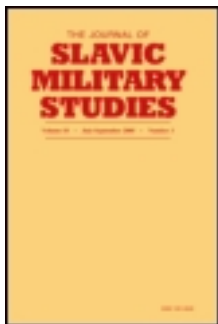


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Analyzing World War II Eastern Front Battles¹

NIKLAS ZETTERLING and ANDERS FRANKSON

With the flow of information originating from former Soviet archives during the present decade, new possibilities for researchers have appeared. However, archival documents are neither without ambiguities nor are they free from errors. Another problem that persists is the perceptions created by previous literature, which to a lesser extent were based upon archival sources. Some of the errors produced by such literature has not been accurately addressed, thus they have to be discussed.¹

This article is based not on work in Russian archives, but in the German military archives. However it is believed that many problems with archival documents originate from the conditions created by combat and can be assumed to occur in Soviet material as well. Thus experiences from work with German archival material can be of value for research in Soviet archives.

Of particular interest to the analyst is balance of forces, casualties, equipment losses and advance rates. In Soviet military literature these factors have been used extensively, but surprisingly seldom have they been clearly defined. Even though they do at first glance seem trivial, a closer examination reveals much ambiguity and many errors do exist among such figures presented for various operations. Quite often the magnitude of the errors can be so great that they render analyses and conclusions irrelevant.

Manpower Strength

Military organizations can use several different categories of manpower strength in their documents. The differences between these can be considerable. This can be illustrated by the German terminology used when reporting manpower strength. The following terms were used:²

Verpflegungsstärke Ration strength, that is the number of men the unit was ordered to provide with necessary substance. Thus it could include sick, wounded, prisoners of war, non-military manpower and manpower from other military organisations.

Kopfstärke This is a rather unusual term but it seems to be used to depict the same kind of strength as *Verpflegungsstärke*.

Iststärke	Actual strength, includes all men that are part of the unit's composition. Men on leave or temporarily detached to other units are included. Also men sick or wounded are included if they are assumed to return to service within eight weeks. Thus, despite its name, this strength category does not give the actual number of men available for service with the unit at the given time.
Tagesstärke	Daily strength, this includes all men momentarily available for service with the unit. Temporarily attached personnel are included too.
Gefechtstärke	Combat strength is the number of fit men in units of combat type, for example, armour, infantry, combat engineer, reconnaissance.
Kampfstärke	Front strength is those men in units of combat type who were up front, for example, tank crews, rifle-men, anti-tank gun crews, etc.

If a figure on manpower strength is not accompanied with a specification on what kind of strength it refers to it is not relevant. To what extent the Red Army used similar definitions is unclear, but the problem has roots in the military reality, and it is very likely that the Soviet staffs encountered these issues too. This is no minor topic since the difference between these strengths can vary considerably, as is indicated by the strengths for the German Eastern Front on 1 June 1944.

TABLE 1³
GERMAN STRENGTH ON THE EASTERN FRONT 1 JUNE 1944

<i>Army Group</i>	<i>Ist- stärke</i>	<i>Tages- stärke</i>	<i>Gefecht- stärke</i>	<i>Kampf- stärke</i>
South Ukraine				
Divisions & Brigades	418,984	360,562	198,510	140,320
GHQ Combat Troops	58,692	47,913	33,169	19,346
Total:	477,676	408,475	231,679	159,666
North Ukraine				
Divisions & Brigades	475,347	367,266	235,649	175,229
GHQ Combat Troops	57,391	40,398	27,840	18,587
Total:	532,738	407,664	263,489	193,816
Centre				
Divisions & Brigades	578,225	442,053	283,543	214,164
GHQ Combat Troops	66,171	44,440	32,657	22,608
Total:	644,396	486,493	316,200	236,772
North				
Divisions & Brigades	376,268	287,078	180,001	138,373
GHQ Combat Troops	58,481	43,947	31,967	19,924
Total:	434,749	331,025	211,968	158,297
Total for Eastern Front:	2,089,559	1,633,657	1,023,336	748,551

However, Table 1 does not include non-combat GHQ units and units directly under command of OKH (which were quite numerous⁴). If these are included, the *Iststärke* for the army groups were 550,000 (AG South Ukraine), 597,000 (AG North Ukraine), 849,000 (AG Centre) and 561,000 (AG North).⁵

But what about *Verpflegungsstärke* – ration strength? No comparable compilation has been found for 1 June 1944, but an example is given by a document discussing the ration strength of Army Group North.⁶ Here it is reported that the ration strength of the army group was 1,012,000 men on 1 June 1944. However the main message of the document is the inaccuracy of the ration strength reports and the fact that so much manpower is included in them which has nothing to do with the combat efforts of the army group. According to the document only 550,200 men can be included in the *Iststärke*. According to the listing this includes divisions, brigades, GHQ combat units, security units, rear supply services and men serving with intelligence, construction, army justice, propaganda, map production, railways and various technical units. Even including all German personnel (thus also civilians) the strength of the army group amounts to 670,000 men. Evidently ration strength, at least as the Germans calculated it, can give a very inflated and inaccurate picture. Indeed it is explicitly stated in the document that this was a well-known problem. However, this seems mainly to be the case for units above division level. Divisions and lower level units seldom had large numbers of men to feed except their own men, or attached GHQ units.

Also the document from which the definitions above have been taken insists that ration strength should not be used for analyses of combat capabilities, because it is simply not relevant. The document (issued by OKH) orders the use of ration strength to discontinue, except in report pertaining to supply matters. Unfortunately, much information on German strength in the documents actually refers to ration strength.

However, it is quite likely that the inaccuracies of ration strength are much more pronounced at army group level than at division or brigade level. These units, more clearly focused on combat, were probably more accurately represented by ration strength.⁷

In the published literature and articles, information on Soviet manpower strength is almost devoid of information on what kind of personnel are included in the numbers given. This is not satisfactory. It is not necessary to fill the text with such information, but it could at least be presented in footnotes.

Probably most figures on Soviet manpower strength are closer to *Tagesstärke* than any other German strength category, but this is a field where further research is necessary. However, if this assumption is true,

the errors occurring when comparing German and Soviet strength can be considerable. According to Table 1, Army Group North had a Tagesstärke at least 100,000 lower than the Iststärke.⁸ Thus the Tagesstärke of the army group could not have exceeded 461,000. Accordingly the ration strength is either at least 45 per cent higher (using 670,000 as ration strength) or at least 120 per cent higher (using 1,012,000 as ration strength). If, as seems likely, Soviet strength usually resembles German Tagesstärke, considerable errors can result if Soviet strength is compared to German ration strength. Most figures on German strength found in Soviet literature seem to refer to ration strength (or are too unrealistic to take seriously), thus giving a distorted picture.

If these problems are solved other difficulties appear. In Soviet post-war literature, STAVKA reserves have usually been omitted in strength comparisons concerning the entire Eastern Front. In the official 12-volume work *Istoria Vtoroi Mirovi Voyny* a table states that the Soviet manpower strength on the Eastern Front 1 July 1943 amounted to 6,612,000 (including navy manpower).⁹ However, closer reading reveals that the 11 fronts arrayed against the German forces (from Leningrad to the Caucasus) had 6,065,900 men¹⁰ (which probably includes navy personnel), while the STAVKA reserves amounted to 1,111,000¹¹ (including e.g. the Steppe Front). While this example is taken from a book against which many objections can be raised, the fundamental problem of deciding which units should be included in a battle and which should not remain unaltered. In this particular example STAVKA reserves should be included since they were intended to be used in Soviet offensive operations when the German Kursk offensive had been halted.

It is of course not only reserves that may pose problems. When looking at larger operations, like 'Bagration' in June 1944, it is important to assure that the numbers given for the opponents refer to front sectors as identical as possible. Unfortunately this is not always the case in much published literature. The solution when researching in archives is to check with files not only for higher command levels, but also consulting files for lower command levels.

Additionally there is the problem posed by different fighting organizations. In the German case, there are the Waffen-SS units, as well as combat units from the Luftwaffe. On the Soviet side, units from NKVD may be included or not. Occasionally it could also be relevant to include partisans too. How NKVD units are recorded in the documents, if they are kept separately or if they are included in the reports from the HQ to which they are subordinated is unclear to us. For the Germans, Waffen-SS units strengths are included in the reports submitted by the HQ they are subordinated to,¹² and this seems to be the case with the Luftwaffe units too.

Finally it is worth emphasizing that Soviet publications have exaggerated German strength routinely. Unfortunately this bad habit has not disappeared entirely during the present decade. An example of this is an article by M. I. Meltyukhov in *Istoriya SSSR* 3/91.¹³ He discusses the force ratios on the eve of Operation 'Barbarossa' both overall ratios and broken down on certain sectors of the front. However his figures on overall German strength are exaggerated in several respects:

1. He includes German High Command reserves that were released during July, but not corresponding Soviet forces.¹⁴
2. He grossly overstates Luftwaffe participation in terms of manpower.¹⁵
3. German satellite forces are included even if they were not committed until later. If such forces are included, Soviet reinforcements arriving in the meantime should be included too in a comparison.

For the fronts and a few of the armies Meltyukhov gives individual strength figures. For the Germans these are invariably exaggerated. To cite but two examples Meltyukhov states that 3rd Panzer Group had a manpower strength of 265,000 men,¹⁶ but the real figure was only 150,000.¹⁷ For 2nd Panzer Group he gives a strength of 461,680 men (but in this is included 43 corps, which was part of 4th Army).¹⁸ However 2nd Panzer Group only mustered 205,000 men.¹⁹ That one corps, consisting of three infantry divisions and some GHQ troops,²⁰ should explain a difference of 256,680 men is utterly unthinkable. Evidently Meltyukhov's article gives a false impression of the force ratios at the beginning of 'Barbarossa'.

