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**Truck Production in
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A Research Paper

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Truck Production in the Soviet Union [Redacted]

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A Research Paper

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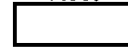
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**Truck Production in
the Soviet Union** 

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Overview

*Information available
as of 1 August 1982
was used in this report.*

As a result of its 15-year truck manufacturing expansion program, the Soviet Union ranks third behind Japan and the United States in truck production. Although this production is only about half that of the United States, the USSR produces almost 20 times as many trucks for the military as does the United States. Soviet truck manufacturers build more for the military because of a larger armed service, a heavy reliance on trucks for logistic support, and shorter truck service lives.

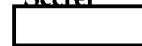
Approximately 98 percent of the almost 800,000 trucks built in the USSR during 1980 were produced in seven plants. These plants—excluding the Kama River Plant, which began operation in 1976—were expanded mainly during the 1970s. By 1980 the seven plants had an estimated capacity of 880,000 units. The expansion and modernization program has been aided substantially by Western financing and technology. The value of equipment and technology imported from the West since 1965 for this program is estimated to be at least \$2 billion in 1980 prices. Most of the Western equipment and technology was used in building and equipping the Kama River Plant. Expansion is continuing at three of the plants, and the capacity of the truck industry is scheduled to increase to more than a million trucks a year by 1985.

The rate of growth in truck production for military use in the USSR has exceeded that of civilian truck production, with procurement of trucks for the military growing at an estimated average annual rate of nearly 5 percent a year in 1971-80 compared with a growth rate of 3 percent for trucks slated for civilian sectors. If the rate of military truck production continues to outpace civilian truck output, truck shortages in the civilian sectors will be exacerbated. The rate of growth in overall truck production has been slowing, and in 1981 output did not increase at all.




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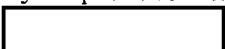


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Preface

At least \$2 billion in Western truck manufacturing equipment and technology has been transferred to the USSR since the mid-1960s as part of a major program to modernize and expand truck production in the USSR. Because trucks—often the same models—are used in both the military and civilian sectors, this “dual use” aspect has frequently been on the frontier of controversy in public discussions and disputes concerning the transfer of Western truck technology to the USSR, especially the advisability of controlling such transfer. 

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This research paper is designed to provide the reader with basic facts about the production of trucks in the USSR, the recent 15-year plant expansion program, the role played by Western technology in that program, and finally the rapid growth in deliveries to the military. The production of other military vehicles is not discussed, although they may be produced in the truck manufacturing plants mentioned in the paper. 

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Truck Production in the Soviet Union [redacted]

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Background

Over the past 50 years, Soviet truck production increased from under 10,000 vehicles a year to almost 800,000 (figure 1). Foreign capital, technology, and equipment were critical to the development of the Soviet motor vehicle industry before and following World War II. After a lull in plant construction and a slowdown in the growth of truck production in the 1950s and early 1960s, a 15-year transportation modernization plan was adopted. The Soviet truck industry entered into a period of steady growth that continued throughout the 1970s. The centerpiece of the program was the Kama River Motor Vehicle Plant, the world's largest single facility (in floorspace) for producing trucks. This plant obtained the latest tooling and manufacturing processes from the West, particularly the United States. [redacted]

Major Truck Producers

Approximately 98 percent of the roughly 800,000 trucks built yearly in the Soviet Union are produced in plants belonging to seven major associations. They assemble trucks for both civilian and military end use. These plants are:

