

**REPORT OF THE
COMPTROLLER AND AUDITOR GENERAL
OF INDIA**

**FOR THE YEAR ENDED 31 MARCH 1991
NO. 14 OF 1992**

**UNION GOVERNMENT – DEFENCE SERVICES
ARMY BASE WORKSHOPS**

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PREFATORY REMARKS

This Report of the Comptroller and Auditor General of India for the year ended 31 March 1991 has been prepared for submission to the President under Article 151 of the Constitution.

2. The Report contains a review on Army Base Workshops.

3. The findings contained therein are those which came to notice in the course of test audit and have now been consolidated as a review.

OVERVIEW

Army Base Workshops are responsible for overhaul/repair of all classes of vehicles including specialised vehicles as well as armaments, electronic items, fabrication of vehicle bodies and manufacture of spares where required. There are eight base workshops in the country. A review of the activities of these workshops revealed that:

- Since 1958 the capacities of these workshops continued to be determined with reference to manpower alone despite, progressive upgradation of repair techniques as well as automation in the workshops in the intervening period.
- Even their available capacity could not be fully exploited due to non-availability of repairables and poor backup of spares. The shortfall in output with reference to available manpower worked out to Rs.33.92 lakhs in 1987-88; Rs.45.26 lakhs in 1988-89; Rs.90.73 lakhs in 1989-90; and Rs.203.56 lakhs in 1990-91.
- The limits imposed by the Government on manhours towards leave, training, trade testing and regimental duties by the workshops were exceeded leading to reduction in availability of manhours for productive purposes. The consequential additional expenditure was Rs.7.82 crores. Interestingly enough, over time payments during the period worked out to Rs.5.14 crores.
- There was under utilisation of high value plant and machinery (costing Rs.1 lakh and above) ranging between 33 and 53 per cent in 1987-88; 38 to 54 per cent in 1988-89; 35 to 45 per cent in 1989-90 and 32 to 59 per cent in 1990-91.
- Specialised plants and machinery costing Rs.1.52 crores procured under a modernisation scheme had either not been installed or remained unutilised.
- Imported plants and equipments costing Rs.289.93 lakhs remained totally unutilised for periods ranging from 18 to over 36 months.

- Indigenous plants and machinery costing Rs.174.41 lakhs remained unutilised from the date of their procurement for periods ranging from 13 to over 36 months.
- A workshop fabricated 107 machinery workshop lorries (mobile workshop) on Shaktiman chassis but could not equip them with full fitments. These lorries with part fitments were held in an ordnance depot without issue for a year. The cost of 107 chassis alone worked out to Rs.3.16 crores. Another workshop fabricated 18 diesel servicing lorries on Shaktiman chassis without fitment of the required test benches. These lorries were consequently held in the workshop/ordnance depot without any use. The cost of these lorries, without the test benches, worked out to Rs.70 lakhs.
- An electrical and hydraulic system (cost:Rs.18.69 lakhs) for washing the hulls of a sophisticated gun at a workshop could not be installed/commissioned for two years, pending completion of required civil works. In the meantime, washing of the hulls was carried out manually.
- An engine repair building was constructed at a cost of Rs.81.20 lakhs but was not utilised for two years.
- In a workshop, actual manhours employed on overhaul of certain vehicles was far in excess of the prescribed norms. This resulted in an excess expenditure of Rs.57.26 lakhs.
- Delay in installation of captive generators (cost: Rs.17.27 lakhs) in a workshop resulted in a loss of considerable manhours owing to power failure, involving Rs.85.77 lakhs. Such loss of productive manhours in two other workshops amounted to Rs.15.20 lakhs and 19.11 lakhs.
- In two workshops no account was kept of the utilisation of items of stores retrieved and reclaimed from Beyond Economical Repair (BER) vehicles and equipment. The seriousness of the problem can be appreciated from the fact that according to estimated figures of Army HQ, the value of components reclaimed in all the base workshops from BER vehicles and

equipments was Rs.6.38 crores in 1988-89; Rs.8.66 crores in 1989-90; and Rs.9.38 crores in 1990-91.

- The workshops do not follow cost accounting system which is a pre-requisite for ensuring cost effectiveness.

ARMY BASE WORKSHOPS

1. Introduction

Army workshops run by the Electrical and Mechanical Engineers (EME) are responsible for overhaul/repair and manufacture of spares, where necessary, of all vehicles and equipment held by the Army. These functions are carried out under a three-tier system, viz;

- (a) Light aid detachment who carry out light repairs;
- (b) Stations workshop/workshop companies who are responsible for field repairs.
- (c) Base Workshops who are entrusted with the responsibility of carrying out repairs beyond the local repair (BLR) capability of the field Army.

The specific duties of the Base Workshops are:

- complete overhaul of 'A' vehicles (Armoured Fighting vehicles and tracked war like vehicles).
- Repair/overhaul of all 'B' vehicles which include all other mechanical transport (trucks, cars, motor-cycles, trailers, tractors, etc.) by either overhaul of assemblies of subsystem or total overhaul by the process of strip and rebuild.
- Repair and overhaul of guns, armaments and electronic items.
- Fabrication of vehicle bodies, manufacture of specialised bodies on vehicles
- Manufacture of spares which are not readily available from the normal source of supply (Ordnance) for repair activities.