There is however another aspect of Meltyukhov's way of counting ratios that are of more interest from a methodological point than his errors in strength figures. For the Soviet Western Special Military District he gives a total strength of 715,680 men, but the combined strength of the armies (3rd, 4th, 10th and part of 11th) is only 294,408.²¹ Admittedly 13th Army, deployed around Minsk, was also part of the district, but it seems that several units relatively close to the border were reserves under control of the Military District rather than the front armies. In a comparison which includes German reserves (even security divisions which were only intended for control of occupied territories) such Soviet reserves should properly be included.²² This example shows that it is not only at STAVKA level reserves pose a problem, but also at lower command echelons.

Casualty Reports

Use of archival documents is no guarantee for obtaining correct information on the casualties suffered by units involved in combat. This is mainly a consequence of the conditions prevailing when the documents are drawn

up. One of the most important problems is delays in casualty reports. Quite often an HQ reports the combined casualties for its subordinated units, even though not all of those units have yet submitted complete reports. This is of course mainly a problem for shorter periods of time, such as reports pertaining to single days. The longer the period, the problems with delays in casualty reporting tend to diminish.

The delays can be caused by such trivial phenomena as communications breakdown or by the reporting agency being under enemy fire (or perhaps destroyed by enemy action). Another explanation is simply that the unit is still involved in intense combat and that the staff has not yet obtained a clear picture of the outcome. For reports pertaining to casualties for individual days, the problem of placing casualties at the correct date can also cause errors or ambiguities. Combat does not always cease at 2400 each night.

What the researcher can do to alleviate these problems is to study reports at various levels in the military hierarchy and compare them with each other to see whether they are consistent. Another approach is to compare daily casualty reports with reports covering longer periods of time. Evidently these two approaches are not mutually exclusive.

There are situations, however, when the problems of delays are not limited to at most a few days. An example is the German casualty reporting during Operation 'Bagration', 23 June–29 August 1944. During this period German staffs in the Army Group Centre area did not always have a clear picture of the situation. The German armed forces had a central agency responsible for collecting information on casualties, the Wehrmacht Verlustwesen. This agency received reports from each field army in action, covering ten-day periods.²³ During Operation 'Bagration' there are several periods when reports are lacking completely for the armies of Army Group Centre. It is not until 14 November 1944 that the Wehrmacht Verlustwesen issues the final reports concerning Operation 'Bagration'.

The reports for the period are as follows:

TABLE 2²⁴
GERMAN CASUALTY REPORTS DURING OPERATION 'BAGRATION'
21 JUNE–31 AUGUST 1944

Period	3rd Pz Army			4th Army			9th Army			2nd Army		
	KIA	WIA	MIA	KIA	WIA	MIA	KIA	WIA	MIA	KIA	WIA	MIA
21–30 June	152	568	34	87	283	19	178	530	48	80	286	45
1–10 July	NO REPORT			NO REPORT			NO REPORT			181	536	50
11–20 July	907	3,976	1,127	588	3,332	851	NO REPORT			740	3,471	1,131
21–31 July	953	4,775	607	802	3,822	1,660	NO REPORT			673	2,864	461
1–10 Aug.	1,444	5,649	1,956	1,150	5,277	2,306	758	3,136	1,397	2,536	13,077	3,632
11–20 Aug.	2,717	7,604	1,077	572	3,153	526	848	4,494	635	825	3,380	961
21–31 Aug.	1,678	8,553	2,275	212	716	178	654	3,596	582	2,045	9,219	6,696

This is obviously not the complete information on German casualties during the period. First of all, for 2nd Army the period 1–10 August also contains casualties suffered during July,²⁵ while some losses from 21–30 June are included in the period 21–31 August.²⁶ The 2nd Army, however, was not engulfed in the catastrophe as the other three armies were, consequently the problems with reporting were relatively slight. For 4th Army a supplementary report exists on 14 September, which adds another 4,604 killed in action, 13,255 wounded and a staggering 107,615 missing for the period 21 June–20 July (there is no further breakdown).²⁷ To find similar supplementary reports for 3rd Panzer and 9th Armies it is necessary to consult a report dated 14 November.²⁸ According to this a further 517 killed in action, 1,814 wounded and 62,100 missing were incurred by 9th Army, while 3rd Panzer Army had 460 killed in action, 2,383 wounded and 64,990 missing to add to its tally of losses suffered during ‘Bagration’.

While this is only a single example it illustrates the problems inherent in continuous casualty reporting when units suffer great defeats. It also indicates the need for thorough consultation of existing records, including documents produced long after the end of the operation studied. Unfortunately, in the case of the Wehrmacht Verlustwesen, delays are not always apparent. If a complementary report arrives from a field army it is often added to the period during which it arrived, rather than the period it actually pertains to. Usually such errors are comparatively small, but as shown above they can be considerable during certain operations.

The example is also interesting because on several occasions Soviet units suffered similar or worse defeats. This is especially common during 1941, but there are also examples of catastrophic Soviet defeats during 1942. It is quite likely that the Soviet casualty reports and compilations are subject to the same kind of limitations as the German records display for Operation ‘Bagration’. One consequence of this concerns the frequently referred-to book *Grif Sekretnosti Sniat*.²⁹ The tables for losses suffered during various operations during World War II presented in the book include several where the Red Army suffered catastrophic defeats, but there is no conclusive evidence on how the casualty figures for these operations have been obtained. Considering the difficulties that may be involved in operations of such character such information should be demanded.

This is not to infer that the figures presented in *Grif Sekretnosti Sniat* are by default false, but they should be regarded with some healthy scepticism unless information on how the casualty figures have been established is added. To give just one example, during the ‘Moscow Defensive Operation’ 30 September–5 December 1941, the Red Army is said to have suffered 514,338 killed and missing, while 143,941 soldiers were wounded.³⁰ This can be contrasted to the fact that Field Marshal von Bock, in an order

of the day, dated 19 October 1941, stated that 673,098 prisoners had been taken in the Vyazma and Brjansk battles³¹ (which are both in terms of time and geographical extent to be included in the 'Moscow Defensive Operation'). That this was no propaganda figure is shown by the fact that the intelligence department of Army Group Centre made a compilation concerning the number of prisoners taken by the armies in the army group area.³² This indicated the capture of 648,196 prisoners 28 September–17 October.³³ Since the situation was comparatively calm in the Army Group Centre area during 28–29 September, almost all the prisoners must have been taken in October.

Evidently the German haul of prisoners does not fit with the number of killed and missing indicated by *Grif Sekretnosti Sniat*. In fact, the German figure is almost 160,000 higher, despite referring to a much shorter period and not including those killed. It is very likely that the Red Army had problems with late casualty reporting and compilation in these circumstances, just as the Wehrmacht had during Operation 'Bagration'. To what extent Krivosheev has taken adequate precautions to cope with these difficulties is not apparent.

According to Krivosheev, the Germans may have included large numbers of non-military men in their figures on the number of prisoners taken. To support this hypothesis a German document is referred to.³⁴ This document is an order to round up men between 16 and 55 years of age, and to include them among prisoners of war. However, the order is issued in July 1943. The majority of prisoners were taken in 1941 and 1942. The major reason for this new order was the lack of labour for the industry. Also, when the German Army was retreating, it intended to deny the Red Army the possibility to draft new recruits from liberated territories. In 1941 the Germans seem not to have intended using prisoners of any kind as labour in the German economy. The very high death rate among prisoners is ample testimony.

Krivosheev also claims that the Germans, due to the alleged procedure described, sometimes claimed more prisoners than there were Red Army soldiers. One such example is the Kiev operation, where according to Krivosheev the Southwest Front had 627,000 men before the operation, but of these 150,000 managed to escape.³⁵ Thus the German claim of 665,000 prisoners as alleged to be untenable. However the Kiev cauldron not only encompassed the units of Southwest Front, but also parts of the Bryansk Front, notably 21st Army. Furthermore, the strength given by Krivosheev actually refer to 7 July,³⁶ but the Germans began the operations to create the Kiev pocket on 24 August, or one and a half months later. Thus the forces were not identical. For example, 16 newly-mobilized rifle divisions were sent to the Kiev area between 10 July and 1 September.³⁷

All this makes Krivosheev's argument quite illogical, but it is a good

example of the importance of assuring that the figures used really apply both to the battlefield studied and the period when the operation took place.

Another aspect is that prisoner counting was mainly the responsibility of the intelligence section of the staffs of field commands. They used such information to assess enemy combat capabilities. Similar use of prisoner data was also made by *Fremde Heere Ost*. Such assessments would be quite meaningless if the figures were inflated by large numbers of civilians.

However there are other operations in *Grif Sekretnosti Sniat* that are assigned suspicious loss figures. Such an example is the Prague Operation 6–11 May 1945.³⁸ Here it is stated that the Red Army lost 1,006 guns and mortars, or 168 per day. This is actually the greatest daily loss rate of all the operations during 1944 and 1945, in fact it is ten times the rate suffered during the Wisla–Oder Operation. That this high loss should occur during an operation that was conducted against an enemy who had already surrendered, or were in the process of surrendering, seems mysterious. It is more likely that losses from preceding operations (notably the Berlin operation) have been included in this operation. Whether this is a mistake on behalf of Krivosheev, an error in the documents, or a result of imperfect Red Army reporting methods is unclear.

