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Central Intelligence Agency



Washington, D.C. 20505

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DIRECTORATE OF INTELLIGENCE

20 May 1991

## TANK PROTECTION LEVELS OF THE 1990S

### SUMMARY

We assess the frontal protection levels against kinetic energy rounds of Soviet tanks of the mid-1990s to be approximately 700 millimeters (mm) and 750 mm steel equivalent for the hull and turret, respectively. For Soviet tanks of the late-1990s, we expect the respective levels to rise to 750 mm and 850 mm. However, advances in ceramics, active protection, explosive reactive armor, or in unconventional tank design may raise these levels further. We expect that Soviet armored vehicles will continue to present a threat in the Third World, and that they will be augmented by transfers of Western tanks and armor technology.

This memorandum was prepared by Scientific and Weapons Research. 1 May 1991 was used in its preparation. Comments and queries are welcome and may be directed to OSWR.

Office of Scientific and Weapons Research  
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**SUBJECT: Tank Protection Levels of the 1990s**

Our estimate of the KE protection levels for Soviet tanks of the mid-to-late-1990s are summarized below (for the frontal arc, in millimeters of steel, equivalent):

	Mid-1990s	Late-1990s
Hull	700	750
Turret	750	850

We would add, however, that these are probably lower bounds, given the many developments now underway that would increase protection levels, but by amounts that are difficult to quantify at this time. These include:

- o Advanced ceramic materials -- notably improvements in silicon carbide [ ] and possible fielding of boron nitride armor in the future.
- o Explosive reactive armor optimized against KE rounds -- we do not know the extent of Soviet R&D in this area but consider it likely for the mid-to-late-1990s, if they have not already developed it.
- o Active protection systems -- recent information indicates that the Soviets have already begun fielding a system designed mainly against ATGMs (on the T-55AD modernized tank). We believe the Soviets are developing KE-optimized active protection systems for fielding by the late 1990s.
- o Unconventional tank designs -- the Soviets are probably continuing to experiment with reduced-volume turret designs and may yet succeed in fielding such a tank, which presumably would have substantially greater frontal protection.

We believe that, for the foreseeable future, Soviet armored vehicles will continue to represent the most important threats against which US systems should be designed. Worldwide, Soviet armored vehicles will continue to set the quality standards and will be present in substantial numbers. The principal reason for this is that the Soviets are aggressively marketing new military systems years earlier than they have in past, in order to compete successfully for hard currency in the world arms market. For example, at an international arms exhibition in Malaysia in March 1990, the Soviets publicly offered the T-72S tank, which fires a new, laser-guided antitank missile and probably contains ceramic armor. They also offered their first-generation reactive armor for sale at the same show.

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Besides the Soviet Union, other countries also may be sources of armored vehicles with significant KE protection levels.

Despite the success of US systems during the Gulf War, the armor threat we faced from Iraq does not approach the potential threat US forces could face in the mid-to-late 1990s. The defeat of the Iraqi armored force was fully expected, given that we had deployed our best available technology against technology generally 10 to 20 years old -- the armor technology in Iraq's basic T-72s was first fielded with the Soviet Army in the T-64 tank in 1967; the technology in Iraq's T-72M1 tanks probably was fielded in the T-64B and T-80 by 1979-80. If current armor technology export trends continue, we may not always be so fortunate in the future.

The add-on armor found on some captured Iraqi tanks further shows that relatively advanced armor technology can be transferred to the Third World. The armor consisted of aluminum, rubber, and steel laminates in a spaced array. Tests have shown this design to have twice the effectiveness of steel against shaped charge weapons, though no more effectiveness than steel against KE rounds. This "burster plate" technology has been known in the West since the early 1970s,

It is entirely possible that, in the future, KE-effective armors will be transferred to Third World countries through similar channels.

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23 MAY 1991

MEMORANDUM FOR:

SUBJECT: Tank Protection Levels of the 1990s

This typescript memorandum is in response to a request from your office for our current views on the tank threat of the mid-1990s and the late-1990s, with particular regard to protection against kinetic energy (KE) rounds. If you would like anything further, please let us know.

Director  
Scientific and Weapons Research

Attachment:  
SW M 91-20017

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