There are eight Base workshops at various locations in the country. Each workshop has been assigned a designated role as under:

Name of workshop	Responsibilities
'A'	Overhaul/repair of 'A' vehicles (West European) 'B' vehicles 'A' and 'B' vehicle engines
'B'	Overhaul of guns, rifles, mortar/ grenades
'C'	Overhaul of Engineer Equipment, earthmoving equipment, Leyland engines and compressors.
'D'	Overhaul of mixed engines of various 'B' vehicles
'E'	Electronic items, radio sets, radars, etc.
'F'	Overhaul of East European air defence systems and Nissan engines
'G'	Overhaul of East European Tanks and engines, small arms, radio equipment of T-55 tanks
'H'	Fabrication of Trailers and manufacture of spares of vehicles, equipment, etc.

The total capacity of the workshops is over 10 million man-hours with an annual outlay of Rs.500 crores approximately. As there is a lead time of five years in programming repair schedules (para 3 below), repairables and required spares are expected to be fed by Central Ordnance Depots (CODs), Central Armoured Fighting Vehicles Depot (CAFVD) and vehicles sub-depots (VSDs) functioning under the control of Director General of Ordnance Services (DGOS). These feeding depots are located in proximity of the designated workshops.

2. Scope of Audit

The utilisation of capacities, targets vis-a-vis output, purchases, installation and utilisation of machinery and equipment and civil engineering works pertaining

to the four year period 1987-88 to 1990-91 and monetary values capable of being determined based on manhour rates indicated by the workshops were test checked in audit.

3. Organisation and Control

At the apex level, Director General, Electrical and Mechanical Engineers (DGEME), Army Headquarters (HQ) is responsible for monitoring the activities of the Base Workshops through HQ, Technical Group (TGEME). Repair liabilities to be included in the repair programme are worked out by the Director General of Ordnance Services (DGOS) for all equipment except 'A' vehicles, which is worked out by the General staff of Army HQ. Yearwise repair liabilities are finalised, keeping in view the population and retention policy of the equipment, laid down periodicities of repair approved, local repair capabilities and available capacity. The priorities for overhaul are indicated by the users. TGEME, after receiving the approved repair liabilities for which Government sanction is obtained by the DGOS, sub allots the load to the workshops keeping in view their capacities and expertise. The available capacity, is fixed in terms of standard units (SUs) of 100 manhours, despite continuous refinements and sophistication in terms of machines and repair techniques. However, other infrastructure such as plant and machinery either of general nature or dedicated ones available in these workshops are not taken into account while formulating either the capacity or the programmes. There are no norms to indicate the standard units in respect of the machine hours.

The Ministry stated (March 1992) that "workshop capacities are calculated on the basis of standard manhours as per the general practice. It is not considered feasible to change the basis of calculation to availability of machine hours. However, the manhours available to a workshop are generally based on the availability of machines."

The Ministry's statement could not be reconciled with the fact that the system of calculation of capacities based on standard units of manhours only has been practised since 1958 without any change, while there has been change in the repair techniques and sophistication in the machinery over the last thirty years. Therefore, in the absence of any indication of advantages of updated technique it was not possible to determine whether the manhour utilisation norms projected to indicate the effi-

ciency of workshops was valid.

The programmes have three phases, viz; the programme for the ensuing year which is "firm", for the second year "planned" and for the next three years as "forecast" to enable advance planning and provisioning. Based on the programmes so devised, different workshops call for repairables and required spares from the feeding ordnance depots i.e. CODs, CAFVD/VSDs. The firm programme for every year is expected to be real with full load of reparables and spares. Execution of the programmes are monitored by the TGEME through 'progress reports' submitted monthly by the workshops which are reviewed and revised, where necessary, taking into account various factors like non-availability of spares, equipment and other inputs reported by different workshops through these reports.

4. HIGHLIGHTS

- The capacity of the workshops is determined with reference to manpower alone. Other inputs like plant and machinery, which considerably speeded-up the jobs, were not taken into account. There was also no apparent relationship between man hours and machine hours.

(Para 3)

- The available capacity (posted strength) ranged between 64 and 74 per cent of the authorised capacity of the workshops in 1987-88; between 67 and 85 per cent in 1988-89; 70 to 96 per cent in 1989-90 and 66 to 93 per cent in 1990-91. Consequently, the potential of the workshops for realisation of programmes and commitments was restricted.

(Para 5.1)

- Shortfall in output of the workshops ranged upto 23 per cent of even the available manhour capacity in 1987-88 (cost: Rs.33.92 lakhs); upto 18 per cent in 1988-89 (cost : Rs.45.26 lakhs); upto 21 per cent in 1989-90 (cost: Rs.90.73 lakhs) and upto 45 per cent in 1990-91 (cost: Rs.203.56 lakhs). The consequent non-utilisation of available manpower for intended productive purposes led to expenditure of Rs.6.97 crores by way of diversion of the available productive man hours to overheads.Reduction in operational

availability of vehicles was another consequence.

(Paras 5.2, 5.3, 7.3)

- Government had authorised 19 per cent of the gross manhours towards leave, training, trade testing and regimental duties. The consumption of manhours on these accounts was however upto 33 per cent in 1987-88; 19 to 37 per cent in 1988-89; 14 (in only 1 workshop) to 27 per cent in 1989-90 and 24 to 31 per cent in 1990-91. This led to reduction in availability of man hours for productive purposes. The additional expenditure involved worked out to Rs.7.82 crores. Consequently, the available man power had to be engaged on overtime involving extra expenditure of Rs.5.14 crores in the workshops.

