Technical Intelligence and Tank Design

by Lieutenant Colonel William L. Howard

The United States was woefully unprepared for WW II. Its armed forces were undermanned and poorly equipped. In fact, much of the Army's equipment was obsolete, compared to that of other countries which were already involved in the war.

One of our most glaring weaknesses was our inability to collect technical intelligence. While the basic role of the fighting man had not changed over the centuries, the weapons he used had changed drastically, often with dramatic effect. Some in the Army's ranks knew that further technological innovations in weaponry could have equally dramatic effects on the outcome of the combat operations the Army was or soon would be engaged in. They considered it imperative that the Army stay abreast of both the current weapons system developments of our allies as well as the enemy powers.

The requirements for information on foreign technology as it applied to warfare were generated at the highest levels. The most immediate requirements for information dealt with German use of radar, rockets, and their progress in developing the atomic bomb. Immediate intelligence requirements were limited to troop dispositions, logistical support, and potential capabilities. The design and development of tanks, artillery, and small arms was a low priority.

Because of the industrial effort required to support both America and her allies, we could not extend a great effort on redesign of our main battle tanks. While there were efforts underway to develop new tanks, America's main battle tank was the *M4* and its improved versions. Technical intelligence information — or to be more precise, information on the technical capabilities of German weapons — came from the evacuation and analysis of materiel recovered on the battlefield. The detailed analysis of captured enemy materiel was conducted by the Foreign Materiel Branch at Aberdeen Proving Ground, home of the Ordnance Corps.

At Aberdeen, the Ordnance Corps and other technical services set up the Enemy Equipment Identification (EEI) units that traveled to the combat theaters to view and study captured weapons and equipment. In many cases, EEI units conducted training programs on the use of enemy equipment by soldiers in the field. The field training conducted by EEI units did not have any appreciable impact on operations until after the Normandy invasion in June, 1944. General George Patton, for one, made extensive use of captured German artillery during his drive across Europe.

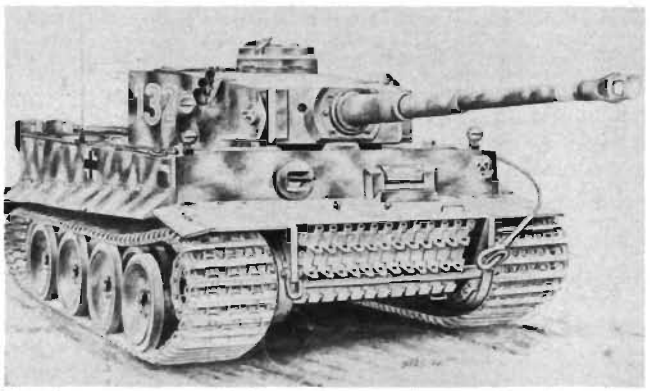
U.S. soldiers examine an unusual German vehicle, the 305-mm assault mortar mounted on a heavily armored Tiger chassis.

Capture of a *Tiger*

The most significant enemy vehicle to be encountered by the Allies during the war was the German *Tiger* tank, first used against the Russians. Exchange of technical information between the Soviet and British armies was never good during WW II, so that British knowledge of the *Tiger* was limited to gleanings from captured documents and POW interrogations. Not until the TORCH landings in North Africa did the British and Americans encounter the *Tiger.* It was a salutary experience, especially for tank battalions of the British 21st and 25th Tank Brigades equipped with the then-supposedly-invincible *Churchill III* and *IV.*

A break came during combat operations in April, 1943, when the German 501st Tank Battalion was forced to abandon a *Tiger* tank. After a preliminary examination by technical intelligence personnel, an initial report was signalled to MI 10, the branch responsible for technical intelligence on enemy equipment at the War Office in London. The vehicle was recovered by 21st Army Tank Brigade workshops, which replaced the damaged components from captured stocks and the remains of other vehicles. Little work was necessary; the turret had to be freed up, the turret hatches replaced, a smoke discharger cup and a few road wheels had to be mounted. The vehicle was put on display in the Tunis area before being shipped to England for detailed examination and testing. During its time in Tunis, the *Tiger* was examined by King George VI and by Winston Churchill, the British Prime Minister.