Another strange set of figures is the losses of small arms weapons during the ‘Moscow Defensive’ (30 Sept.–5 Dec. 1941) and ‘Moscow Offensive’ (5 Dec. 1941–7 Jan. 1942) operations. Krivosheev states that the Red Army lost 250,800 small arms weapons during the former and 1,093,800 during the latter³⁹ (according to VIZh 1/67 the participating forces had an initial strength of only 581,609 small arms when the offensive began,⁴⁰ this would imply a loss rate of almost 200 per cent). Thus despite the fact that the offensive operation only lasted about half as many days, the losses of small arms weapons were four times greater. The manpower strength in these two operations were similar according to Krivosheev.⁴¹ The main difference between the operations is that the defensive operations resulted in very large Soviet forces being cut off and a large number of soldiers becoming prisoners. This typically results in large equipment losses, compared to offensive operations, where the majority of casualties are wounded soldiers. Thus it should be expected that the daily equipment loss rates were higher during the defensive operation than during the offensive operation, but according to Krivosheev’s figures the daily loss rate of small arms weapons was more than ten times higher during the offensive operation.

A similar pattern can also be discerned when artillery losses are studied. Again it should be expected that loss rates were greater during the defensive operation, with its catastrophic defeat. However, according to Krivosheev’s figures, daily loss rates of guns and mortars were almost seven times higher during the offensive operation. Actually there are only two Soviet offensive

operations that resulted in a daily loss rate of more than 100 guns and mortars and those two are the Prague Operation (168 per day) and the Moscow Offensive operation (393 per day).⁴² Almost invariably Red Army offensives resulted in less than 50 guns and mortars lost per day according to Krivosheev.⁴³ It is also interesting to compare with the Rzhev–Vyazma Offensive Operation (8 January–20 April 1942) which followed immediately after the Moscow offensive operation. Despite the fact that it lasted three times longer and resulted in manpower casualties twice as high, the losses in small arms and artillery were considerably lower than during the Moscow offensive operation according to *Grif Sekretnosti Snial*.⁴⁴

It is also worth noting that the Germans captured 4,378 artillery pieces (not including mortars) in the Viazma and Bryansk encirclements 2–19 October.⁴⁵ This figure is 546 higher than given by Krivosheev for the period 30 September–5 December. But Krivosheev's figure also includes mortars,⁴⁶ making the discrepancy even greater. While the explanation that civilians were included in the German haul of prisoners is at least theoretically plausible, no such explanation is applicable in this case.

Considering this information, the figures presented by Krivosheev on the Moscow defensive operation cannot be regarded as reliable. It is quite likely that casualties and equipment losses suffered during this operation have been included in later operations. This is probably a result of the Red Army being incapable of accurately recording the losses under the prevailing circumstances during the autumn 1941, just as the Germans experienced similar difficulties during the summer 1944, as demonstrated above.

Quite common in published literature is confusion between casualties and killed. But killed is not an unambiguous term. In German documents *Gefallene* is the most common term, referring to those soldiers losing their lives before they receive professional medical treatment. This is similar to the American term killed in action (KIA). Of course a proportion of those soldiers wounded have suffered such severe injuries that they will die, despite professional medical treatment. These seem in German documents to be grouped under the term *Verstorbene*,⁴⁷ while the corresponding word in American terminology is died of wounds. The latter category was far from negligible. In the US Army, the number of soldiers who died from wounds constituted about 17 per cent of the number killed in action.⁴⁸ The US Army was probably second to none when it came to taking care of the wounded, and for the German Army it could be expected that the percentage was slightly higher, especially in Russia where the harsh weather presented additional problems. This is illustrated by the fact that the Wehrmacht suffered 158,773 soldiers killed in action (*Gefallene*) during Operation 'Barbarossa' (until the Soviet counteroffensive at the outskirts of Moscow).⁴⁹ During the same period the number of killed (*Tote*)

amounted to 188,982,⁵⁰ which is 19 per cent higher. The winter 1941–42 was as severe as the German Army was poorly prepared for it and this is reflected by the great difference between Gefallene (KIA) and Tote (dead including dead from wounds).⁵¹ The figures are 86,287 and 133,446 respectively,⁵² or a difference of 54 per cent.⁵³ On the whole, during the period 22 June 1941–31 December 1944 the number of soldiers who died from wounds constituted 18 per cent of all battle deaths among ground combat units according to Table 3:

TABLE 3⁵⁴
GERMAN CASUALTIES 22 JUNE 1941–31 DECEMBER 1944 ACCORDING TO
CORRECTED REPORTS

	Killed due to Enemy Action	Died of Wounds	Deceased due to other causes	Total Killed	Wounded due to Enemy Action	Missing Total in Action	Casualties
Total Army	1,239,425	278,480	134,536	1,652,441	3,903,543	1,596,703	6,874,207
On Eastern Front	1,091,962				3,459,568	999,746	5,551,276
Total Luftwaffe	219,087				199,726	147,101	565,914
On Eastern Front	53,469				114,732	48,284	216,485
Total Navy	34,998				25,259	34,395	94,652
On Eastern Front	8,039				6,691	7,578	22,308

Note: Waffen-SS is included in the army figures. Those that died of wounds are not included in total casualties, since that would result in them being counted twice.

This data can be compared with two other sets of figures. The first is the ten day reports compiled by the Wehrmacht Verlustwesen giving the Army (including Waffen-SS and Luftwaffe ground combat units) losses 22 June 1941–31 December 1944. Those records are summarized in Table 4:

TABLE 4⁵⁵
GERMAN CASUALTIES 22 JUNE 1941–31 DECEMBER 1944 ACCORDING TO
INITIAL REPORTS

	Killed in Action	Wounded in Action	Missing in Action	Total Casualties
Army	1,014,576	3,881,883	1,712,042	6,608,501
On Eastern Front	906,901	3,519,879	1,117,265	5,544,045

As can be seen the total casualties for the Eastern Front are almost identical to those given in Table 3 (the difference is a mere 0.13 per cent). However there are notable differences among the three categories killed, wounded and missing. This is explained by the fact that the Table 4 gives the losses

as they were reported immediately after combat, while Table 3 displays casualties as they were regarded at the beginning of 1945. As the reader can see the number of missing on Eastern Front is greater in Table 4 than in Table 3. This is explained by the fact that soldiers initially recorded as missing have later been found out to be dead and are accordingly classified in Table 3. The discrepancy between total army casualties is greater, but this is largely explained by those deceased not due to enemy action. Another explanation is that wounded in air accidents are included in the wounded due to enemy action in Table 3 (rather strange considering the heading, but nevertheless explicitly stated in the document) as also are soldiers poisoned (e.g. by smoke).

These two examples serve to illustrate that even though the total number of casualties remains unchanged the proportions between killed, wounded and missing may vary, depending on when the compilation was made and what additional information on the actual fate of the men has been cranked into the records.

This data is also interesting for another question. It can be used to check the accuracy of the reporting made by the German field armies. The casualties given in Table 4 are those suffered 22 June 1941–31 December 1944 as they were reported by the field armies to the Wehrmacht Verlustwesen. As shown above these reports present almost identical data for total casualties as given in Table 3. For the reasons presented above there are discrepancies in the number of dead, but these are to be expected because of the differences in compilation methods and dates.

As indicated in Table 3 the total number of dead suffered by the army was 1,652,441 between 22 June 1941 and 31 December 1944. This can be compared to the fact that German Army (including Waffen-SS) losses amounted to 1,750,281 men killed between 1 September 1939 and 31 December 1944 according to the available by-name records of deceased Wehrmacht soldiers.⁵⁶ The difference of almost 100,000 men is fully explained by losses suffered before 22 June 1941.⁵⁷ Thus it can be concluded that the loss reports submitted by the field armies were accurate, even though they did occasionally suffer from delays in the reporting which may cause losses to be placed on the wrong dates.

Evident from the figures above is that killed constitutes about 22 per cent of all casualties incurred by the German Army due to enemy action, while killed in action on the Eastern Front made up 16 per cent of all casualties suffered there. However it seems to be quite common that authors mix up dead and casualties. This has probably happened in two recent articles in Russian periodicals. In No.3/95 of *Voенно-Исторический Журнал* M. V. Filimoshin states that Soviet losses during the Great Patriotic War amounted to 11,444,100 which is compared to 8,649,500 German

losses, or a 1.3:1 ratio.⁵⁸ The Soviet losses are identical to those presented by Krivosheev as killed and missing, but they do not include wounded. However the German losses can only reach that level by including wounded. Thus Filimoshin is comparing different kinds of losses, making his ratio meaningless. Similar figures are presented by V.V. Gurkin in *Novaya i Noveyshaya Istoriya* 3/92.⁵⁹

However, another possible explanation exists. The figures presented by the authors above coincide with those presented in *Grif Sekretnosti Snial*,⁶⁰ where the figures are presented in more detail. Here it is said that the German forces (not including the Axis satellites) lost 2,869,300 dead and 3,362,400 missing or imprisoned. In addition the German forces are said to have lost 462,000 Austrians, Sudetens and Alsations (which are included in the German loss reports). However, these figures are so high that they can only be reached by including German losses against the Western allies,⁶¹ and soldiers who surrendered after Germany had surrendered unconditionally, making the comparison with Soviet losses quite meaningless. But it is not fruitful to speculate how German losses have been distorted in Soviet (or Russian) literature. It is sufficient to realise that such literature is not a valid source for German casualties.