(Para 7.3)

- Under utilisation of plant and machinery (costing Rs.1 lakh and above) ranged between 33 per cent and 53 per cent in 1987-88; 38 to 54 per cent in 1988-89; 35 to 45 per cent in 1989-90 and 32 to 59 per cent in 1990-91. This was due to work load not available (13 to 60 per cent); non-availability of operators (10 to 26 per cent); power failure (5 to 46 per cent) and down time (7 to 60 per cent).

(Para 8.1)

- Machines costing Rs.1.52 crores procured under modernisation scheme on the recommendation of a Committee had either not been installed or remained unutilised.

(Para 9)

- Several high value imported plants and equipment remained totally unutilised (June 1991). 4 items of equipment valued at Rs.232.49 lakhs for over 36 months; 1 item valued at Rs.46.06 lakhs between 25 and 36 months; one item valued at Rs.11.38 lakhs for 18 months; yet another item valued at Rs.10.88 lakhs for six months. Similarly, several items of indigenous plants and machinery remained unutilised from the date of their procurement (June 1991). Of them, 26 items valued at Rs.99.02 lakhs for over 36 months; one item at Rs. 1.29 lakhs for 34 months; 22 items valued at Rs.75.39 lakhs between 13 and 24

months; and 5 items valued at Rs.7.96 lakhs upto 12 months.

(Paras 9.1 to 9.5.31)

- Workshop 'A' did not equip 107 lorries with full fitments. As a result these lorries representing investment of Rs.3.16 crores on chassis alone were held in the depot without issue.

(Para 10.1.1)

- Workshop 'F' could not equip 18 fabricated lorries with fuel injector pump test benches. Consequently, these were held in the workshop/concerned depot (June 1991). The idle investment on these lorries without the test benches worked out to Rs.70 lakhs.

(Para 10.1.2)

- An electrical and hydraulic system (cost:Rs.18.69 lakhs) for washing the hulls of another sophisticated gun to be undertaken at Workshop 'F' could not be installed/commissioned, pending completion of required civil works.

(Para 11)

- In Workshop 'F' a new Engine Repair Shop building constructed at a cost of Rs.81.20 lakhs in June 1989, had not been put to use (June 1991).

(Para 11)

- In Workshop 'G', the actual man hours employed on overhaul of 'A' and 'B' vehicles and engineer equipments were far in excess of the norms laid down by the Government, resulting in an excess expenditure of Rs.57.26 lakhs.

(Para 12.1)

- Failure to carry out the intended 'unification feature' in certain tanks at the time of base overhaul in workshop 'G' resulted in re-stripping of the tanks, involving duplication of work at a cost of Rs.7.40 lakhs.

(Para 12.2)

- Delay in installation of a captive generator (sanctioned cost: Rs.17.27 lakhs) in Workshop 'D' resulted in a loss of 20,19,780 productive manhours valued at Rs.85.77 lakhs due to power failure. The loss of productive manhours owing to power failure in Workshops 'E' and 'F' amounted to Rs.15.20 lakhs and Rs.19.11 lakhs respectively:

(Para 12.3.1 to 12.3.2)

- Items of stores retrieved and reclaimed from Beyond Economical Repair Vehicles and equipment were not accounted for by workshops 'E' and 'G'. Such stores were, stated to have been used in the repair/overhaul of vehicles and equipments undertaken by the workshops. There were, however, no documents available at the workshops indicating this position. The value of such stores for all workshops according to the estimates of TGEOME, ranged between 6 to 9 crores annually during the last three years.

(Para 12.4)

- No time frame for collection of vehicles and equipments after completion of their repairs/overhaul had been laid down. In workshop 'A', 33 completed tanks were detained beyond 6 months; 109 between 3 and 6 months and 57 upto 3 months during the period 1987-1991.

(Para 12.5)

- In Workshops 'D' and 'H', repaired items were rejected by Inspection resulting in rectification, involving 4,35,882 manhours valued at Rs.39.52 lakhs during the period 1987-88 to 1990-91.

(Para 12.6)

- 107 'A' vehicle engines and 138 'B' vehicle engines prematurely failed were overhauled in workshops 'C' and 'G' during the period 1987-88 to 1990-91. The overall cost of the overhaul of the engines could not be worked out as the workshops did not follow cost accounting system. However, 106840 manhours spent on the job were valued at Rs.10.68 lakhs.

(Para 12.7)

- The Workshops do not follow proper cost accounting systems which are essential to bring about cost effectiveness.

(Para 12.7)

5. Authorised and available capacity vis-a-vis output

5.1 The authorised capacity is the repair potential of a workshop for realisation of programmes and commitments with reference to manhours authorised. Available capacity is the quantum of output that could be achieved with available manhours (posted strength). The authorised capacity, vis-a-vis, output of the eight Base workshops were as under:

Name of workshop	Particulars	Year			
		1987-88	1988-89	1989-90	1990-91
		(in standard units)			
'A'	Authorised	21000	21000	21000	15750
	Available	13471	15071	15801	12918
	Percentage	64	72	75	82
'B'	Authorised	14121	14121	14121	14121
	Available	10495	11085	11789	9833
	Percentage	74	79	83	70
'C'	Authorised	7168	7168	7168	7168
	Available	4870	5290	6647	6647
	Percentage	68	74	93	93
'D'	Authorised	17510	17510	17510	17510
	Available	11526	14932	15770	13677
	Percentage	66	85	90	78
'E'	Authorised	15899	15899	15899	15899
	Available	10482	11230	11600	10516
	Percentage	66	71	73	66
'F'	Authorised	16000	16000	16000	16000
	Available	11314	12244	14454	11748
	Percentage	71	77	90	73

'G'	Authorised	18181	18181	18181	18181
	Available	12959	13967	17389	15693
	Percentage	71	77	96	86
'H'	Authorised	12000	12000	12000	12000
	Available	7980	8037	8360	9535
	Percentage	67	67	70	79

The reason attributed by the TGEME as well as the workshops for the variance between the available capacity and the authorised capacity was ban on recruitment of industrial and non-industrial personnel over the years. The percentage of under-utilisation of machine hours due to this was not indicated. The potential of the workshops for realisation of programmes and commitments was thus restricted.