On arrival in England in 1943, the *Tiger* was sent to the School of Tank Technology (STT), a wing of the Military College of Science at Chertsey, Surrey. The tank was complete with its full complement of stowage and narrow rail travel tracks, waterproofing equip-



The German Tiger, at left, was used against the Russians, but poor technical intelligence did not prepare U.S. and British troops for their encounter with the 56-ton tank in the North Africa fighting. It clearly outclassed and outgunned even the newer Allied tanks. The Churchill, at right, was one of the newer British designs at the time.

ment, snorkel, and stocks of both HE and AP ammunition. At that time, STT had the task of examining and reporting on all captured enemy AFVs received in the UK and acting as a holding depot for these vehicles. The collection, along with Allied vehicles, later became the basis of the postwar Bovington Tank Museum.

After STT had issued its brief preliminary report in November, 1943, the *Tiger* was taken to London for display in the Horse Guards Parade, then returned to Chertsey for detailed testing, stripping, and examination by STT. The final examination report was issued in January, 1944. The introduction to this first installment of the final examination report stated, in its introduction:

"The *Tiger* is outstanding, being the heaviest AFV in general service, scaling approximately 56 tons in battle order. Its main armament is an 8.8 centimeter gun, while its heaviest armour (on the front vertical plate) is 102 mm. Another feature of outstanding tactical interest is its deep wading facilities. . . to a depth of 15 feet. Its size and weight impose tactical disadvantages, the most outstanding being the restriction on transportation due to its width, and its limited radius of action, due to heavy fuel consumption. . ."

Subsequent installments of the report covered the armament, power plant, fighting arrangements, stowage, and special devices and equipment, such as the deep-wading gear. The last installment was issued in September, 1944, by which time the vehicle had undergone automotive and wading trials at the Fighting Vehicle Proving Establishment (FVPE) and gunnery firing trials at the AFV School's experimental wing at Lulworth, Dorset. By this time, interest in this vehicle had been superseded by the necessity to examine and report on various models of the *Panther* tank, the *Tiger Model B,* and various self-propelled guns which had been captured in Italy and Northwest Europe.

As the war moved on and new equipment was encountered, the Ordnance intelligence effort moved along with the combat elements to evacuate the materiel. While jet airplanes, long-range rockets, and nuclear weapons captured the imagination of most high-level planners, research and development on new tanks and antitank weapons continued both in the U.S. and Europe.

When the war ended in 1945, these Enemy Equipment Identification teams were redesignated Technical Intelligence Detachments and were assigned to the various technical services. Ordnance TI teams, for example, conducted a detailed exploitation of the arms industries of Germany and Japan.

The *Tiger Model E* occupies a distinguished place in the history of tank design. It exerted a great influence on the U.S., British and Russian tank designers, particularly in the fields of firepower, protection, and deep wading. The postwar British emphasis on firepower in the *Centurion* and *Chieftain* programs certainly resulted from the wartime superiority of German designs, most especially from the shock of meeting the *Tiger*, which combined an even more powerful gun with armor frontally impenetrable to British tanks at virtually point-blank range.

Within the U.S., the postwar demobilization of the Army had begun, intelligence operations had been scaled back, and most of the technical services had eliminated their technical intelligence operations. The Ordnance Corps retained a small cadre of men at Aberdeen Proving Ground. Their efforts were limited in scope, compared to today's, and would not be of great value until the Korean War began.

In the case of the *Tiger*, the immediate conclusion that was reached was that its initial successes stemmed from surprise and subsequent successes from its firepower, mobility, and armor plate. If the U.S. and Russia had a better inteligence system prior to the start of the war, *Tiger's* initial successes would not have been achieved. While it is generally held that the Russians were able to field the best tank of its time, the *T-34*, their failure to keep their troops informed on enemy weapons probably contributed to their failures in the initial encounters. The Americans and the British did a much better job of keeping their people informed.

