

PRELIMINARY ESTIMATE OF AXIS EUROPEAN GROUND FORCE
AND AIR FORCE CONSUMPTION OF LIQUID PETROLEUM PRODUCTS,
JAN. - JUNE 1944

Prepared for the

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AXIS EUROPEAN GROUND FORCES: OIL CONSUMPTION, 1944

1. Number and Type of Divisions, May 1944.

The number of German divisions in May 1944 was about 325, of which slightly more than 50 were Panzer and Panzer Grenadier divisions. The bulk of these divisions (about 195) were concentrated on the Eastern Front, while about 70 divisions were stationed in the West, nearly 25 in Italy, and an equal number in the Balkans. The number of satellite divisions was 100 to 110, but these include large elements of low fighting potentialities.

It may also be pointed out that the F.O. of German infantry divisions has been reduced and that, even so, there are numerous reports indicating that actual strength is below T.O. In addition, certain types of divisions intended for limited employment in some instances contain foreigners and Germans either above or below the best combat age. It seems clear that the overall manpower situation is the most serious problem confronting the German High Command.

2. Strength of German Divisions.

A. Truck strength, March 1944. It has been assumed on the basis of very incomplete and unsatisfactory evidence that the vehicular strength and the strength in tanks and armored cars per division in March 1944 was 5 percent below the strength per division in July 1943. This assumed decline is less than the probable decline in manpower in the German army between the same dates, but it is believed that the Germans have been better able to replace losses in vehicles, etc., than in manpower. For example, the Germans may have been able to obtain as many as 20,000 Italian trucks after the collapse of Italy. Assuming, then, a 5 percent reduction per division in truck strength between July 1943 and March 1944, the German military truck position would have been as follows in March 1944:

German Military Trucks, March 1944 (in thousands)

	:Divi- :sional :	: Non- :divisional :	: : Total :	:Of which, : liquid : fuelled :	:Of which, : Converted :	:Converted :as percent : of total
Russia (& Finland)	155	85	240	225	15	6.3%
Italy	23	10	33	31	2	6.1%
Balkans	14	7	21	18	3	14.2%
France and Lowlands	25	18	43	28	15	34.9%
Germany, Norway, Denmark	11	7	18	13	5	27.8%
	228	127	355	315	40	11.3%

Estimated Strength of the Various Types of German Divisions, March 1944,
in Trucks, Tanks, and Armored Cars

Division	M. C.	Motor Cars	Trucks	Tractors	Tanks	Armored Cars
1. Pz Division						
a. Divisional	1138	333	2758	297	213	73
b. Non-div.	479	140	1161	125	90	31
Total	1617	473	3919	422	303 ^a	104
2. Pz Gr Division						
a. Divisional	1158	85	2384	228	54	48
b. Non-div.	488	36	1064	96	23	20
Total	1646	121	3388	324	77	68
3. Field Division						
a. Divisional	387	63	519	140	-	22
b. Non-div.	163	26	218	59	-	9
Total	550	89	737	199	-	31
4. Limited Employment Divisions (all Non-div.)	163	26	218	59	-	9
5. Static Divisions (all Non-div.)	163	26	218	59	-	9

a. Includes self-propelled artillery.

B. The truck strength shown for March 1944 may be compared with an estimated truck strength of 375,000 in July 1943. The total number of converted military trucks in July 1943 is estimated at about 23,000.

C. It is highly unlikely that savings of liquid motor fuel of any importance can be achieved through further conversions. On the contrary, it is probably to be expected that some converted military trucks, especially in the West, will be shifted to liquid motor fuel now that the German forces in the West are confronted with invasion.

3. Assumptions.

A. Russia.

1. Non divisional vehicular strength estimated at 50 percent of divisional. About one-sixth of the non-divisional vehicles are assumed to be converted.

2. Wastage and losses are estimated at 7 1/2 percent of total consumption excluding wastage and losses. This amounts to about 140,000 tons in the first six months of 1944.

3. Winter allowance of 20 percent of total consumption excluding winter allowance is made in the first three months of the year.

4. For the first five months information on the number of divisions on each sector of the front is available and has been applied to the index of intensity to secure monthly consumption. Fighting was very intense in the first three months of the year, dropped off considerably in April, while May was very quiet in the North and Center and localized in the South. It has been assumed that consumption in June will be at about the May rate: there has been an almost complete lull on all sectors in the first half of the month.

5. Assuming that the entire Eastern Front becomes active, with heavy to intense fighting, consumption on the Eastern Front would rise to about 305,000 tons per month (or nearly 100,000 tons more than in June).

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B. Finland.

1. Non-divisional vehicular strength estimated at 40 percent of divisional. Nearly two-fifths of the non-divisional vehicles are assumed to be converted.

2. Wastage and losses estimated at 7 1/2 percent of total consumption excluding wastage and losses.

3. Winter allowance of 20 percent in the first three months.

4. A complete lull on the Finnish front persisted through May and part of June. The Russian offensive has not so far (14 June) involved the German divisions in Finland, which are stationed in the north. Nevertheless, localized fighting has been assumed for these divisions in June.