The Ministry stated (March 1992) that "the available capacity is lower than the authorised capacity due to ban on recruitment which is beyond the control of workshop management".

5.2 The available capacity vis-a-vis output was as under:

AC = Available capacity, In SUs (1SU = 100 manhours)
 O = Output,
 S = Shortfall in percentage

Name of Workshop	1987-88		1988-89		1989-90		1990-91	
	AC	O	AC	O	AC	O	AC	O
		S		S		S		S
'A'	13471	10355	15071	12366	15801	12482	12918	7093
		23		18		21		45
'B'	10495	16019	11085	15535	11789	15353	9833	10983
		-		-		-		-
'C'	4870	5217	5290	5736	6647	6409	6647	3843
		-		-		4		42
'D'	11526	11580	14932	12711	15770	12806	13677	8800
		-		15		19		36
'E'	10482	10832	11230	11649	11600	12469	10516	11523
		-		-		-		-
'F'	11314	11037	12244	13052	14454	13076	11748	7465
		2		-		10		36

'G'	12959	12772	13967	13389	17389	15713	15693	12199
		1		4		10		20
'H'	7980	8930	8037	8552	8360	9257	9535	9472
		-		-		-		-

Though the output in respect of workshops 'B', 'C', 'E', 'F' and 'H' stated to have been achieved was more than the available capacity, a comparative analysis of the physical output against the targets fixed for different activities revealed that there was considerable shortfall in the achievements as per Appendix-A. The reasons attributed by the TGEME and workshops for the downward trend in the output were non-arising or belated arising of repairables against the targets set out in the annual programmes and poor backup of required spares. Workshop 'D' stated that in respect of a commitment, the position of repairables had remained poor with the feeding depot, they were never near the targeted quantities and the five year repair programme was based on estimated repairable arisings and not on repairables held.

The Ministry stated (March 1992) that if the output of all the workshops together for the period of four years from 1987-1988 to 1990-1991 is considered, the overall utilisation of capacity is satisfactory.

The Ministry's contention is not tenable in that each workshop is assigned with a specific role and the targets with reference to available capacity are fixed and firmed up annually. As such the output of the workshops cannot be put together, that too over a period of four years.

5.3 The shortfall in output in terms of money value was as under:

Name of workshop	Shortfall in output (Manhours in SUs)								Total cost (Rs.in lakhs) *
	1987-88		1988-89		1989-90		1990-91		
	Man hours	cost Rs.in lakhs	Man hours	cost Rs.in lakhs	Man hours	cost Rs.in lakhs	Man hours	cost Rs.in lakhs	
'A'	3116	29.94	2705	27.35	3319	35.58	5825	64.54	157.41
'B'	-	-	-	-	-	-	-	-	-
'C'	-	-	-	-	238	1.88	2804	22.15	24.03
'D'	-	-	2221	12.37	2964	24.60	4877	40.48	77.45
'E'	-	-	-	-	-	-	-	-	-
'F'	277	2.30	-	-	1378	11.44	4283	38.55	52.29
'G'	187	1.68	578	5.54	1676	17.23	3494	37.84	62.29
'H'	-	-	-	-	-	-	-	-	-
Total		33.92		45.26		90.73		203.56	373.47

* Calculated on cost of manhours indicated by the workshops as verified by internal audit.

6. Target vis-a-vis output

6.1 Every workshop receives programmes from the TGEME regarding number of vehicles (both 'A' and 'B'), equipment, engines, armament, guns, to be repaired/overhauled and body building/fabrication over a planned period of 3-5 years indicating the targets to be achieved during the initial year of the programme. The programmes for the first year is firmed up and fixed whereas targets for subsequent years are in the nature of planned and forecast figures to enable advance planning for provision of necessary maintenance/overhaul spares, etc. Based on these programmes, each workshop calls for repairables from the feeding bodies. The system provides for the Ordnance Stores Section attached to the workshops to arrange the stores from the CODs. The workshops also resort to local purchase of material, where necessary, on the basis of non-availability certificate rendered by the CODs. The current year programme is therefore, updated with reference to availability of all inputs since a four year lead time is envisaged for fixing up all requirements. This is assisted by the Ordnance Procedure which lays down mandatory stocking programme for stores. The performance of the workshops is expressed as a ratio between the output and the aggregate production manhours. The output is the product of yard sticks for each activity formulated by the

EME and approved by Government and the number of units overhauled/repaired/fabricated.

6.2 The targets, vis-a-vis, output in the eight workshops for the period 1987-88 to 1990-91 are enumerated in Appendix-A.