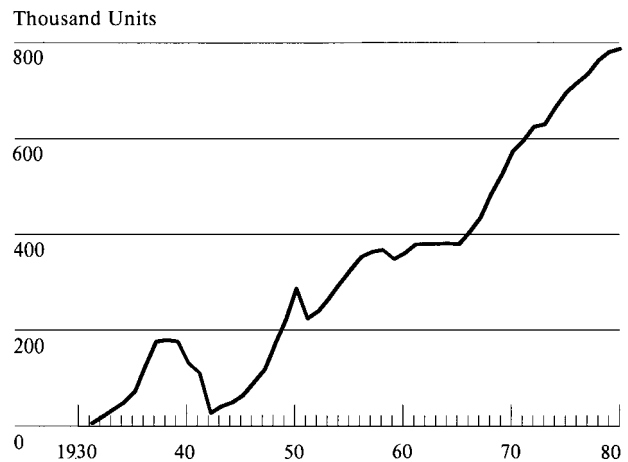
- Gor'kiy Motor Vehicle Plant (GAZ).
- Likhachev Motor Vehicle Plant (ZIL).
- Ul'yanovsk Motor Vehicle Plant (UAZ).
- Kama River Motor Vehicle Plant (KaMAZ).
- Ural Motor Vehicle Plant (UralAZ).
- Minsk Motor Vehicle Plant (MAZ).
- Kremenchug Motor Vehicle Plant (KrAZ).

All of these facilities are in the western USSR (figure 2). They vary considerably with respect to capacity, employment levels, and size [redacted]

Four other facilities—the Belorussian, Kurgan, Kuznetskiy, and Mogilev Motor Vehicle Plants—build specialized trucks for agriculture, construction, and mining. [redacted]

[redacted]

Figure 1
USSR: Production of Trucks and Jeeps^a



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^a Production figures include Jeep-like vehicles built by Ul'yanovsk Motor Vehicle Plant (UAZ). Official Soviet figures excluded these until 1973.

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other 40 or so plants involved in Soviet truck manufacturing perform a variety of functions that include the production of spare parts and the assembly of specialized chassis for such vehicles as fuel tankers and cement mixers. [redacted]

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Truck Types Produced

Analysis of open literature and truck specifications indicate Soviet facilities produce about 90 truck models, but diversity is more apparent than real. Only 20 models account for over 90 percent of all output. The remaining models are built in small numbers for specialized tasks such as mining and agriculture. For [redacted]

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Figure 2
Major Truck-Producing Plants in the Soviet Union



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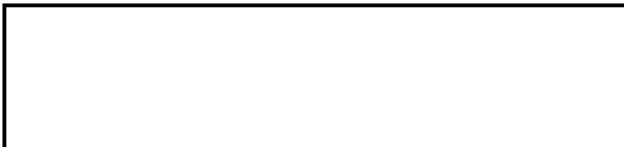
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the most part, specialized trucks consist of special-purpose bodies joined to a standardized chassis. There is little choice of alternative engine sizes and transmission gearings, or of most of the other optional features that characterize truck production in the West. On the contrary, the Soviets strive for the manufacture of standardized models with standardized components over long production runs. This approach tends to lower costs to producers through economies of scale and the "learning curve" effect, but it raises ownership costs to truck purchasers since they must operate trucks that may not meet their specific needs. [redacted]

Each manufacturer produces only two or three basic models (figure 3). Two plants, GAZ and ZIL, produce the two models that are in greatest demand—the 2-ton GAZ-66, an all-wheel drive truck for off-highway use that has been in continuous production since 1964, and the ZIL-130 (figure 4), a 5-ton highway truck first produced in 1964. [redacted]

In figure 5, major models, arrayed in descending order of production shares, are shown for three cargo capacity tonnage classes: light (less than 2 tons),

medium (2 to 5 tons), and heavy (over 5 tons).¹ All-wheel drive models are also distinguished from models that do not have this capability. This figure shows that virtually all Soviet output of trucks with a cargo capacity of 5 tons or less is from three plants—UAZ, GAZ, and ZIL. UAZ produces most of the light trucks, and GAZ and ZIL are the main producers of medium trucks. MAZ, UralAZ, and KrAZ historically have produced the bulk of the heavy trucks—mainly all-wheel drive vehicles—but KamAZ heavy truck output has been growing rapidly and will eventually exceed that of the other plants. All-wheel drive vehicles account for a relatively large share of production because they are required to provide all-terrain mobility for military operations and for agricultural use in regions where good roads are scarce. [redacted]



¹ The definitions of light, medium, and heavy cargo capacity tonnage classes in this paper are those commonly used in the USSR; they differ from those used in the United States. [redacted]