Tank Strength

The major problem with figures on tank strength is whether vehicles in workshops are included or not. An example from the Battle of Kursk will illuminate this. On the evening of 4 July, the II SS-Panzer Corps reported 451 operational tanks and assault guns.⁶² Seven days later, the evening before the well-known battle at Prokhorovka, the corps reported 294 operational tanks and assault guns.⁶³ While these figures do give a correct picture of the instant combat capabilities of the corps they do not necessarily give a correct impression of the long-term capabilities. Also it would be fundamentally wrong to conclude that 157 vehicles had been destroyed. The missing piece of information is the number of tanks damaged (due to enemy action or mechanical breakdown) but which could be repaired. On 10 July, the corps had 173 tanks in workshops, the vast majority of them by the divisions themselves.⁶⁴ A few days later, during the night between 12 and 13 July, the corps had 122 tanks and assault guns that were expected to be repaired within four days⁶⁵ (further tanks were damaged, but were not expected to be repaired within such short notice). It should be added that no new tanks were allotted to the corps during the period.⁶⁶

Evidently such great numbers of tanks, which were expected to return to the combat units with short notice, gave the units greater staying power, thus increasing their combat potential over a longer period of time. This

also caused the daily tank strength to fluctuate considerably. As an example the number of operational tanks and assault guns of II SS-Panzer Corps can be given 11–16 July 1943:

TABLE 5⁶⁷
NUMBER OF OPERATIONAL TANKS IN II SS-PZ. CORPS 11–16 JULY 1943

	11 July	12 July	13 July	14 July	15 July	16 July
Leibstandarte	77	no report	70	78	85	96
Das Reich	95	103	107	115	99	103
Totenkopf	122	121	74	73	77	93

Another example is provided by the Soviet Belgorod–Kharkov offensive operation in August 1943. It has been concluded that the Waffen-SS panzer divisions had priority over their Wehrmacht counterparts when it came to replacing tank losses.⁶⁸ This is based on the fact that the strength of the Waffen-SS divisions remained remarkably stable during the period, while the strength of Wehrmacht divisions gradually diminished. This is, however, not a result of resupply priority. Again the missing piece of information is tanks in workshops. The conclusion is based on number of operational tanks, but this can be very misleading. Table 6 gives the tank status of three panzer divisions, but observe that only vehicles estimated to be repaired within three weeks are included among those in workshops.

TABLE 6
TANK STRENGTH FOR 3 PANZER DIVISIONS

	1 August 1943				1 September 1943			
	Operational Tanks	AGs	In workshops Tanks	AGs	Operational Tanks	AGs	In workshops Tanks	AGs
11th Pz. Div. ⁶⁹	56	26	28	9	27	16	30	6
Das Reich ⁷⁰	58	27	51	5	36	23	124	5
Totenkopf ⁷¹	68	49	92	21	33	15	53	6

Before the beginning of the Soviet Belgorod–Kharkov offensive the 1st SS-Panzer Division departed for Italy. It left all its tanks and assault guns to be distributed among Das Reich and Totenkopf. This provided many damaged tanks that were subsequently repaired, thus maintaining the number of operational tanks. Furthermore, one tank battalion of Das Reich was missing when the Red Army began its offensive, since it was in Germany to be equipped with Panthers.⁷² This battalion arrived during the Soviet offensive. It is not possible to conclude that the Waffen-SS had priority in resupply.⁷³ In general it is simply not possible to compare the number of

operational tanks at two different dates and from this data conclude how many tanks have been lost or received as replacements.

As was the case with manpower strength, the Germans used various terms to describe the tank status of units. Again the terminology is the result of military realities and has to be regarded when operations are analysed. The following terms were used:⁷⁴

- Soll – The number of tanks the unit is assumed to have according to its Table of Organization and Equipment.
- Ist – The number of tanks on hand, both operational and in workshops, sometimes also called Bestand.
- Einsatzbereit – The number of operational tanks.
- Instandsetzung – Tanks in workshops.

It is important that the distinctions between these terms are observed. They all represent phenomena in the military reality, that are relevant both to the Red Army and for the Wehrmacht. While the terms as such were used by the German Army, probably the Red Army must have used rather similar categories and any researcher has to check carefully to obtain the full picture.

Particularly treacherous is the risk of comparing different kinds of tank strength without recognising the particular characteristics. This can easily result in false conclusions, as has been illustrated above. One such example is the ratio of tanks 1 January 1944 as presented by Soviet literature. Quite often it is stated that the Red Army had 5,357 tanks on the Eastern Front, while German tank strength on the Eastern Front was 5,400.⁷⁵ The latter figure is of course wrong, the true figure was 1,849 tanks and 1,507 assault guns.⁷⁶ This is not the only objection to that set of figures. The German figures include a large number of vehicles in workshops.⁷⁷ The Soviet figure on the other hand includes only combat-ready tanks and assault guns.⁷⁸ It does not include STAVKA reserves.

Tank Losses

Tank losses are quite often exaggerated. Particularly exaggerated are Soviet figures on German tank losses.⁷⁹ There is simply no reason to take Soviet figures on German tank losses seriously, whether they are found in printed sources or in archival documents. This is not necessarily a result of deliberate distortion of historical facts. There are several fundamental characteristics of tank combat which make it difficult to assess enemy losses. In fact almost all of these peculiarities tend to produce exaggerations.

Foremost of these is the fact that tanks are quite often possible to repair after being put out of action. From 1 October 1943 to 31 January 1944, the

German tank maintenance companies on all fronts repaired 8,702 tanks and assault guns.⁸⁰ Another 453 were repaired in the zone of interior.⁸¹ During the same period 2,945 were permanently lost.⁸² This means that only one quarter of all tanks put out of action were actually lost. During offensive operations the percentage of permanently lost was even lower. These figures can be compared with another example from the Battle of Kursk. The Soviet 2nd Tank Army lost 30.7 per cent of its tanks 6–14 July, while a further 16.7 per cent were put out of action but later repaired.⁸³ This means that nearly two out of three disabled tanks never returned to service, a much higher percentage than the German example given above. During offensive operations the percentage of permanently destroyed tanks was lower, but higher than for German offensive operations.⁸⁴

There are several explanations for this phenomenon. The Germans, from 1943, had tanks whose armament was powerful enough to penetrate Soviet tanks almost independently of where they hit. The Tiger and Panther had such powerful armament, but even the Panzer IV and StuG III, which made up the majority of German tanks and assault guns on the Eastern Front, had weapons that were very likely to penetrate a T-34, at least at distances less than 800 m. The Soviet 76mm gun on the other hand, experienced difficulties against the frontal armour of the Panzer IV and was impotent against the Tiger and Panther. Even with the introduction of the 85mm gun in late 1943 the T-34 was still powerless against the Panther.⁸⁵ Thus a greater percentage of Soviet hits were likely to cause only temporary damage, such as track damage. Another important explanation is that the Germans, if possible, continued firing against damaged Soviet tanks until they were burning. This is evident both from German recollections⁸⁶ and from Soviet analyses.⁸⁷

That the number of tanks temporarily disabled compared to total write-offs is greater during offensive operations than during defensive operations is of course a consequence of the likelihood of a damaged vehicle being towed to a workshop. Another explanation is mines, which rarely destroy a tank, but can disable them sufficiently to require repairs in workshops. It is much more likely that an attacking tank will hit a mine. An example is provided by the first day of Operation 'Zitadelle', 4 July 1943, when the German panzer divisions of Army Group South reported the following:⁸⁸

19th Pz. Div.	6 mechanical breakdown and 13 Tigers due to mines
Totenkopf	5 Tigers due to mines, 7 StuG
Das Reich	2 Tigers due to mines, 10 StuG
Leibstandarte	3 Pz IV, 6 Tigers and 11 StuG due to mines
3rd Pz. Div.	1 Pz IV completely destroyed, 4 Pz IV due to mines
11th Pz. Div.	6 Pz III, 2 Pz IV due to mines
Großdeutschland	20 tanks and 5 assault guns due to mines

Evidently mines were a major cause of tanks put out of action on that day, but few of those were seriously damaged.

There are of course several other explanations for exaggerated reporting. More than one weapon may be firing at the same target or an already knocked out vehicle may be fired upon and knocked out once more. It seems reasonable to assume that the side with numerical superiority will more often double count or triple count knocked out enemy vehicles, since it is more likely that more than one weapon will fire at a single target.

Finally it is worth mentioning that, arguably, the most well-known tank battle, the battle at Prokhorovka is one of the most erroneously portrayed World War II battles. Almost all published books state that the German II SS-Panzer Corps losses in tanks and assault guns were 300, including 70 Tigers. This is, however, entirely wrong. A report dated 23 July shows that II SS-Panzer Corps losses (total write-offs) during the entire Operation 'Zitadelle' was 5 Pz III, 23 Pz IV, 3 Tiger, 5 assault guns and 2 Marder.⁸⁹ The discrepancy between the conventional figures and the truth is indeed very large. The false figures probably originate from Lieutenant General P. A. Rotmistrov of 5th Guards Tank Army but it is deplorable that so many Western historians have uncritically accepted those figures.⁹⁰

Advance Rates

Advance Rates rarely figure in archival documents prepared during battle, but are more prominent in analyses after the war. Unfortunately much literature uses advance rates (usually given as km/day) without stating how advance rates are measured. This is very common in Soviet literature used by Western historians.