6.3 An analysis of the output with reference to targets fixed for each of these workshops revealed the following position:

Percentage of shortfall in output against targets

Nature of activity	Name of Workshop nominated for the activity	Year			
		1987-88	1988-89	1989-90	1990-91
Overhaul of 'A' Vehicles	A	32	-	41	86
	F	-	53	67	67
	G	67	43	29	43
Overhaul of 'A' Vehicle Engines	A	-	25	31	72
	G	52	21	8	-
Overhaul of 'B' Vehicles	C	94	69	62	49
	D	94	83	69	83
	F	-	28	11	84
	G	75	55	37	80
Overhaul of 'B' Vehicle Engines	A	-	7	25	15
	C	24	26	8	23
	D	18	15	26	37
	G	78	25	26	78
Body-building/fabrication	A	19	11	-	51
	D	7	16	60	91
	F	-	-	-	9
	H	59	46	31	59
Engineer Equipment/Assemblies Overhaul Upgradation of Vehicles	C	41	58	52	82
	G	74	94	47	83
	G	95	58	-	-

Bridge repairs	D	90	51	40	71
Manufacture of spares	H	83	84	76	81
Small Arms	A	-	31	-	51
	B	-	-	84	23
	G	40	-	3	-
Class 'B' Stores (A & B) Vehicles	G	-	52	48	-
Radio sets	E	6	-	6	1
Generating sets charging	E	74	2	8	19
Radars	E	7	3	60	67
Electronics items	E	-	-	82	31
Guns	B	19	16	15	25
Mortars/Gre-nades	B	13	43	58	57
Boat Assault	B	24	-	-	94
Boat storm	B	33	-	-	-
Life Jacket	B	-	47	69	-
Instruments	E	-	-	72	49
General Stores (class 'B')	E	-	-	65	-

The table would indicate that the output against the target was persistently low in respect of each of the activities undertaken by the workshops throughout 1987-88 to 1990-91. The reasons attributed for low output were

non-availability of spares, and non arising of repairables. This will have to be viewed in light of the fact that a majority of 'A' and 'B' vehicles (like Vijayanta, Shaktiman, TMB) equipments etc. are of indigenous nature where non-availability of spares would not arise as also the fact that the repairables have been predetermined with reference to repairable holdings by the Ordnance. Consequently, apart from reducing the operational availability of tanks, armaments, guns, equipments etc. the available manpower in the workshops could not be utilised to the optimum level as brought out in the succeeding paragraphs

The Ministry stated (March 1992) that "while the repairable arisings are assessed for a period of 5 years in advance, the actual repair arisings are based on the condition of the equipment and long term projects can seldom be accurate. Further the exact requirement of spares can never be predicted and is further aggravated by the variation in the physical state of repairables. The lower level of arisings were also due to higher level of reliability".

The Ministry's reply did not take into account the fact that the repairs are programmed on roll plan of 3-5 years on the basis of life span, periodicity of repair of vehicles, equipment, armament etc. which is firmed up annually taking all the factors into account, the actual repairables held in the Ordnance depots/units/formations and expected to be supported by stocking procedure for spares. Slippages in the programmes and targets lead to under utilisation of available infrastructure.

7. Manpower utilisation

7.1 The Establishment of the workshops are worked out and sanctioned by Government, in a manner that 49.44 per cent of the total available manpower is deployed on direct labour and the balance 50.56 per cent on overheads. Non-available manhours such as leave (14 per cent), trade testing (3 per cent) and regimental duty/course/training (2 per cent) is restricted to 19 percent of the gross manhours as per the norms approved by the Government.

7.2 Gross manhours, manhours not available, production manhours, and overheads actually booked in respect of the eight base workshops during 1987-1991 were as per Appendix-B.

7.3 An analysis of the data revealed the following pattern of manpower utilisation in the workshops.

Percentage of man-power utilisation

 Authorised percentage towards non-available manhours = 19

Available manhours = 81

Direct Labour = 49.44% of 81

Overheads. = 50.56% of 81

Pattern of manpower accounted for	Name of Workshop	1987-88	1988-89	1989-90	1990-91
Manhours not available	'A'	22.95	28.24	26.36	26.60
	'B'	32.62	31.48	25.60	29.98
	'C'	11.74	18.95	13.94	25.48
	'D'	19	26	27	31
	'E'	24.6	26.7	24.2	26.4
	'F'	29	32.6	22.9	27.5
	'G'	31.9	36.6	26	26.4
	'H'	22.1	22.8	21.9	23.7
Production Man-hours (direct labour)	'A'	47.5	48.7	48.7	47.3
	'B'	45	45	48	49.7
	'C'	46.2	46.2	50.5	49.1
	'D'	45.8	50.6	43.8	41.6
	'E'	46.3	48.8	49.8	49.1
	'F'	38	49.6	41.3	43.9
	'G'	44.1	44.9	47	40.7
	'H'	38.3	39.6	40.1	40.2
Overheads	'A'	52.5	51.3	51.3	52.7
	'B'	55	55	52	50.3
	'C'	53.8	53.8	49.5	50.9
	'D'	54.2	49.4	56.2	58.4
	'E'	53.7	51.2	50.2	50.9
	'F'	62	58.4	58.7	56.1
	'G'	55.9	55.1	53	59.3
	'H'	61.7	60.4	59.9	59.8