The Postwar Years

In April, 1945, Russian tank fleets smashed their way into Berlin and shortly thereafter Nazi Germany surrendered. The war in Europe was over.

As a result of the wartime Lend-Lease Program, the Americans had supplied a considerable amount of military materiel to the Soviet Union and, in exchange, we had been given several of their *T-34* tanks, which were taken to Aberdeen Proving Ground. Very little effort was expended on analysis of these tanks; however, some samples of the armor plate were cut out and tested before the tanks were put on display.

In the closing days of the war, the Soviets had also fielded the *Stalin* tank, a 46-ton vehicle that appeared in 1944 to counter the *Tiger.* In addition to the *Stalin,* work was also begun on improving the *T-34.*

The postwar technical intelligence organization in this country reverted to its prewar size. The Ordnance Intelligence Unit at the Pentagon continued its work on a smaller scale and a technical intelligence team at Aberdeen conducted extensive research into the foreign ordnance field, which was dominated by German equipment. Other than a review of the *Tiger* tank and later vehicles, it appears that little effort was made to integrate foreign designs into U.S. equipment, especially in the area of tanks, although considerable foreign technology was adopted in the development of long-range rockets and numer-

ous German scientists were brought to the U.S. to develop our missiles.

Captured German officers were interviewed to determine combat methods used against the Russians and numerous classified studies were prepared. In 1947, the Army developed the Aggressor program to add realism to training, but because of political reasons and a lack of Soviet equipment, the Aggressor program was not as effective as today's OPFOR (Opposing Forces) program.

The Korean War Era

". . . A strong force of North Korean infantry and tanks struck Task Force Smith as it stood alone in the roadway between Seoul and Ch'onan. For seven long hours, the Americans poured their howitzer, bazooka, mortar and small arms fire at the Russian-made tanks. . . Hopelessly outgunned and outmaneuvered, the tank-less Americans had received a grim baptism of fire.

". . . A few *Sherman* tanks began to make their appearance in combat, although their 75-mm guns were not a match for the heavier armament carried by the Russian-made *T-34s*. . ."

In June, 1950, the only functioning technical intelligence operation was the 528th Ordnance Technical Intelligence Detachment. With the outbreak of hostilities in Korea, the 528th deployed and in September, 1950, returned to the U.S., escorting the first *T-34/85* tank. The tank was placed on display in Washington and then sent to Chrysler for detailed engineering analysis.

Despite the supposed failure of American intelligence to predict the outbreak of the Korean War and the fact that our forces were outgunned in the early stages, U.S. tank designers had been in the process of developing tanks to match the Soviet tanks. With the start of the Korean War, the Army continued to press forward with new tanks. In October, 1950, design of the *M48* series of medium tanks began. Because of the war, production was authorized prior to the completion of any prototypes or testing. Ford, General Motors and Chrysler were awarded production contracts, but the first *M48* was not delivered until early 1953, too late to be a factor in the Korean War — and too late to have been influenced by the Soviet tanks recovered early in the war.

Numerous technical problems were discovered in the early production models of the *M48*, which delayed full-scale deployment until 1958. The tank was revised several times, the most recent version being the *M48A5*, which is still in U.S. service.

It's interesting to note that the early *M48* was equipped with deep-water fording gear, a requirement that probably developed from the analysis of the German *Tiger* two wars earlier.

Meanwhile, the Soviets had not been idle and had been working on upgrading their tanks. They developed the *T-44/85* in 1944 with improved hull, transmission, and suspension. By 1947, the *T-44* had been upgunned with a 100-mm gun, and the following year, the *T-54* was introduced. During this period, much of the information on the new Soviet tanks came from

An American soldier is dwarfed by the Jagdtiger, above, which mounted a 128-mm. main gun on a late Tiger chassis. At lower left, the German Pzkpw IV is inspected by curious U.S. soldiers at Kasserine Pass, North Africa. Japanese tanks were less of a factor in the Pacific, but the one pictured at lower right was active in Okinawa fighting.

intelligence sources abroad; it would be several years before the actual hardware got into the hands of American evaluators.

