downgrade. The GAZ-51, outmoded even by Soviet standards, is being phased out of production, and only limited production of a transitional model, the GAZ-53-F, is under way. Gor'kiy, although still a highly vertically integrated plant, has attempted to subcontract specialized components. However, these plants have not provided Gor'kiy with the necessary components and thereby have compounded production difficulties.

V. Soviet Production of Machine Tools for the Motor Vehicle Industry

There is no doubt that US machine tools and transfer lines are superior to their Soviet counterparts. It does not follow, however, that the Soviet machine tool industry is incapable of producing equipment suitable for the needs of Soviet industry. The attached appendix lists machine tools and lines produced in the USSR during the past several years that are generally similar to the kinds of machines and equipment that the USSR was interested in importing from the US in 1962. It is well established that the USSR is technically capable of developing and supplying the motor vehicle industry with machine tools and automatic lines incorporating adequate technology and capacity to support both present levels of production and anticipated future growth. At present, the machine tool industry is hard pressed to handle all of its assignments.

The largest known motor vehicle transfer line built by the USSR included 85 machine tools. It was designed by a Soviet design bureau, SKB-1, and was built at the Ordzhonikidze Machine Tool Plant in Moscow. This line reportedly is capable of completely machining 60 V8 ZIL-130 truck cylinder blocks per hour -- the capacity of the line is optimistically stated at 240,000 blocks per year. The Soviets announced the installation of this line at Likhachev in March 1962, and indications are that it started operation on a trial basis in September 1963. The blocks made at Likhachev probably are cast iron, although some aluminum V-8's are planned. Although it can not be said that this line is a substitute for the proposed Cross "Transermatic," it demonstrates Soviet ability to manufacture a transfer line for V-8 cylinder blocks. This line is only one of 53 automated lines used to

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produce the ZIL-130 engine; numerous other lines and machine tools have been made for processing motor vehicle crankshafts, blocks, heads, camshafts, and other associated parts. It is difficult to make an accurate evaluation of these lines, but it is estimated that the Soviets will assemble 600,000 motor vehicles in 1964 -- nearly all of them including parts that came off domestically manufactured lines.

In recent years there has been increased evidence that the Soviet leadership recognizes that its domestic industries alone are not in a position to supply all the needs for machinery and equipment of the USSR, especially in view of increased attention being given to improving the quality of output. Although the Soviet machine tool industry is an efficient and low-cost producer of many general-purpose machine tools, it is far from being an efficient producer of many types of special-purpose machine tools, of machines requiring a high degree of precision and productivity, or of lines requiring custom research and development. There can be little doubt that faced with the vast array of priority tasks the USSR in numerous areas would prefer to take advantage of the years of experience and research that has gone into advanced US and Western equipment. This is not to say that the USSR is incapable of producing equipment generally similar to the kinds of US machines that were to be imported in 1962. It does mean, however, that Soviet planners have become increasingly aware of the advantages that the USSR can gain through the judicious import of specialized and technologically advanced foreign machinery.

VI. Soviet Imports of Machine Tools

is denied

the specific intelligence information detailing these transactions. Known purchases abroad include a large transfer line from Renault and a new type of die-casting machine of 2,200 metric tons' capacity from Triulzi of Italy. The USSR contracted in 1962 to export \$3.5 million worth of automatic crankshaft grinders, multiwheel grinding machines, and cylindrical grinders. Delivery of these fully automated machines was scheduled for 1964-6. An agreement was signed with the French in 1963 for nearly \$4 million in automatic transfer lines (not specifically identified), another \$4 million in precision machine tools (part of which were destined for automotive production), and a complete plant for producing shock absorbers. The trade protocol and the USSR in 1960 included provision for the export of \$5.75 million in transfer lines to Soviet motor vehicle and tractor industries. A small number of lines for machining parts for carburetors and other automotive components also have come from Hungary's Csepel Machine Tool Plant.

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It seems highly unlikely that the USSR would have spent \$43 million on its relatively low-priority automobile industry in one year. This sum would be equal to nearly one-half of all Soviet imports of machine tools for all purposes and from all countries, both Bloc and non-Bloc, in 1963. Although there has been a steady increase in Soviet imports of machine tools from the industrial West, the total in 1963 from the major non-Bloc suppliers - (the UK, West Germany, Italy, France, Switzerland, and Japan -) amounted to only \$23.8 million -- just a little more than one-half the amount involved in the prospective automobile transaction. Imports from the industrial West have shown no unusual increase in the first three quarters of 1964.