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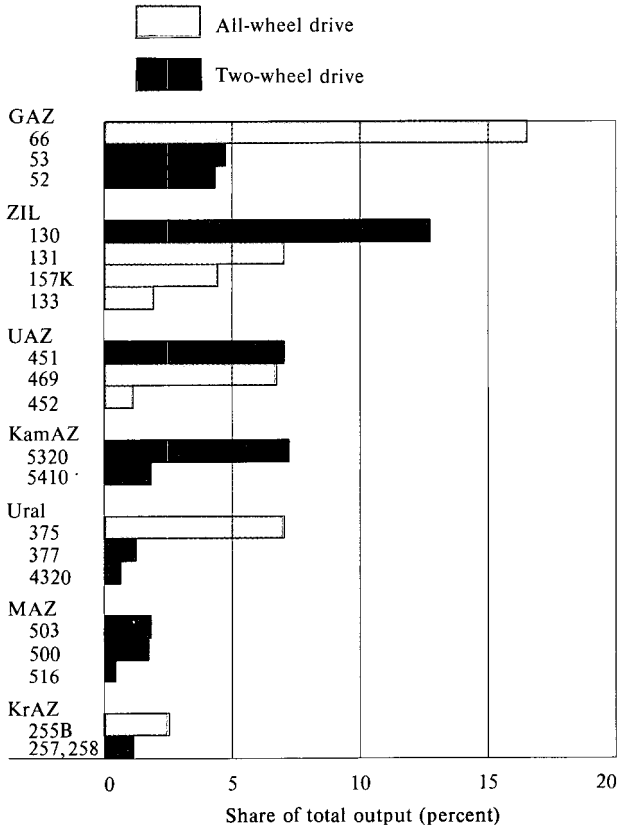
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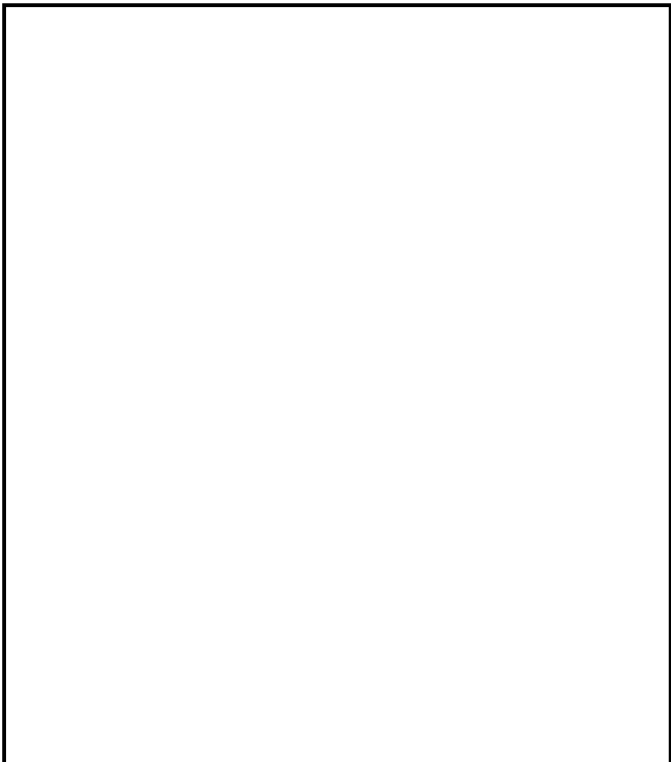
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Figure 3
USSR: Selected Truck Production
by Plant, 1980



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Western Assistance

A particular feature of the 15-year (1966-80) expansion plan was the extensive use of Western technology and capital. A significant portion of the capital that was needed to expand existing plants, build a new complex, install modern tooling, and import Western manufacturing processes was provided by Western financial institutions backed by government guarantees. Western technology and expertise enabled the Soviets to adapt Western manufacturing processes to their plants and to improve their automotive designs and management techniques in truck manufacturing.