 The above table would indicate that as against 19 per cent of the gross manhours authorised towards non-available manhours such as leave, regimental duties, training and trade testing, the actuals were ranging betw-

een 11.74 and 36.60 per cent through out the period under Review i.e. 1987-88 to 1990-91, in all the workshops, save for workshop 'C' during the years 1987-88 to 1989-90 and workshop 'B' during 1987-88. It was also observed that as against authorised two per cent towards regimental duty/course/training, the actuals were ranging between 0.81 and 10.68 per cent which affected the availability of man-hours of production. The expenditure involved on this account worked out to Rs.7.82 crores. Overtime manhours paid for during this period worked out to Rs.5.14 crores as per Appendix-C and D:

Similarly, as against 49.44 per cent of available manhours authorised towards production manhours (direct labour) the actuals were ranging between 38 and 48.7 per cent during the period under review, involving diversion of the manhours to overheads. The total manhours, booked against the overheads in excess of the authorisation worked out to Rs.6.97 crores vide Appendix-E.

The Ministry stated (March 1992) that "the actual booking of manhours available due to leave, regimental duties, training, etc. is due to the fact that the existing norms were laid down in early 1960's and has become "somewhat outdated" Since the 1960's the leave entitlements etc. have increased and more training was required."

The fact however, remained that the percentages have been laid down by government and the repeated variations, which has led to reduction in production manhours, have neither been condoned nor regularised.

8. Machine hour utilisation

8.1 The details of total number of plant and machinery (costing Rs. one lakh and above) held, machine hours available, utilised, not utilised and break-up of the same categorywise in respect of the six workshops are enumerated below:

		Year			
Workshop		1987-88	1988-89	1989-90	1990-91
a) No. of	A	23	28	34	38
Plant and	B	36	40	39	54
Machinery	E	9	10	12	17
held	F	53	60	61	72
	G	-	362	362	362
	H	66	86	89	78
b) Total Machine Hours available (in thousands)					
	A	40	27	54	63
	B	64	93	87	89
	E	18	20	23	33
	F	51	118	116	132
	G	-	710	709	708
	H	131	164	174	153
c) Total Machine Hours utilised (in thousands)					
	A	19	15	35	43
	B	33	58	53	43
	E	10	11	14	13
	F	34	66	72	75
	G	-	326	450	450
	H	71	89	95	82
d) Total Machine Hours unutilised (in thousands)					
	A	21	12	19	20
	B	31	35	34	46
	E	8	9	9	20
	F	17	52	44	57
	G	-	384	259	258
	H	60	75	79	71

An analysis of the data revealed that the pattern of utilisation of plant and machinery was as under;

		Percentage of under-utilisation during			
		1987-88	1988-89	1989-90	1990-91
Workshop	A	53	44	35	32
	B	48	38	39	51
	E	46	48	40	59
	F	33	44	38	43
	G	-	54	37	36
	H	46	46	45	46

The above table would indicate that the percentage of under utilisation of Plant and Machinery in the six workshops ranged between 33 and 53 per cent in 1987-88; 38 to 54 in 1988-89; 35 to 45 in 1989-90 and 32 to 59 in 1991. The reasons attributed to the under utilisation were non-availability of operators and work load, power failure and repairs. An analysis in audit of the reasons for the under-utilisation revealed the following position:

Percentage of under utilisation - categorywise - with reference to total machine-hours

		Year			
		1987-88	1988-89	1989-90	1990-91
a) Operators not available					
Workshop	A	16	15	23	26
	E	10	18	15	12
	F	22	13	12	16
	G	-	13	15	13
	H	16	10	9	8
b) Workload not available					
Workshop	A	37	13	32	25
	E	41	47	51	44
	F	15	49	52	26
	G	-	15	25	26
	H	51	44	52	60

c) Power failure

Workshop	A	9	19	9	11
	E	12	28	24	9
	F	46	17	15	16
	G	-	12	16	19
	H	8	7	10	5

d) Down time (repairs, maintenance, etc.)

Workshop	A	38	53	26	38
	E	37	7	10	35
	F	17	21	21	42
	G	-	60	44	42
	H	25	29	29	27

The Ministry stated (March 1992) that "while source of data was not clear, the machine hours available per machine vary from year to year and workshop to workshop. For planning purposes, not more than 1200 hours per year can be assured per machine for a single shift working per norms followed in Poland".

The data indicated by audit were the returns on the subject furnished by the workshops themselves to Army HQ, who are expected to be aware of it and who laid down the basic norms of 2000 hours against which figure returns were being submitted. The generalised reply and comparison with norms followed in Poland for a particular project dealing with specific equipment could not also be reconciled with the large number of general purpose machines not utilised as indicated in paras 9.4 and 9.6 below.

9. Modernisation of selected workshops for manufacture of critical spares

In May 1977, a committee was, appointed to carry out a detailed study of items of spares and minor assemblies and select typical/technology - oriented items for manufacture by Army Base Workshops themselves. In the report submitted by the committee in 1978, 94 types of plant and machinery on selective basis to workshops 'A' and 'B', 'E', 'G' and 'H' were recommended for procurement under the modernisation scheme. Accordingly, 132 machines were procured for the purpose.

The DG EME informed Audit (October 1991) that no directions were issued for implementation of the recommendations and no progress reports were called for. As such no detailed information was available regarding installation and utilisation of the machinery purchased. Individual workshops had taken action to obtain Government sanction for their procurement.