However, there seems to exist no consensus on how advance rates should be defined or calculated. This is of great importance if figures from different operations are compared. Principally, the concept of advance rate can be used on tactical, operational or strategic level. Which definition or calculation method is most advantageous may vary with the level studied.

There exist at least five major sources for confusion within this subject. They are:

1. Distances can be measured as the crow flies, or they can be measured along the path which the minor combat units trace on the ground, with all their detours.
2. In operations which begin with a breakthrough phase, the time spent to achieve the breakthrough can be included or not.

3. Movement performed behind the protection of other friendly units can be included or not.
4. Force sizes must be taken into consideration. At least for shorter distances it is usually easy to find examples of reconnaissance detachments advancing very rapidly. If we focus upon the operational level, advance rates calculated must relate to the movement of division-sized units or larger.
5. The total depth of the operation does affect the advance rate. Given all other factors identical, an operation over a depth of 700 km is not likely to result in as high advance rate as an operation over a depth of 250 km. Logistical factors alone would ensure that. This means that if operations should be compared in terms of advance rates, the depth of the operations should be taken into consideration.

Within the operational level, it is preferable to measure distances as the crow flies, along the main axis of advance. This has the benefit of making it easier to check the accuracy of figures presented. It also presents advantages when comparing different operations.

If an operation is planned as a sequence of breakthrough and exploitation, it is not unreasonable to include the time spent on both parts of the operation in the calculation of the advance rate during the operation.

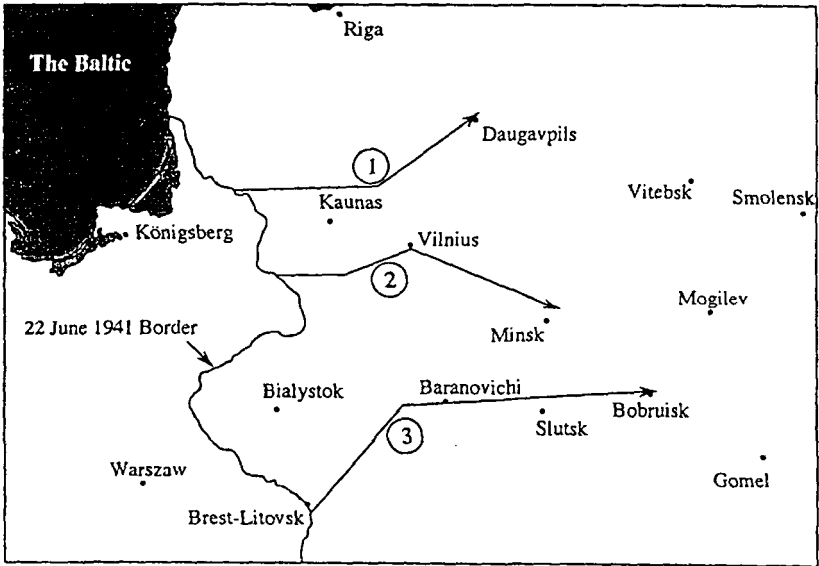
Unopposed movement behind the protection of friendly units cannot reasonably be included in the distance covered when calculating the operational advance rate.

If these points are accepted, many figures on advance rates have to be changed. Even if they are not accepted, use of a common method of advance rate measurement will anyway result in the revaluation of many figures presented.

Since many false figures and analyses have been presented it could be useful to demonstrate a few cases from Eastern Front operations. Here printed sources has been used to obtain information on when certain objectives were reached by attacking forces. The distances has been measured on the map⁹¹ and the advance rates has been calculated.

Operation 'Barbarossa', June 1941

During Operation 'Barbarossa', the highest advance rates were achieved in the sector north of the Pripyat marshes. Three Panzer Groups were employed, numbered 4, 3 and 2 from north to south. We have chosen to illustrate the quickest advances by these Panzer Groups during the opening stage of the operation. LVI Corps (motorized) belonged to Panzer Group 4, while XXXIX Corps (mot.) was subordinated to Panzer Group 3 and XXIX Corps (mot.) formed part of Panzer Group 2.

MAP 1 OPERATION 'BARBAROSSA', THE INITIAL PHASE⁹²TABLE 7⁹³

OPERATION 'BARBAROSSA' RATES OF ADVANCE 22-28 JUNE 1941

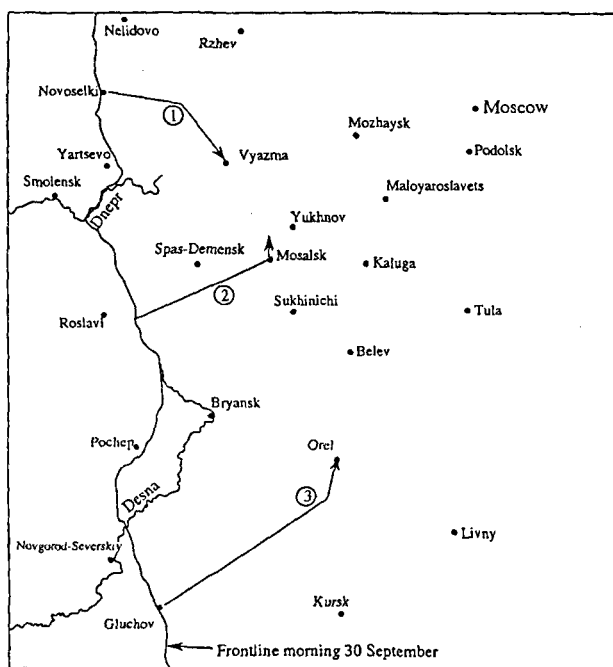
Advance Number	Unit	Starting Date	End Date	Number of days	Distance [km]	Advance Rate [km/day]
1.	LVI Corps (mot.)	22 June	26 June	4 days, 5 h	310	73.7
2.	XXXIX Corps (mot.)	22 June	25 June	4 days	325	81.3
3.	XXIV Corps (mot.)	22 June	28 June	7 days	442	63.1

It is worth noting that the advance by XXIV Corps (mot.) was made over a distance of no less than 442 km. Military operations with such depth are not common and are usually not performed during one week, rather the time tends to be measured in months.

Operation 'Typhoon', October 1941

The German offensive aimed at capturing Moscow was launched at the end of September 1941, after the end of the Battle of Kiev. Three Panzer Groups, from north to south the 3rd, 4th and 2nd, constituted the main striking forces.

MAP 2 OPERATION 'TYPHOON' 1941

TABLE 8⁹⁴

OPERATION 'TYPHOON' RATES OF ADVANCE 30 SEPT.-6 OCT. 1941

Advance Number	Unit	Starting Date	End Date	Number of days	Distance [km]	Advance Rate [km/day]
1.	LVI Corps (mot.)	2 Oct.	6 Oct.	5 days	133	26.6
2.	XXXX Corps (mot.)	2 Oct.	4 Oct.	3 days	145	48.3
3.	XXIV Corps (mot.)	30 Sept.	3 Oct.	4 days	228	57.0

As shown, the advance rates, while still respectable, are lower than those at the beginning of Operation 'Barbarossa'. The reasons for this are of course manifold. Among factors contributing, increased enemy strength, no considerable surprise effects and worn German combat units may have figured prominently. It must be added that the advances indicated on the map were not the only advances performed, nor the only axes of advance. They do however represent the primary operational axes for the Panzer Groups during the initial phase of the operation, which resulted in huge Soviet forces being surrounded. Of course several of the other operations portrayed in this article exhibit a similar character.

Operation 'Bagration', June–July 1944

The most important operation conducted by the Red Army in the summer of 1944 was Operation 'Bagration', sometimes called 'The Destruction of Army Group Centre'. Since this operation consisted of advances in several directions, by different units, it is suitable to divide it into seven major advances, in different phases of the operation. We have tried to identify the major axes of advance for mechanized units of divisional size or larger. These are indicated on Map 3, while Table 9 gives the distances advanced, the time spent and the units involved.

MAP 3 OPERATION 'BAGRATION'⁹⁵

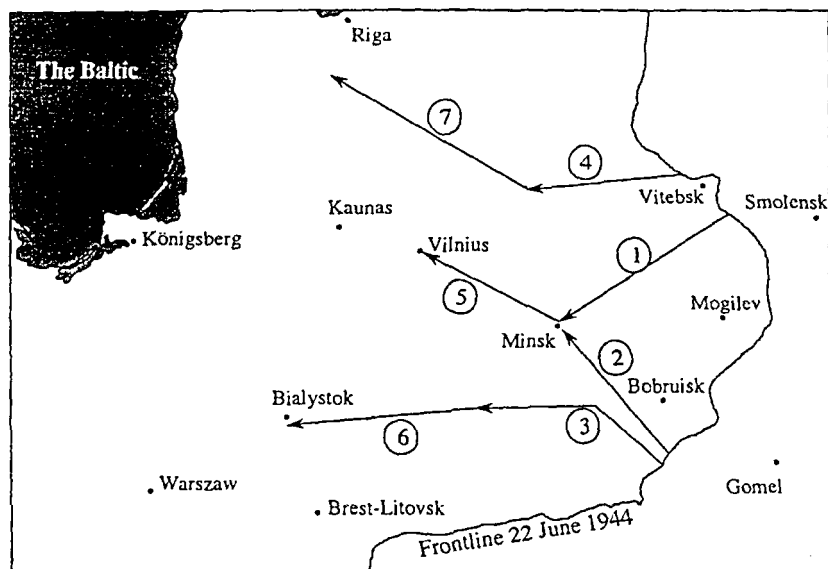


TABLE 9⁹⁶

OPERATION 'BAGRATION' RATES OF ADVANCE 23 JUNE–27 JULY 1944

Advance Number	Unit	Starting Date	End Date	Number of days	Distance [km]	Advance Rate [km/day]
1.	5th GTA & 11th GA	23 June	3 July	10	217	21.7
2.	1st GTC & 65th A	23 June	3 July	10	178	17.8
3.	Pliyev Cav-Mech Group	23 June	8 July	15	229	15.3
4.	5th A	23 June	4 July	11	178	16.2
5.	5th GTA	3 July	13 July	10	166	16.6
6.	Pliyev Cav-Mech Group	4 July	27 July	23	197	8.6
7.	51st A & 5th GTA ⁹⁷	4 July	27 July	23	238	10.3

As can be seen, the average advance rates, calculated along the main operational axes, do not exceed 25 km/day, and do usually not even reach 20 km/day. This is generally less than the advance rates claimed by Soviet sources. It is also considerably less than the pace achieved by the Germans over the same area in 1941, in fact only about a quarter of the advance rate achieved by XXXIX Corps (mot.) three years earlier.