In retrospect, American technical intelligence in the Korean War was slow to respond and slow to become effective. Their mission was of limited value to the combat troops because of the short duration of the conflict, but the work was to be valuable in the future.

In meeting the overall requirement to gain an understanding of Soviet military capabilities, technical intelligence operations provided the basic analysis of Soviet equipment and industrial capabilities, and the foreign weapons training they conducted paved the way for training innovations such as the present program at the National Training Center.

The Korean War also showed that the U.S. could no longer remain in isolation from the world's problems. The war pointed out some serious shortcomings in our materiel acquisition process. These problems would be resolved in 1962, with the reorganization of the Army, but it would take several more years before the analysis of captured Soviet tanks would be used to forecast future trends in tank development.

Following the Korean War, ordnance technical intelligence operations were again scaled back. Under a new organization, ordnance technical intelligence units were to be assigned to each arsenal to provide expertise on foreign equipment encountered in combat. By this time, the foreign equipment being analyzed was basically Soviet.

The 507th Ordnance Detachment at TACOM translated the *T-54* operator's manual into English. Following the 1956 Hungarian Revolution, when a defecting tank crew fled to the West with several rounds of 100-mm ammunition from the *T-54,* the materiel was evacuated to Aberdeen for testing. Several of the 100-mm rounds were used in destructive testing of the experimental and radically new U.S. prototype, the *T-95*, which never reached production.

Personnel at Aberdeen, working under Colonel J.B. Jarrett, developed a series of manuals and a data base on foreign equipment. Much of the effort was aimed at letting American military attaches abroad know what the R&D elements had discovered about foreign materiel.

As a result of intelligence operations overseas, new Soviet weapons were identified and reported, the information becoming part of the Threat analysis. Some of this information influenced U.S. weapon development. Analysis of the 100-mm L/54 Soviet tank gun made it apparent that the 90-mm L48 gun of the *M48* was inadequate and led to the upgunning of the *M48* with the British-designed 105-mm gun now in widespread use.

As the 1980s approached, several events occurred which, on the surface, would seem to have little to do with tank design, but provided the impetus for future development.

A key event was the Russian success with Sputnik, which orbited the earth in 1952. One response to this technological surprise was the Defense Department's creation of the Defense Advanced Research Projects Agency (DARPA), an organization of scientists and engineers who worked on developing advanced concepts in science and technology that might yield important military applications.

In the mid-1950s, the Army created the Strategic Army Corps, a form of rapid deployment force consisting of the XVIII Airborne Corps and assigned units. Significantly, when the corps deployed for maneuvers, a technical intelligence detachment was assigned to corps headquarters.

By 1961, the Defense Intelligence Agency (DIA) was in place, acting to coordinate U.S. and allied intelligence and to manage the defense attaches all over the world, drawing their informatin together and analyzing it for the Joint Chiefs and the Secretary of Defense.

In 1962, the various technical servic-

Enemy tanks were rare in Vietnam, but this Soviet T-54 was one of several knocked out at An Loc.

es were reorganized under the new Army Materiel Command, which included, as one of its subordinate commands, the new Foreign Service and Technology Center. This organization centralized control and coordination of information coming in from the field from attaches and other sources.

The 1962 reorganization had a serious weakness; the lowest level that a technical intelligence element was authorized was at corps. This unit's function was to advise the corps commander, through his G2, of the capabilites of enemy weapons encountered in the field.

The Vietnam Era

As U.S. involvement in Vietnam began to expand, the 519th MI Battalion deployed to Saigon. The Combined Materiel Exploitation Center, composed of Ordnance, Signal, Chemical, Medical and Engineer detachments, fielded five "go teams" assigned to collect captured materiel.

Since the early Vietnam war was primarily an infantry/artillery operation, the weapons collected were Soviet-bloc small arms, *RPG-7* antitank rounds and *RKG-3M* antitank hand grenades.