We estimate that from 1965 to 1980, the Soviet Union spent at least \$2 billion (1980 prices) on Western truck manufacturing equipment and technology, including known imports of about \$1.5 billion for

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Figure 4. ZIL-130 5-ton highway truck. [redacted]

the Kama River Truck Plant. The truck manufacturers spent at least \$700 million for US equipment alone. Some of the other truck manufacturers that benefited from Western equipment and technology were ZIL, GAZ, UAZ, MAZ, and the Bryansk Motor Vehicle Plant (BAZ).² The figures in table 3 indicate a total of about \$1.7 billion, but we believe this substantially understates the actual amount. Western trade data frequently are not disaggregated sufficiently to identify specialized equipment such as that used for truck manufacturing. Moreover, export regulations in most Western countries do not require the identification of the final destinations of goods exported. Consequently, the data are incomplete, both with respect to total value of the equipment imported by the USSR and the end users of the Western equipment. [redacted]

The United States equipped almost the entire Kama plant's iron, steel, and nonferrous foundries and its diesel engine assembly facility. West Germany fully equipped the transmission plant. The other leading Western suppliers—France, Italy, the United Kingdom, Japan, Sweden, and Switzerland—provided equipment that was installed in portions of the truck assembly plant, the press and stamping plant, the forge plant, and in the tool and repair plant. [redacted]

Similarly, the United States and other Western nations provided equipment and technical support to other major plants, but not on as large a scale.

[redacted]

Table 3
USSR: Imports of Western Machinery and Tooling for Truck Plants Since 1965^a

	Estimated Value of Imports From West (million 1980 dollars)	Estimated Share From United States (percent)
Total	1,736	43
Kama River Motor Vehicle Plant (KamAZ)	1,500	40
Likhachev Motor Vehicle Plant (ZIL)	140	50
Gor'kiy Motor Vehicle Plant (GAZ)	80	69
Ul'yanovsk Motor Vehicle Plant (UAZ)	8	88
Minsk Motor Vehicle Plant (MAZ)	1	0
Bryansk Motor Vehicle Plant (BAZ)	7	100

^a Estimated. Data reflect a minimum value for imports.

[redacted]

Specific instances include:

- Expansion of ZIL's capability through a US computer-controlled assembly conveyor system and a Japanese spot welding robot line for truck cabins (see figure 6).
- Improved engine and drive train components by US firms and the design of an air-cooled engine by Porsche for GAZ.
- Purchase of US gear-cutting machine tools for the UAZ plant. [redacted]

Current Production³

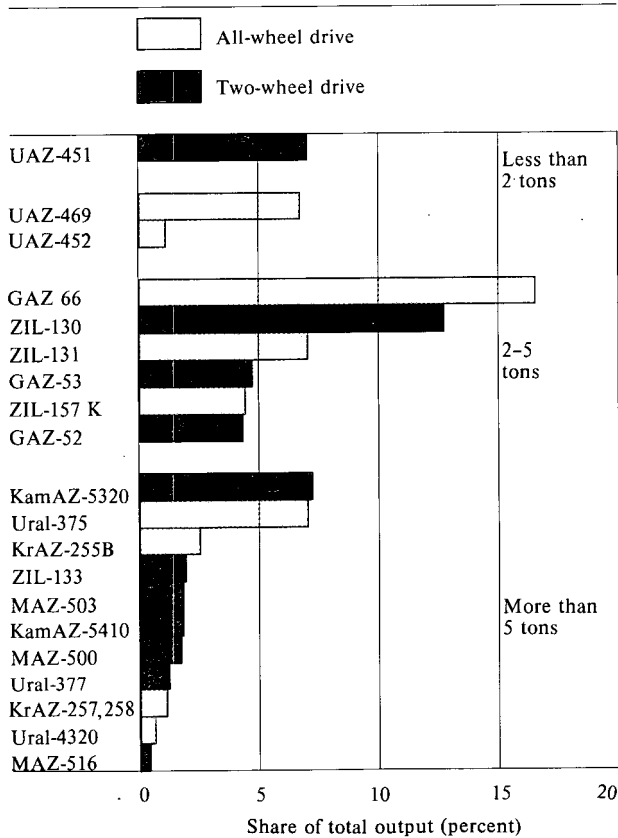
As a result of the expansion and modernization of production plants, output of trucks increased more than one-third during the 1970s. [redacted]

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Figure 5
USSR: Selected Truck Production as a Share of Total Output, 1980



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Some modernization continues, and by 1985 truck manufacturing capacity is scheduled to exceed 1.2 million units. We estimate truck production in all Soviet plants to have increased from 380,000 in 1965 when the 15-year expansion plan was initiated to 787,000 in 1980, bringing the USSR to third place in the world behind Japan and the United States in total trucks and first in trucks exceeding 2 tons' capacity.