The Wisla-Oder Operation, January-February 1945

This operation dashed any German hopes of arresting the advancing Red Army on the eastern borders of the 'Reich'. In one massive operation the Red Army advanced from the gates of Warsaw to a point within 50 kilometers of the outskirts of Berlin.

MAP 4 THE WISLA-ODER OPERATION

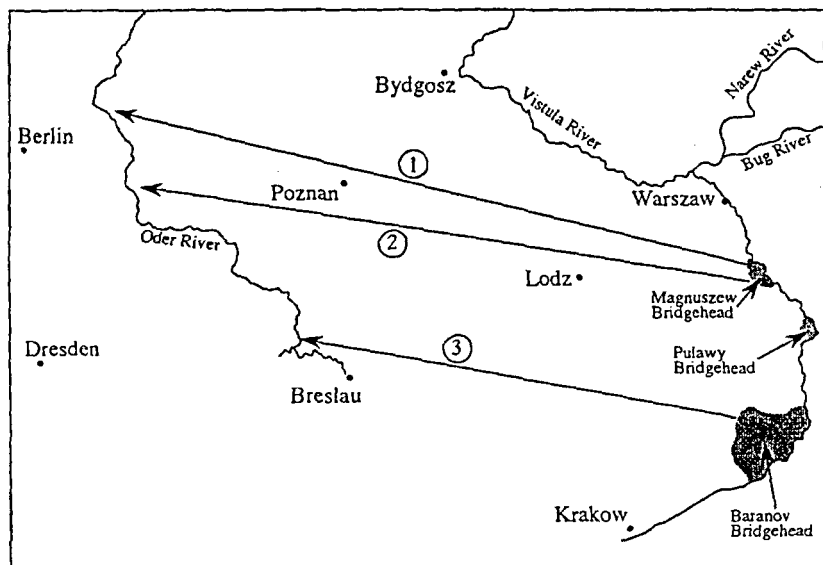


TABLE 10⁹⁸

THE WISLA-ODER OPERATION RATES OF ADVANCE 12 JANUARY-1 FEBRUARY 1945

Advance Number	Unit	Starting Date	End Date	Number of days	Distance [km]	Advance Rate [km/day]
1.	2nd Guards Tank Army	14 Jan.	1 Feb.	19	490	25.8
2.	1st Guards Tank Army	14 Jan.	1 Feb.	19	460	24.2
3.	4th Tank Army	12 Jan.	22 Jan.	11	337	30.6

Conclusions

The need for more precise use of numerical data is evident. Numbers constitute a very important part of military history and analyses, but if they are not close to reality they can be very misleading. Previously numbers have rarely been treated with sufficient care. It has been unclear what is included in them or how they have been aggregated. Furthermore, the use of Soviet sources (whether published or archival) to obtain information on German strength, losses, etc. is not recommended. Similarly Soviet sources are recommended for information on Soviet forces. Finally it is recommended to use primary sources, despite the greater effort needed. The vast majority of published literature is not good enough to be used as sources.

NOTES

1. The authors wish to thank Mr Chris Lawrence at the Dupuy Institute for the many very valuable discussions on issues related to this article. The two authors are of course alone in their responsibility for any errors in the article.
2. OKH GenStdH/Org.Abt. Nr. I/2000/44 geh. H.Qu., den 25.4.44. *Betr.*: Festlegung der Stärkebegriffe. (German Military Archives in Freiburg [Hereafter referred to as BA-MA], file RH 2/60).
3. OKH Org. Abt. I, H.Qu., den 26.7.1944, Verbände Stand 1.6. and Fechtende Heeresgruppen Stand 1.6. (BA-MA RH 2/1341).
4. According to OKH. Org.Abt. (I) Nr. I/20 737/44 g.Kdos. *Betr.*: Iststärken, Fehlstellen und Ersatzzuführungen des Ostheeres von Januar bis Oktober 1944, 24. November 1944 (BA-MA RH 2/1341) the Iststärke on the Eastern Front amounted to 2,620,000 men on 1 June, this is only 63,000 more than the combined total for the army groups.
5. *Notiz Betr.*: Iststärken und Tagesstärken des Feldheeres aufgliedert nach Kriegsschauplätzen, Stand 1.6.44. (BA-MA RH 2/1339).
6. OKH Org.Abt. I Nr. I/18280/44 g.Kdos H.Qu., den 23. Juli 1944 (BA-MA RH 2/1341).
7. Actually, for divisions, the Iststärke and Verpflegungsstärke usually differs little (less than 10 per cent).
8. Since the Iststärke of the divisions, brigades and GHQ combat troops was 434,749 compared to a Tagesstärke of 331,025, the strength difference was 103,724. To this should be added a difference for the non-combat GHQ troops, but how great that was has not been found in the documents, but here it is assumed that it is 0, which certainly is too low.
9. *Geschichte des Zweiten Weltkrieges* (the East German translation) Vol.7, p.138 (see Table 14).
10. *Ibid.* p.145 (Table 15).
11. *Ibid.* p.133.
12. Several examples of this could be given, 4th Panzer Army had three Waffen-SS divisions in its order of battle at the beginning of the Battle of Kursk. For the purposes of strength reporting from the army HQ, they are treated as any combat unit (see file BA-MA RH 21-4/422). We have also studied Operation 'Barbarossa', the battle in Normandy and the Battle of the Bulge. The pattern is similar in those operations. Also casualty reporting make no distinction between Army or Waffen-SS (usually they are lumped together under the heading 'Heer' or sometimes 'Feldheer' even though in the latter case this is technically incorrect).
13. M.I. Maltuykhov, '22 iyunya 1941, tsifry svidetelstvuyus', *Istoriya SSSR* 3/91 pp.16-28.
14. According to Meltuykhov the German Army had assembled 3,300,000 men for the invasion. Explicitly this does not include Luftwaffe and Navy, but it does include Waffen-

- SS. This is an exaggeration, since the strength of army forces gathered for Barbarossa amounted to 3,050,000 men [OKH Gen St d H/Gen Qu, Abt. H. Vers./Qu. 1, Nr. I/0740/41 g.Kdos. den 20. Juni 1941; BA-MA RH 2/1326]. However this *included* 26 divisions in OKH reserve that were mainly committed during July. Probably the initial German strength was closer to 2.5 million men from the Army and Waffen-SS.
15. Meltyukhov puts the overall Luftwaffe manpower strength at 1,545 million men. Of these 1.2 million (or 78 per cent) are said to be available for Operation 'Barbarossa'. The overall strength is close to correct, but Meltyukhov does not realize that it is almost evenly divided between air units, anti-aircraft artillery and training and replacement organizations. Of the training units almost none participated in Barbarossa. Of the 1,206 heavy German AA batteries only 239 (or 19.8 per cent) were used in Barbarossa, while 135 (or 15.2 per cent) of 887 light batteries and 25 (or 9.4 per cent) of 265 searchlight batteries were assigned for the invasion of the Soviet Union [Cf. Boog/Förster/Hoffman/Klink/Müller/Ueberschär. *Der Angriff auf die Sowjetunion* (Frankfurt am Main, Fischer Taschenbuch Verlag 1991) p.361]. Of Luftwaffe aircraft 68 per cent was assigned to other fronts than the Eastern [ibid. p.360f]. Thus it is completely unrealistic to assume that 78 per cent of Luftwaffe manpower were assigned for Operation 'Barbarossa'.
 16. Meltyukhov (note 13) Table 8.
 17. Hgr Mitte, KTB Nr.1 22.6–31.12.1941 (BA-MA RH 19II/120). The figures refer to Kopfstärke.
 18. Meltyukhov (note 13) Table 8.
 19. As note 17.
 20. The divisions were 131st, 134th and 252nd Infantry Divisions, while GHQ troops included four artillery battalions, one engineer battalion, one bridge engineer battalion, three construction battalions, one army AA battalion. [Kriegsgliederung Barbarossa, Stand 18.6.1941 (BA-MA RH 2/435)].
 21. Meltyukhov (note 13) Tables 7–11.
 22. According to Meltyukhov the Western Special District had 48.5 divisions (Table 7). Of these 29 were in the front armies. Only six divisions belonged to 13th Army. When he compares those front armies he does it with all the 51.5 divisions of Army Group Centre. Three of the divisions of the army group were in army group reserve (293rd, 102nd and 402nd) [Kriegsgliederung Barbarossa, Stand 18.6.1941 (BA-MA RH 2/435)]. Additionally 255th and 286th Divisions were reserves with 2nd Panzer Group and 4th Army respectively [ibid.]. However, entire German corps, such as 46th Panzer Corps were grouped as far back [H. Guderian, *Panzer Leader* [1956] (London: Futura 1982) p.149ff] as many of the Soviet military district reserves.
 23. The reports covered the 1–10, 11–20 or 21–30 (31 if the month had that number of days) each month. These were compiled by the Verlustwesen four days after the end of the period they refer to.
 24. BA-MA RW 6/v. 559. Reports dated 4 July–4 Sept. have been used.
 25. Ibid., explicitly stated in report dated 14 Aug.
 26. Ibid., explicitly stated in report dated 4 Sept.
 27. Ibid., report dated 14 Sept.
 28. Ibid., report dated 14 Nov.
 29. G.F. Krivosheev, *Grif Sekretnosti Sniat* (Moscow: Voenizdat 1993).
 30. Ibid. p.171.
 31. Der Oberbefehlshaber der Heeresgruppe Mitte, Tagesbefehl, H.Qu., 19.10.1941 (BA-MA RH 19II/124).
 32. KTB Abt Ic./A.O. Gefangene und Beute, 17.10.1941 (BA-MA RH 19II/124).
 33. This was broken down as follows: 2nd Army: 53,483; 4th Army: 397,153; 9th Army: 104,326; 2nd Panzer Army: 77,261; 3rd Panzer Group: 4,800.
 34. Krivosheev (note 29) p.334.
 35. Ibid. p.337.
 36. See ibid. p.166.
 37. See Voennno-Nauchnoe Upravlenie General'nogo Shtaba, *Boevoi sostav Soverskoi armii, Chast' 1. (Iun'-dekabr' 1941)* (Moscow VAGZ 1963). According to Krivosheev, Southwest