The reply is not tenable. As brought out in para 11 of the Report of the Comptroller and Auditor General NO.8 of 1991, a machine (Cost:Rs.46.06 lakhs) was procured under this scheme in a base workshop through the TGEME despite the workshops apprehensions regarding its utility. Thus DGEME/TGEME can not disclaim responsibility regarding progress in implementation of the recommendations.

The pattern of utilisation of some of the plants and machinery purchased under the scheme was test checked and it was observed that considerable number of machines purchased at a cost of Rs.1.52 crores either had not been installed or remained unutilised in the workshops as under:

(i) Pneumatic Power Hammer

A Pneumatic Power Hammer costing Rs.25.42 lakhs was received in workshop 'F' in January 1984 to facilitate forging of thicker sections of steel. The machine was not yet installed (June 1991). Consequently, the workshop had to carryout the particular activity under the existing uneconomical method of processing.

(ii) Friction Drop Hammer

A Friction Drop Hammer (1500 Kg capacity) was procured in June 1987 at Rs.20 lakhs for workshop 'H'.The hammer was, however, installed/commissioned in March 1990, after a lapse of about three years. It was yet to be put to use (June 1991).

(iii)Electronic gear testing machines

An Electronic gear testing Machine was imported at a cost of Rs.43.17 lakh in June 1986 for workshop 'F'. The machine sustained damages during transshipment from the port of entry (Bombay) to the workshop.The staff court of inquiry, which investigated the matter; opined that the damages occurred due to the failure of the Embarkation

Head Quarters to comply with instructions regarding the opening of the packages and re-packing and its transportation, resulting in rusting of vital components by the ingress of rain water. As the cost of repair to the machine was worked out at Rs.26 lakhs, it was proposed to be written off. Necessary loss statement was stated to be under preparation (June 1991). The Ministry stated (March 1992) that the damage was mainly due to non-adherence to packing instructions during transshipment from Bombay. It was added that instructions have since been issued that workshops should insist on bonded delivery with the customs so that packages are opened only in the workshop premises.

Another electronic gear testing machine imported at a cost of Rs.43.17 lakhs was received in workshop 'H' in August 1986 and installed in November 1986. It was not put to use till August 1987 due to certain defects. The utilisation of the machine during 1986-1989 ranged from zero to fourteen per cent, the average being 6 per cent. The workshop authorities stated (October 1990) that though the utilisation was low, it had provided the workshop additional advantage and technological facilities to meet its capability.

(iv) Copy Milling Machine

A copy milling machine (cost: Rs.19.77 lakhs) required for manufacture of armament and automatic components needed for overhaul of special weapons in workshop 'F', was received in July 1989 but installed and commissioned in March 1990, but developed defects in July 1990 and rectified in November 1990. In the meantime, the workshop was asked (October 1990) by TGEME to transfer the machine to workshop 'H', which was considered to be the viable load centre for the establishment of forging and foundry arisings. The machine was not yet (June 1991) transferred to that workshop.

(v) Wheel arborator, three welding machines and a imported gear grinding machine

Mention was made in paragraph 31, 32 and 11 of the Report of the Comptroller and Auditor General of India, Union Government (Defence Services) for the year ended March 1989 and March 1990 respectively about non-utilisation of a wheel arborator (cost: Rs.5.41 lakhs) procured in January 1986 for workshop 'H' and its subsequent transfer

(September 1987) to workshop 'G'; three welding machine (total cost: Rs.3.88 lakhs) procured between December 1985 - February 1986 meant for workshops 'D', 'E' and 'G'; and an imported gear grinding machine (cost: Rs.46.06 lakhs) procured in April 1986 for workshop 'H'. In the Action Taken Note to the Audit Reports, the Ministry stated (June 1991) that the wheel arborator procured initially for workshop 'H' could not be optimally utilised in that workshop, hence it was asked to be shifted to workshop 'G', which was entrusted with an important defence project and the machine could not be immediately installed in that workshop either due to ongoing civil works related to the project. As regards welding machines, the Ministry stated (April 1991) that since actual workload available at the time of receipt of the machines was not commensurate with the capabilities of the machines, the aim of gainfully utilising the machines elsewhere necessitated the transfer of the machines to other stations and the machines would be brought back to the nominated workshops once adequate expertise was developed and work load was available. With regard to gear grinding machine, the Ministry stated (October 1990) that Army HQ was exploring the possibilities of obtaining some job for the machine from the Public Sector Undertaking.

During subsequent audit of the concerned workshops it was observed that the wheel arborator transferred to workshop 'G' in September 1987 was installed only in March 1991, after a lapse of 3 1/2 years. The welding machines were yet to be brought back to the nominated workshops (June 1991).

9.5 Non-utilisation of plants and machines (other than Modernisation Scheme)

It was noticed that a number of plants and machinery procured for the workshops (other than those procured under the Modernisation Scheme) were also not put to any use/negligible use as detailed below:

Workshop 'A'

9.5.1 Two milling universal machines alongwith accessories costing Rs.4.55 lakh procured in December 1984 were held in the workshop till August/September 1986 without any use and transferred to workshop 'H' in December 1986/ March 1987.

9.5.2 Capstan 6 1/2 inch centre, costing Rs.2.08 lakhs was procured in April 1983. The machine was not put to any use till June 1985. Thereafter, it was put to use only to the extent of 27 per cent of available machine hours by December 1985; 33 per cent by June 1986 and was held without further utilisation till June 1987 when it was finally transferred to workshop 'B'.