* Total production figures given here include Jeep-type vehicles built by UAZ. Official Soviet figures excluded these vehicles until 1973.

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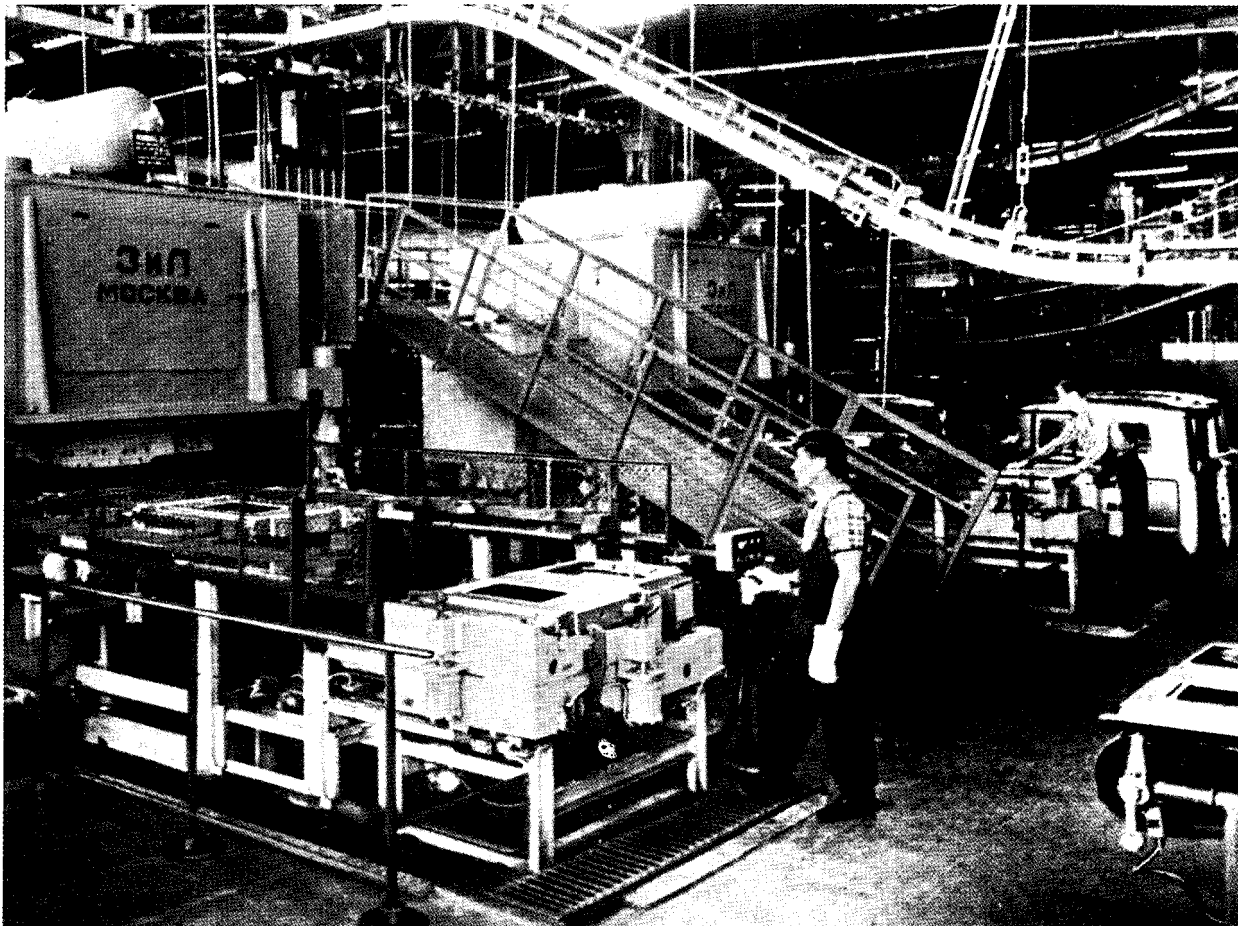