In 1967, the 122-mm rocket was recovered, but the units had no success in recovering Soviet-built *PT-76* amphibious light tanks used just prior to the Tet Offensive in 1968 — either the vehicles were too badly damaged to recover or important components had been removed as war souvenirs.

When 100-mm tank gun ammunition was discovered — a tipoff that heavier armor might be used — the information was used to trigger a search for tank staging areas and to confirm the existence of the *T-54* tanks that were the North Vietnamese Army's prime armor weapon. The threat of meeting *T-54s* led to the hasty deployment of *TOW* missile units which arrived in time to stop the *T-54s* loosed in the 1972 offensive.

By 1971, however, most of the technical intelligence personnel had departed Vietnam and the collection emphasis shifted to the Middle East.

In the wake of the Arab-Israeli conflict, large quantities of Soviet materiel had been captured by the Israelis, including the *T-62* tank, which had first been seen publicly in 1965. The reports and photographs fueled a continuing intelligence effort to analyze Soviet weapons and to use this knowledge to improve our own.

Under the auspices of the Foreign Science and Technology Center, research and development labs under contract were studying Soviet equipment. In August, 1968, a report was prepared entitled "Armor Material - USSR" (U), the first comprehensive report on Soviet progress in this field. By 1972 this information became the basis for additional reports, including Ballistic Research Laboratory Report No. 1593, "Evolution and Forecast of the Soviet Main Battle Tank," (U), in June, 1972, and a classified report, "Antitank Weapon Systems," (U) which became the cornerstone of DARPA's work on liquid propellant guns, the automatic tank cannon, and long-rod penetrators, among other projects.

The next Arab-Israeli conflict, in October, 1973, also yielded numerous Soviet vehicles. The 519th MI Battalion, relocated at Aberdeen in 1976, began producing technical intelligence bulletins on the captured Soviet materiel. These reports, which were unclassified, were very useful to the field soldier and helped form the doctrine of the Opposing Forces (OPFOR) program and the Red Thrust detach-

The 1973 Arab-Israeli conflict yielded many Soviet-built vehicles, like this T-62 shown being analyzed at Fort Knox.

A Soviet-built BMP infantry fighting vehicle, also captured in the 1973 Arab-Israeli conflict, gets a once-over at Fort Knox.

ments, established at Fort Hood, whose purpose was to train Army units to field realistic opposing forces that would use Soviet tactics.

By September, 1976, the Rand Corporation had also produced a report, "Armor Development in the Soviet Union," which drew together all the previous technical intelligence work done during WW II, Korea and the early 1970s into one unclassified report.

Much of the technical intelligence gathered under these new programs found their way into the design of the *M1* with its revolutionary turbine engine, special armor, hypervelocity main gun, laser rangefinder, night vision equipment and computerized fire control.

But in the meantime, the Soviet tank designers have not been idle. Since fielding the *T-62*, they have followed with two newer models, the *T-64* and *T-72*. Details of these tanks are based on sketchy reports from observers, and photos of the tanks taken from the air. Despite several unsuccessful attempts, no actual hardware has come into the hands of U.S. personnel.

Some theorists contend that an even newer Soviet tank, the *T-80*, is merely an upgraded version of the *T-72* fielded to fool Western observers while the Soviets work on a really radical new tank design. Others believe that the *T-72 (M1981/3* is to be the main Soviet tank of the future. In any event, there must be hard, physical evidence to confirm or refute these theories, and this will be the work of technical intelligence operations in the future.

Summary

Based on past experience, there is considerable delay in getting captured enemy materiel to the rear for analysis. Apart from the normal hazards of combat, there are problems of transporting the materiel, pilferage of war souvenirs as well as a lack of qualified technical intelligence personnel at the combat unit level. Unfortunately, current organizational changes planned for combat intelligence units contain the same basic flaw of the past: the intelligence teams are to work at corps level. There has been no mention of where these people will come from. They do not have a career field in any branch. And there are no plans to have them at division level, where they are really needed.

So, until such time as the Army establishes technical intelligence operations far beyond those that now exist, it will fall to the nearest armor unit to safeguard and evacuate any captured enemy tanks or other materiel.

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