Front had 26 rifle divisions on 7 July, when it numbered 627,000 men (these figures do not include 21st Army). On 1 Sept. Southwest Front had, together with 21st Army (which formally was subordinated to Bryansk Front), 46 rifle divisions [see *Boevoi sostav Sovetskoï armii*].

38. Krivosheev (note 29) pp.372–3.
39. *Ibid.* pp.368–9.
40. *VIZh* 1/1967; Dokumenty i materialy. Moskovskaya bitva v tsifrakh, p.92.
41. Krivosheev (note 29) pp.171, 174.
42. *Ibid.* pp.368–73.
43. *Ibid.*
44. *Ibid.* pp.176, 368, 369.
45. Der Oberbefehlshaber der Heeresgruppe Mitte, Tagesbefehl, H.Qu., 19.10.1941 (BA-MA RH 19II/124).
46. Almost invariably Soviet literature lumps guns and mortars together, while German sources do not, in fact German mortar strength is almost never given.
47. Quite often a clarification is added, stating whether it refers to men who have died from wounds suffered in combat or if it refers to men who have died from disease.
48. This has been derived by checking the casualties for ten US infantry divisions (1st, 2nd, 4th, 5th, 8th, 9th, 28th, 29th, 30th and 35th) that fought in France, Belgium, Netherlands and Germany during 1944–45. Source: S.L. Stanton, *Order of Battle US Army, World War II* (Novato, CA: Presidio Press 1984).
49. BA-MA H4/35. The document used does not explicitly state that the figures refer to Gefallene on the one hand and Tote on the other. Rather the document says that the lower numbers are killed (Tote) according to Wehrmacht Führungsstab (Heeresarzt) and the higher numbers are killed (Töte) according to the Wehersatzdienststellen. Comparing the figures with other documents shows clearly that the lower number refers to killed in action (Gefallene). Generally it is much more common to find documents giving the number of killed in action (Gefallene) than killed (Tote).
50. *Ibid.*
51. Part of the difference may of course be explained by the fact that soldiers wounded before the end of the German offensive operations 1941 may have died during the winter. This number is probably quite small, since the mortality of wounded soldiers decline with the time that has elapsed since they received the wounds.
52. See note 49.
53. This was the greatest percentage for the period covered by the document (from the beginning of ‘Barbarossa’ to, and including, the summer/autumn 1943). For the entire period the number of killed exceeded the number of killed in action by 28 per cent.
54. According to OKH Org.Abr. document which uses OKH/GenStdH; OKM/Skl/Adm Qu; OKL/Gen Qu; WVW; OKW/Chef W San as sources. See National Archives, Washington DC, Microfilm Publication T78, Roll 414, Frames 6383201-6383204.
55. Der Heeresarzt im OKH GenStdH/GenQu Az: 1335 c (Iib) Nr. I/063/45 g.Kdos; Personelle Blutige Verluste des Feldheeres 22. Juni 1941 bis 31. Dezember 1944, den 4. Januari 1945 (National Archives, Washington DC, Microfilm Publication T78, Roll 414, Frame 6383240).
56. See B. Müller-Hillebrand, *Das Heer*, Vol.III (Frankfurt am Main: Mittler & Sohn 1969) pp.260–1.
57. The campaign in Poland 1939 resulted in 16,343 army soldiers killed; the invasion of Norway saw the army suffer 4,975 men killed, while the price for the campaign in western Europe cost 66,266 men killed (all figures according to Müller-Hillebrand, note 56, p.265). If to this is added men killed in the Balkans and North Africa before 1 June 1941 the difference is fully explained.
58. See M.V. Filimoshin, ‘Vragi boyatsya da sikh por’, *VIZh*, 3/95, p.33.
59. V.V. Gurkin, ‘O lyudskikh poteryakh na Sovetsko-Germanskom Fronte v 1941–1945’, *Novaya I Noveyshaya Istoriya*, 3/92, p.224.
60. Krivosheev (note 29) p.392.
61. German losses suffered against the Western allies were far from negligible. Especially

great was the number of prisoners taken during 1945.

62. Tagesmeldung vom II. SS-Pz.Korps an PzAOK 4 4.7.1943 (BA-MA RH 21-4/118).
 63. Ibid. 11.7.1943 (BA-MA RH 21-4/118). Of the 294 tanks and assault guns only 15 were Tigers.
 64. BA-MA RH 21-4/450.
 65. PzAOK 4 O.Qu Anlage zu KTB, Aktennotiz 13.7.1943 (BA-MA RH 21-4/450).
 66. 16 Panzer IV were sent to the Leibstandarte 25 June. They arrived 1–4 July. No tanks were sent to Army Group South until 13 July, when 15 Panzer IV departed by train from Germany. It took several days for them to reach the combat units. See 'Verteilung der Pz.-Fahrz. Bd. ab Mai 1943' (BA-MA RH 10/349).
 67. KTB PzAOK 4 Ia, Tagesmeldungen und Nachmeldungen v. II SS-Pz.Korps an PZAOK 4 (BA-MA RH 21-4/118).
 68. See David M. Glantz, *From the Don to the Dnepr: Soviet Offensive Operations, December 1942–August 1943* (London: Frank Cass 1991) p.364f.
 69. Monthly reports to the Inspector-General of Panzer Troops (BA-MA RH 10/149).
 70. Ibid. (BA-MA RH 10/312).
 71. Ibid. (BA-MA RH 10/313).
 72. It is a widely spread myth that Das Reich had Panthers at Operation 'Zitadelle' in July 1943. The division technically had this type, but the tanks were still in Germany together with their crews. The battalion was transferred to the Eastern Front during August.
 73. There are further errors in this section of *From the Don to the Dnepr* (note 68). Glantz gives the strength of a few German infantry divisions (255th, 332nd and 57th). However it seems that the strength figures given refer to combat strength. While we have no figures available for those specific divisions, another comparison is possible. According to Glantz the 168th, 168th, 106th and 252nd (here we probably have a case of printing error, since this division was with 4th Army in the Smolensk area, but it is assumed that it actually refers to 282nd Division) suffered similar losses. The strength of these divisions was 5,747, 9,193, 10,238 and 8,711 respectively on 30 Aug. [Übersicht über den Zustand der Divisionen und gep. Einheiten der 8. Armée, Stand 30.8.43. Anlage zu OAK 8 Ia Nr. 1511/43 g.Kdos. BA-MA RH 20-8/91]. While the strength given here is Verpflegungsstärke, this relatively accurately portrays unit strength as long as divisions are studied. Considering the TO&E strength of German infantry divisions, this does certainly not indicate losses in the order of two thirds.
- Another error in this section is Glantz statement that 'German losses were equally severe'. Since the author writes that the German force was smaller than the Soviet the German losses were more critical, he must mean that German losses were almost as great as Soviet. This is wrong however. The German 4th Panzer and 8th Armies suffered 51,724 casualties (killed, wounded, missing) during August [see BA-MA RW 6/v. 558]. This can be compared to Soviet losses of 255,566 men during the operation [Krivosheev, note 29, p.190].
74. For an example of how these were used see the tables produced by the Kraftfahrwesen, Abt. V of 4th Panzer Army at Kursk in file BA-MA RH 21-4/450.
 75. See e.g. *Geschichte des Grossen Vaterländischen Krieges der Sowjetunion* (East German translation of *Istoriya Velikoy Otechestvennoy Voiny Sovetskogo Sojuz*) Vol.4 (Berlin: Deutscher Militärverlag 1965) p.26.
 76. Panzer-Lage Ost (Nach Gen.Qu.), BA-MA RH 10/61 and StuG-Lage Ost (Nach Gen.Qu.), BA-MA RH 10/62. Included in the figures are 118 obsolete tanks (Pz II, Pz 38, Pz III L42, Pz IV L24) 135 command tanks, 349 Panthers and 232 Tigers. The figures on German tank strength include damaged tanks in workshops.
 77. It has not been possible to establish the proportion in workshop, but it is worth noting that on 1 Oct. 1943, 72 per cent of all German tanks on the Eastern Front were in workshops [BA-MA RH 10/68].
 78. *Geschichte des Grossen* (note 75) p.26. While the German tank strength is said to be 5,400, the 5,357 Soviet tanks and assault guns are compared to 3,700 combat-ready German tanks and assault guns when the numerical ratio is computed (see also footnote 43).
 79. Of course it is quite common to find exaggerated German reports on Soviet tank losses. However, it seems that the Germans were closer to the truth when reporting enemy tank