Figure 6. Western-supplied automated welding and cabin assembly line at ZIL plant. [REDACTED]

In addition to increasing total production, the Soviets changed the mix of trucks they produced. Between 1965 and 1980 the manufacture of light and heavy trucks increased relative to that of medium trucks [REDACTED]

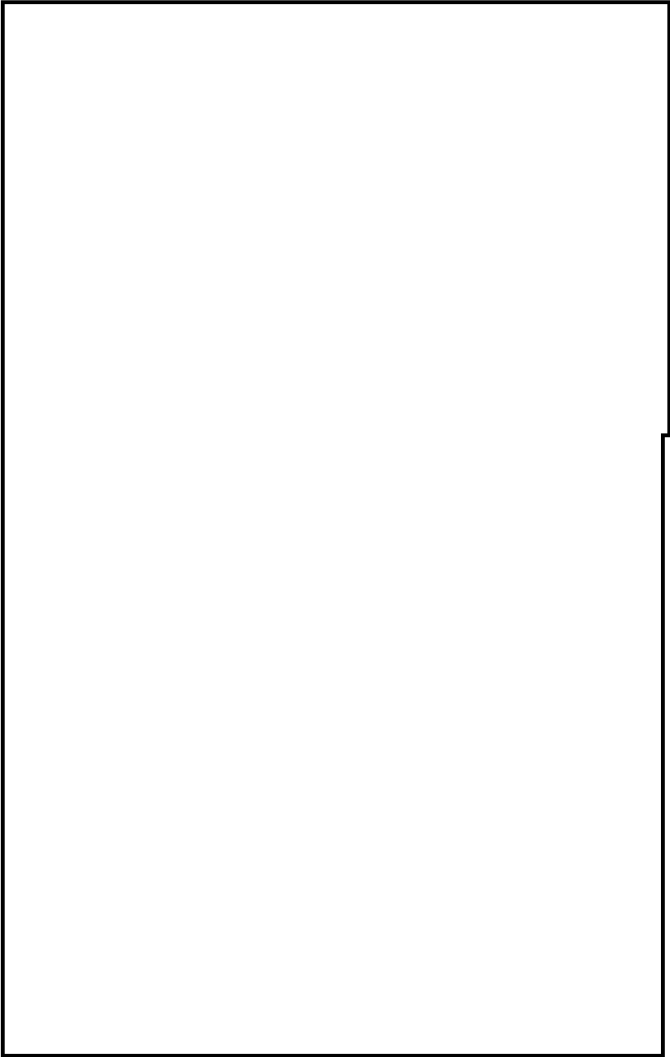
The increased share of heavy truck production was primarily related to greater output of heavy trucks at the KrAZ and UralAZ plants and the start of production at the Kama River Plant in 1976. The large increase in heavy truck production was caused by the demand for more long-distance hauling capacity by the civilian sector and a doubling of heavy trucks in military fleets since 1970. (Figure 7 shows a

convoy of heavy KamAZ trucks in Kabul, Afghanistan.) Although the share of production devoted to medium trucks declined by more than 20 percentage points between 1965 and 1980, the Soviet Union still produced more of this type than any other. Increased production of light trucks was attributable to Jeep-type vehicles for the military. The civilian market for light trucks is relatively small, mainly because of the underdeveloped Soviet service sector.⁵ [REDACTED]

⁵ US manufacturers supply the needs of a more advanced service industry. Consequently, 80 percent of US truck production consists of light pickup trucks and vans. [REDACTED]

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Soviet truck manufacturers build more trucks for the military because of the substantially larger size of the Soviet armed forces, a heavy reliance by ground forces on trucks for logistic support, and shorter service lives. [redacted]