C. Italy.

1. Non-divisional vehicular strength estimated at 40 percent of divisional. One-fifth of the non-divisional vehicles are assumed to be converted.

2. Wastage and losses are estimated at 7 1/2 percent of total consumption excluding wastage and losses. This amounts to about 11,000 tons in the first six months of 1944.

3. For the first five months information on the number of divisions at the front is available and has been applied to the index of intensity. Heavy fighting is assumed for the month of June.

4. Consumption by divisions stationed in Northern Italy estimated at rate of reserve divisions (i.e., one-quarter of localized).

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D. France and Lowlands, January-May.

1. Non-divisional estimated at 30 percent of divisional.

2. Wastage and losses estimated at 2 1/2 percent of total excluding wastage and losses.

3. Savings from conversion estimated at about 35 percent of total consumption.

4. Activity assumed to be that of reserve divisions (i.e., ^{index} ~~under~~ 25, or 1/4 of localized).

E. France and Lowlands, June.

1. Non-divisional assumed to rise to 40 percent of divisional. One-fourth of the non-divisional vehicles assumed to remain converted (i.e., about 4,500 ^{as} ~~ex~~ compared with 15,000 prior to invasion); it is assumed, in other words, that about 10,000 vehicles are shifted to liquid fuel as a result of the invasion and the need for efficient transportation.

2. Wastage and losses estimated at 7 1/2 percent of total excluding wastage and losses.

3. Activity assumed to be between heavy and intense for 24 days for all divisions, even though many of these are not engaged, as it is believed that a considerable regrouping and strengthening of all troops is probably in progress. At this assumed level of activity consumption in France and the Lowlands in June is estimated at 41,000 tons.

Assuming that the fighting is at a sustained intensive level in July, consumption would rise to about 55,000 tons (with strength still at May level).

F. Balkans.

1. Non-divisional estimated at 30 percent of divisional. About one-third of the non-divisional vehicles are assumed to be converted.

2. Wastage and losses are estimated at 5 percent of total excluding wastage and losses.

3. Activity assumed to be on the average one-half of localized fighting.

4. Assuming heavy to intense fighting in the Balkans involving the forces stationed there in May, consumption would amount to about 25,000 tons per month (or about 15,000 tons more per month than in June).

G. Germany, Norway, and Denmark.

1. Non-divisional estimated at 30 percent of divisional.

2. About 30 percent of total consumption assumed to be saved through conversion.

3. Wastage and losses estimated at 2 1/2 percent.

4. If these divisions should become engaged in heavy to intense fighting, consumption would amount to about 10,000 tons per month (or about 8,000 tons more per month than in June).

5. A nominal figure of 15,000 tons (allowing for conversion of one-half of all vehicles) is made for Administrative, Special Administrative, and Mobilization divisions in Germany. These so-called divisions have a very low strength and have no combat potentialities.

H. Limited Employment and Static Divisions. These divisions are assumed not to have any divisional motor transport but to have non-divisional motor transport equivalent to that of an infantry division.

I. Todt and NSKK. Activity in 1944 is assumed to be at the same rate as in 1943, but it is estimated that one-half of all vehicles are converted. Total consumption is allocated 40 percent to Russia, 40 percent to the West, and 20 percent to the Mediterranean area.

J. Satellites. Activity in 1944 is assumed to be at the same fronts and rates as in 1943.

4. Monthly Consumption Rates. In the following table the monthly consumption per division, including the non-divisional consumption associated with divisional consumption and assuming that on the average one-fourth of total strength is always held in reserve, is shown:

Monthly Consumption Rates per Division
(In metric tons, rounded)

Degree of Fighting	Pz	Pz-Gr	Field	Lim. Empl.	Static
Intense	6800	5600	900	350	350
Heavy	5400	4500	700	300	300
Localized	4100	3400	600	250	250
Direct	3100	2500	400	175	175

5. Consumption by Ground Forces in 1944.

A. Consumption by Fronts.

	<u>Jan.-June 1944</u>	<u>June 1944</u>	<u>Possible Increase over June^a</u>
1. Eastern Front			
a. German	1955	216	100
b. Satellite	65	11	5
c. Total	<u>68</u>	<u>11</u>	<u>-</u>
	2088	238 ^b	105
2. Mediterranean			
a. German in Italy	179	33	-
b. German in Balkans	58	11	15
c. Satellite	45	8	11
d. Total	<u>35</u>	<u>6</u>	<u>-</u>
	317	58	26
3. Western and Central Europe			
a. France and Lowlands)		41	14
b. Norway and Denmark) 106		2	7
c. Germany and)			
Central Europe)		3	1
d. Total	<u>68</u>	<u>11</u>	<u>-</u>
	174	57	22
4. Total	2579	353	153

a. Assuming heavy to intense fighting on fronts quiet in June and a more intensive degree of fighting in the West than in June.

b. Northern Russia and Finland - 35; Central Russia - 52; Southern Russia - about 73; Bessarabia - about 78. With localized fighting ground force consumption in the Bessarabia area would require about 100,000 tons per month.