losses. 1 July–31 December 1943 German combat units reported that they had destroyed 30,668 Soviet tanks and assault guns, this was reduced by OKH to 15,344 to compensate for double-counting and vehicles that were repairable (BA-MA RH 10/77). This can be compared with recent Russian figures. According to *Grif Sekretnosti Sniat* (note 29, p.357) the Red Army lost (total write-offs) 23,500 tanks and assault guns during 1943. The period 1 January–30 June cost the Red Army 5,747 tanks (E. Bacon, 'Soviet Military Losses in WWII', *JSMS* 6/4 (Dec. 1993) p.623). Thus losses 1 July–31 December amounted to 17,753. This would indicate that troop reporting was about 70 per cent too high, while the figure OKH was working with was nearly 15 per cent too low. An example of Soviet reporting is given by the Battle of Kursk. Soviet documents put German losses at 3,572 tanks and assault guns 5–15 July according to I.N. Venkov and V.V. Muchin (see R.G. Foerster, *Gezeitenwechsel im Zweiten Weltkrieg?* (Hamburg: Mittler und Sohn 1996) pp.238, 244. This is however entirely wrong. On all fronts, during the entire month of July, German losses amounted to 852 tanks and assault guns (total write-offs). Extensive research in the German military archives shows that less than half of these were destroyed at Kursk 5–15 July. These Soviet figures on the Battle of Kursk are of course not the only ones presented in Soviet sources, but usually the gross figures given are difficult to interpret, since it is neither clear which period of time they apply to nor are they accompanied by unambiguous information on how the battle is geographically delineated.

80. H.B. Müller-Hillebrand, 'German Tank-Strength and Loss Statistics' (MS at National Archives, Washington, MS # P-059) p.16.
81. *Ibid.*
82. *Ibid.* Appendix 2.
83. 'The Battle of Kursk (Continued): Tank Forces in the Kursk Bridgehead' and Operational Maskirovka According to Voronezh Front Experience July–August 1943', *JSMS* 7/1 (March 1994) p.112.
84. Examples from Soviet-based Western literature can be given: During the Orel Offensive Operation July 1943, 19 per cent of 2nd Tank Army's disabled tanks were completely destroyed [C.N. Donnelly *et al.*, *The Sustainability of the Soviet Army in Battle* (Soviet Studies Research Centre, Royal Military Academy, Sandhurst 1986)] p.285; Of the tanks disabled in 4th Tank Army during the same offensive 46 per cent were permanently lost [*ibid.*]; During the Wisla–Oder Operation 1945 the 2nd Guards, 3rd Guards and 4th Tank Armies had 28 per cent, 35 per cent and 28 per cent permanently destroyed respectively [*ibid.*].

Examples from the German Kursk offensive can be given: At 2400, 10 July, 48th Panzer Corps reported that it had 283 tanks in workshops for repairs, while 43 tanks had yet been completely destroyed [Versorgungslageberichte des Gen. Kdo. XXXXVIII. Pz.Korps Abr. Qu. vom 2.7.1943 bis 30.10.1943. Anlageband 3 zum KTB nr 2 (National Archives, Washington, Microfilm Publication T314, Roll 1169, Frame 000749)]; At the same time II SS-Panzer Corps had 179 tanks in workshops for repair, while 21 tanks were reported as completely destroyed [PzAOK 4 O.Qu Anlage zu KTB, BA-MA RH 21-4/450]. This means that for each tank destroyed, 48th Panzer Corps had 6.6 in workshops, the II SS-Panzer Corps had 8.5. Of course it may well be that some of the damaged tanks were never repaired, but e.g. cannibalized for spare parts. This is however contradicted by the fact that during the night between 12 and 13 July, 48th Panzer Corps had 190 tanks expected to be repaired within four days, while II SS Panzer Corps had 122 [*ibid.*]. Also several damaged tanks had already been repaired by 10 July.

85. According to Lt. Gen. P.A. Rotmistrov 'On the whole the T-34 is powerless against the T-V (Tank-V = Panther), especially the 85mm gun'. See *Obezpechit Prevsoskhodstvo Sovetskikh Tankov, Dokladnye zapinski I.V. Stalin 1942–1944* (Istoricheskii Arkhiv no.5 1993) p.111. This evaluation is in good agreement with ballistical data on the T-34/85 gun and the armour protection of the Panther. Rotmistrov's analysis contradicts C.J. Dick who asserts that the T-34/85 was able to contend with the Panther on equal terms (C.J. Dick, 'The Operational Employment of Soviet Armour in the Great Patriotic War', p.101 in J.P. Harris and F.N. Toase (eds) *Armoured Warfare* (London: Batsford 1990). The only sources Dick presents are Soviet published books.

86. A German NCO, commanding a Tiger tank, described his first action during Operation 'Zitadelle', 1943. They disabled three T-34 tanks, resulting in the enemy withdrawing. However, since none of the T-34s were burning, they continued firing until all of them had caught fire. During his next action nine T-34s were disabled, and burning, which was necessary for reporting them as destroyed. [Horst Hasse, 'Bericht des Ktd "131" über ein Gefecht bei Zitadelle' in A. Rubbel (ed.) *Erinnerungen an die Tiger-Abteilung 503 1942-1945* (Selbstverlag Bassum 1990) pp.186-7.
87. 'German artillery, tanks and self-propelled guns did not stop firing against tanks until they caught fire, even when the tank had stopped as a result of being hit by a shell. Such a method of fighting against attacking tanks leads to enormous irreparable losses in their ranks.' See 'Documents: Tank Forces in the Defense of the Kursk Bridgehead' (note 83) p.144.
88. Tagesmeldungen 6.7.1943, Hgr Süd meldung über Ausfälle an Pz. und StuG am 5.7 (BA-MA RH 10/64).
89. See Gen.Kdo II SS-Pz.Korps 23.7.1943 (BA-MA RS 2-2/18). The figures presented in this document are well inline with reports by the Kraftfahrwesen in 4th Panzer Army (see file BA-MA RH 21-4/450), compilations made by the Inspector-General during the battle (see file BA-MA RH 10/64) and by Strength reports before and after the battle. For the number of replacements (very few) sent to the units see file BA-MA RH 10/349.
90. In fact the presentation of the battle as a clash between II SS-Panzer Corps and 5th Guards Tank Army is not entirely correct either, since both those formations had parts fighting other units. E.g. the majority of the Totenkopf Division fought against 5th Guards Army commanded by Lt. Gen. A.S. Zhadov.
91. Principally the various projection systems used when producing maps result in inaccuracies. For the distances involved in the operations studied here, the resulting error is in the magnitude of one per cent and is quite irrelevant for the issues discussed in this article. The distances have been measured using *The Times Atlas of the World* (Comprehensive edition, 5th ed. London: Times Books 1975).
92. Source for advance number 1 is E. von Manstein, *Verlorene Siege* [lost victories] (Bonn: Athenäum-Verlag 1958) pp.180-3. Source for advance number 2 is R.H.S. Stolfi, *A Bias for Action: The German 7th Panzer Division in France and Russia 1940-41* (Quantico, VA: US Marine Corps Assoc. 1991) pp.47-54. Source for advance number 3 is Guderian, *Panzer Leader* [1956] (London: Futura 1982) pp.152-60. All distances have been checked in *The Times Atlas* (note 91).
93. Ibid.
94. Original daily situation maps produced by the German Panzer Groups have been used. They can be found in the German military archives in Freiburg (Bundesarchiv - Militärarchiv, files RH 21-2/v. 241K, RH 21-3/v. 79K and RH 21-4/76K).
95. We have used the East German translation of *Istoriya Velikoy Otechestvennoy Voyny Sovetskogo Sojuz, Geschichte des Grossen Vaterländischen Krieves der Sowjetunion* (note 75) as source for the map. Map 70 in the Kartenband has been used. The distances have been measured on the map and checked against *The Times Atlas* (note 91).
96. In the table, GTA means Guards Tank Army, GTC, means Guards Tank Corps, GA means Guards Army and A means Army. Distances are measured according to the previous footnote. Dates are taken from the map and from Vol.4 of *Geschichte des Grossen Vaterländischen Krieves der Sowjetunion* (note 75) pp.193-224 and Vol.9 of *Geschichte des Zweiten Weltkrieges* (an East German trans. of *Istoriya Mirovoi Vtoroi Voyny*) p.69-82.
97. As can be seen in Table 9, 5th Guards Tank Army figures in both advance number 5 and number 7 during July. The army was shifted to a more northerly direction after 13 July. Advance number 7 was initially made by 51st Army, but 5th Guards Tank Army took the lead after it had been shifted.
98. *Geschichte des Grossen Vaterländischen Krieves der Sowjetunion*, Vol.5, pp.83-105 and Map 91 in the Kartenband.