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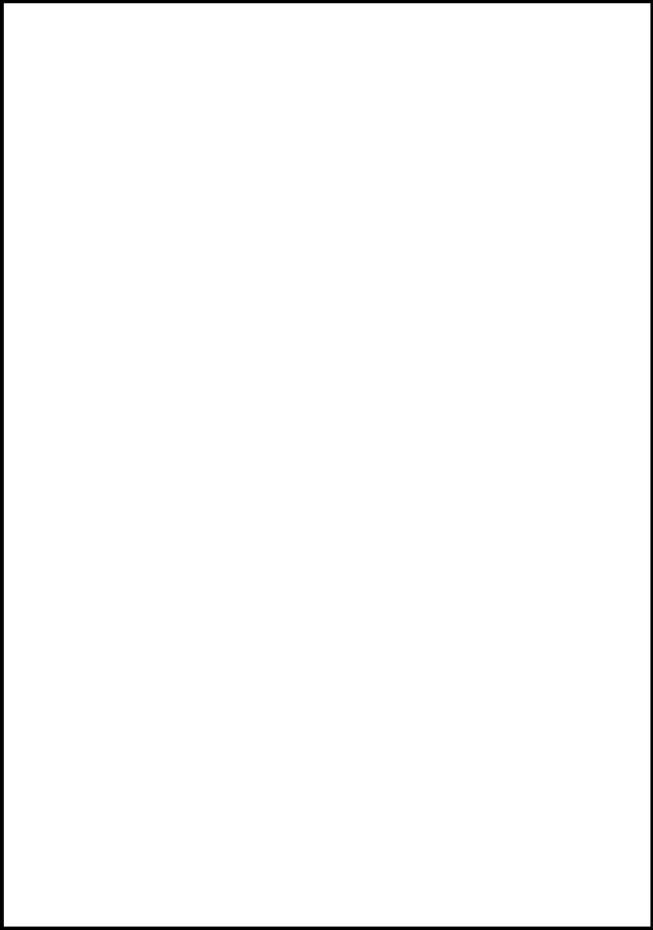
[redacted] Soviet military trucks normally are replaced in about eight years. US military trucks often are operated for longer periods—up to 20 years in some cases for tactical vehicles. The Soviets nonetheless have been able to replace older trucks and increase the size of their military fleets as well. [redacted]

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Production for the Military

The military establishment in the Soviet Union has first claim on the output of the truck manufacturing industry. [redacted]

[redacted] Military output was less than 1 percent of the 1.6 million trucks built in the United States in 1980. The Soviets thus built almost 20 times as many trucks for their military.⁶ [redacted]

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⁶ Rough estimates indicate that the Soviet military maintains an inventory of nearly 800,000 trucks—about one out of every five trucks in the USSR. [redacted]

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Figure 7. KamAZ military trucks in Kabul, Afghanistan.

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Figure 8. ZIL-131 all-wheel drive military truck. [redacted]

The rate of growth in military trucks produced for the military in the USSR has exceeded that delivered to the civilian sector. [redacted]

[redacted]

Continued growth in military truck production may exacerbate truck shortages in the civilian sectors if, as it now appears, overall truck production continues to level off.

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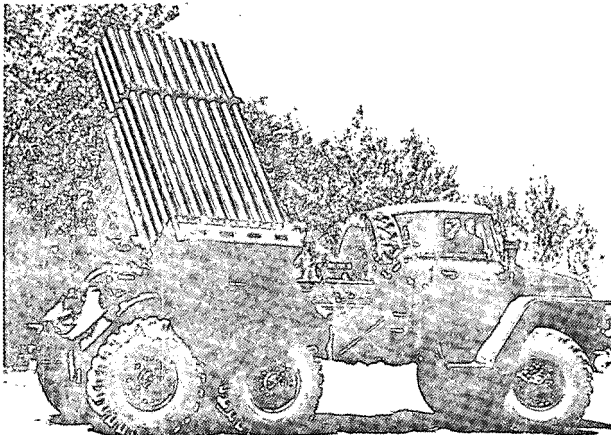


Figure 9. Ural-375D heavy truck with 40-tube rocket launcher. [redacted]

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Figure 10. GAZ-66 2-ton, all-wheel drive military truck. [redacted]

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