VII. Summary and Conclusion

Output of trucks, the largest component of production by the Soviet motor vehicle industry, has remained virtually unchanged in recent years, posting only a 1.8 percent gain during the first 5 years of the Seven Year Plan. Shortages of some types of machine tools and automatic lines, primarily due to increased needs of higher priority industries and a general slowdown in the rate of growth in all the machine building industries, undoubtedly have contributed to the poor performance of the Soviet motor vehicle industry. It is clear that denial of US equipment was not the sole reason or even a major reason for the poor performance of the Soviet motor vehicle industry. Introduction of new models, temporary upheavals caused by increased specialization, disruptions of normal production because of the introduction of more automated equipment, and increased requirements for specialized military vehicles all have been major contributing factors. Furthermore, the Soviet industry in general has found it increasingly difficult to meet all the requirements of the military establishment, heavy industry, the space program, and the consumer. In the competition for productive resources the Soviet motor vehicle industry has received a relatively low priority, and there are no indications at present that its priority is increasing.

Since the US denied the USSR has imported some similar types of machine tools from Western Europe, although information on such imports is scant and incomplete. In 1963, total Soviet imports of machine tools from Western Europe and Japan amounted to only \$23.8 million, about one-half of the proposed purchases in the US in 1962. Furthermore, there has been no major increase in imports of machine tools by the USSR in 1964. The proposed purchases from the US in 1962 were so much greater than previous or

recent exports of machine tools from the industrial West that it is possible that many of the 112 cases never would have reached the firm contract stage.

In all likelihood the USSR will continue to place orders for motor vehicle equipment with the West in spite of the fact that it has demonstrated the technological capability to manufacture equipment adequate for its motor vehicle industry. The USSR believes that the same or better results can be achieved at a lower cost by the import of certain types of equipment from the West, especially when only a limited number of each type of machine is required.

APPENDIX

SELECTED SOVIET MANUFACTURED MOTOR VEHICLE MACHINERY TOOLS AND AUTOMATIC LINES USED TO

PRODUCE FRONT ENDS PAINTS AND REAR END GEARS

Model No. and Purpose	Date of Manufacture or Introduction	Description and Remarks
<u>Cylinder Blocks</u>		
1161, 1162, 1163	January 1959	Three lines used together to machine SMD 55 engine blocks.
1199	September 1961	13 unit type machine tool transfer line for use in truck production at Likhachev Plant in Moscow.
1196	December 1961	65 machine tool transfer line for M11 150 crank engines, installed in Likhachev Plant in Moscow.
11140	April 1962	Transfer line for V10 blocks, installed in Zvezdnyi Engine Plant.
<u>Camshafts</u>		
1A892, 1A893	January 1960	Semi-automatic lathe with unloading and loading mechanism.
1891, 1892, 1893	Currently produced	Manually loaded camshaft lathe.
KASH 130, 170	1955	Manually loaded, automatic cycle camshaft copy grinding.
KASH 17	1958	Transfer equipped, automatic camshaft profile grinder.
KASH 202, 203	1960	Automatic camshaft grinder, can be used in automatic line.
KASH 213	1958	Automatic loading camshaft finish grinder.



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APPENDIX. SELECTED SOVIET MANUFACTURED MOTOR VEHICLE MACHINES TOOLS AND AUTOMATIC LINES USED TO

PRODUCE ENGINE PARTS AND REAR END GEARS (continued)

Model No. and Purpose	Date of Manufacture or Introduction	Description and Remarks
<u>Connecting Rods</u>		
6U39, 40, 41, 42	1961	Transfer line for machining and assembling connecting rods of D12 9 engine, 26 machine tools.
<u>Crankshafts</u>		
--	1962	Automatic line for dynamic balancing of crankshafts.
--	Designed 1962	Automatic line for complete machining of crankshafts designed by GSE-J.
KbSNL-1	--	Line for machining crankpins of SMD engine, output 40 pieces per hour.
3A423	1959	Crankshaft grinder.
3A421	1957	Crankshaft grinder.
KbSh 257	1958	Multi-wheel crankshaft grinder, can be used in automatic line.
<u>Rear End Gears</u>		
5702	1963	Spur end helical bevel gear shaper.
5231, 5232	1959	Spiral bevel gear semi-automatic.
525B	--	Rough cutting hypoid and spiral bevel gear, Gleason type.

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APPENDIX. SELECTED SOVIET MANUFACTURED MOTOR VEHICLE MACHINE TOOLS AND AUTOMATIC WEAPONS LISTED TO
 PRODUCE MACHINE PARTS AND TEAR AND GEARS (continued)

Model No. and Design	Date of Manufacture or Introduction	Description and Remarks
<u>Rear End Gears (continued)</u>		
525	--	Automatic spiral and hypoid bevel gear generator.
5231, 5032	1958-59	Spooling and finishing of rear end gears.
5831	1951	Crushing obsolete and spiral bevel gears.
5872	--	Crushing spiral and hypoid bevel gears.