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B. Consumption by Products, January-June 1944, in thousand metric tons

Motor Fuel	1785	—
Lubricants	91	
Diesel Oil	<u>703</u>	
Total	2579	

GERMAN AIR FORCE: OIL CONSUMPTION, 1944.1. Strength.*

a. First Line Strength and Stored Reserves of GAF, 1 June 1943 and 1 March 1944.

	<u>First Line Strength</u>	<u>Stored Reserves</u>	<u>Total</u>
1 June 1943	4,850	800	5,650
1 March 1944	5,330	675	6,005

b. I. E. by Types and Theaters, 1 June 1943 and 3 March 1944.

	<u>West and Central</u>		<u>Mediterranean</u>		<u>Russia</u>		<u>Total</u>	
	<u>1944</u>	<u>1943</u>	<u>1944</u>	<u>1943</u>	<u>1944</u>	<u>1943</u>	<u>1944</u>	<u>1943</u>
SEF	811	593	300	258	349	459	1,460	1,310
TEF	822	547	48	159	63	79	933	785
Total Fighters	<u>1,633</u>	<u>1,140</u>	<u>348</u>	<u>417</u>	<u>412</u>	<u>538</u>	<u>2,393</u>	<u>2,095</u>
LRB	726	417	252	339	412	549	1,390	1,305
Rec. B.	134	126	66	78	180	231	380	435
FB	(71	124	(63	102	(486	84	(620	310
DB	(	71	(	-	(	279	(	350
AC	36	40	60	18	219	252	315	310
Coastal	73	91	75	36	27	18	175	145
Transport	<u>725</u>	<u>655</u>	<u>290</u>	<u>295</u>	<u>350</u>	<u>420</u>	<u>1,375</u>	<u>1,370</u>
TOTAL	3,398	2,664	1,154	1,285	2,096	2,371	6,648	6,320

2. Operational Sorties by Type and Theater, 1943 and 1944. Observed sortie data are available for the Western and Mediterranean fronts for fighters, bombers, fighter bombers, and reconnaissance for the first four months of 1944. It has been assumed that May sorties were at the April level and June sorties at 150 percent of the April level in the West and that May and June sorties were at the April level in the Mediterranean. The April data are presented in the following table.

No comparable data are available for Russia. In computing GAF sorties on the Russian front a "maximum rate" per type has been established on the basis of American experience and has been applied to the I. E. in the Russian

* Based on B.A.M. data.

theater. The results for an average month are shown in the following tables.

Transport sorties are assumed throughout to be 16 per month per plane (I. E. basis). Coastal sorties are assumed throughout to be 15 per month per plane (I. E. basis).

AC sorties are assumed to be at the same rate per plane as FB sorties.

GAF SORTIES, APRIL, 1944,* BY THEATER AND TYPE

	<u>West</u>	<u>Mediterranean</u>	<u>Russia</u>
Fighter	10,470	2,970	6,679
LRR	965	310	3,430
FB	255	190	1,677
Reconnaissance	580	1,345	1,680

* Except for Russia, where average per month in 1944 is shown.

3. In calculating total sorties by types an allowance must be made for non-operational sorties. Non-operational sorties per ^{plane}~~type~~ have been estimated on the basis of American experience to be as follows:

LRR	3.5 sorties per month
Recon. B.	3.5 sorties per month
SEF	7.4 sorties per month
TEF	2.8 sorties per month
DB, FB, and AC	3.4 sorties per month
Coastal	3.5 sorties per month

4. Consumption per sortie per type has been estimated on the basis of information as to tankage capacity of German models and on assumptions as to the percentage of total tankage capacity used on the average sortie to be as follows:

Consumption per sortie (in metric tons)

LR3	1.914
Rec. B.	2.370
SEP	.325
TEP	.971
DB	.396
FE	.760
AC	.340
Coastal	1.333
Transport	1.582

5. Consumption by the ground establishment of the GAF is estimated on the basis of 75,000 trucks. Conversion of 15 percent of GAF vehicles in Russia and the Mediterranean and of 30 percent of GAF vehicles in Germany and the West is assumed. Altogether one-fifth of the GAF ground vehicles are assumed to be converted. Consumption of motor fuel per vehicle is estimated at a little less than one-half ton per month.

6. Consumption by GAF, January-June 1944 and June 1944. (in thousand metric tons)

a. Consumption by fronts.

	<u>Jan.-June 1944</u>	<u>June 1944</u>	<u>Possible Increase over June*</u>
West	533	111	25
Mediterranean	152	27	10
Russia	322	53	=
Total	1,007	191	35

b. Consumption by products, January-June 1944 (in thousand metric tons)

	<u>Amount</u>
Aviation Gasoline	808
Motor Fuel	123
Lubricants	35
Diesel Oil	41
	<u>1,007</u>

* Assuming maximum rate of utilization.