9.5.3 A thread rolling machine costing Rs.1.55 lakhs was held with negligible use in the workshop between June 1976 and November 1987 when it was transferred to workshop 'H'. The machine was not put to any use in workshop 'H' during 1988-89. However, the machine was put to limited use in that workshop in 1990 having been under repair for considerable period coupled with non-availability of work load.

9.5.4 Welding machine (submerged) procured in October 1985 for Rs.1.30 lakhs by the workshop was held without any use till December 1989 when it was eventually transferred to an Armoured Troops Workshop.

9.5.5 Another welding equipment procured in March 1989 at Rs.0.27 lakh was held in the workshop without any use till February 1990 and transferred to a field workshop.

9.5.6 A hydraulic dynamometer was imported costing Rs.11.38 lakhs (DM 135437) in December 1989. The machine could not be commissioned due to corrosion on the main electronic panel and load cell conditioner panel. The defective parts were intended (January 1991) to be sent to the principal manufacturer abroad for rectification, which was yet to be carried out (June 1991).

9.5.7 Another imported dynamometer procured in January 1991 at Rs.10.88 lakhs (DM 114140) was installed but was yet to be commissioned (June 1991).

9.5.8 Universal tools and cutter grinder costing Rs.0.63 lakh was procured in December 1982 and installed in June 1983 in the workshop. However, the machine was not put to any use till June 1991 even after a lapse of 8 years.

Workshop 'B'

9.5.9 In January 1985, the workshop projected the need for procurement of a computer controlled horizontal machining equipment anticipating large number of critical

repairs of guns and manufacture of high precision spares for guns. In February 1989, the DGS&D placed an order for supply of the machine at Rs.55.40 lakhs. The machine was received in November 1989 and installed in February 1990 but was not put to use till June 1991. The reasons attributed for non-utilisation of the machine were that it required heavy power input, which could not be provided and inability to develop requisite tooling and machinery programme for its exploitation.

Workshop 'C'

9.5.10 Eight machines such as Honing, Lathe centre, Forge coal burning, Boring machine, Lathe wood turning, Drill Bench, procured and installed between November 1989 and March 1990 at a total cost of Rs.5.69 lakhs in the workshop were not put to any use as yet (June 1991).

Workshop 'D'

9.5.11 Three lathes and one each pneumatic hammer, slotting, sheering and milling machine valued at Rs.15.20 lakhs were received in the workshop during January 1984 - April 1988. These machines were, however, put to use from 1990 only. The reasons for the delay in putting the machines to use were non-availability of material and trained staff for handling them. In the meantime, the repair programmes in the workshop were carried without the aid of these machines.

9.5.12 Two power presses of 50 tonne capacity (cost: Rs.2.81 lakhs), one press of 160 tonne capacity (cost: Rs.6.75 lakhs), Two presses of 80 tonne capacity (cost: Rs.7.24 lakhs) and one press 315 tonne capacity (cost: Rs.14.12 lakhs) were received in the workshop in October 1987, November 1988, December 1989 and January 1991 respectively. The two 50 tonne presses were installed in 1988, one 160 tonne press and one 80 tonne press were installed in 1990. The remaining two presses viz., one 80 tonne and 315 tonne were still (April 1991) lying at the Railway sidings due to breakage of transport trolley. The presses installed were put to very limited use.

9.5.13 Two machines viz. vertical, spindle surface grinder (cost: Rs.5.69 lakhs) were received and installed during 1983. The machines could not be put to use for want of safety device, manufacture of which was stated to have been discontinued by the manufacturer. Consequently, the

grinder machine had been held in the workshop without any use since 1983.

9.5.14 Three degreaser trichloroethylene plant costing Rs.1.50 lakhs were received in the workshop in February 1990, in bad shape and without operating manual. The plants were yet (April 1991) to be installed/commissioned due to dispute regarding erection and commissioning of the equipment.

Workshop 'E'

9.5.15 Based on Army Headquarters indent of February 1987 on the DGSD, a welding equipment costing Rs.1.10 lakhs was received in April 1988 in the workshop. The equipment was, required to establish facilities for heavy duty fabrication load. The equipment was, yet to be used (June 1991). The fabrication commitment entrusted to this workshop was since shifted to ^{another} workshop in 1991.

9.5.16 An Automatic Digital Printed Circuit Board Test System AFIT 3500 base system imported at a cost of \$1132640 (Rs.137.05 lakhs) was received in COD Agra in February 1985. On receipt, a package containing the control unit of the system was found damaged. The firm disowned (December 1986) responsibility stating that the cause of the damage was defective packing at the time of reshipment at the port of entry in India. The damaged control unit was replaced in August 1987 at a cost of \$37638 (Rs.4.55 lakhs). On receipt in the COD Agra, the data general mini computer model of the control unit was found damaged. However, the equipment along with a unit in damaged condition was issued to this workshop in June 1989. Since then the equipment (total cost 141.60 lakhs) was lying in damaged condition in the workshop.

9.5.17 Two cutter grinders costing Rs.0.60 lakh each were received in the workshop in November 1982 and September 1983 in damaged condition as well as deficient of vital spares and accessories. The grinders could not be installed/commissioned by the supplier due to lock out of their plant. Ultimately, the machine was downgraded as BER and a loss statement has since been initiated in July 1990 for Rs.1.06 lakhs by the workshop authorities.

9.5.18 A degreasing trichloroethylene plant costing Rs.0.21 lakh was received in the workshop in July 1979 in damaged condition. Despite protracted correspondence with

the firm, the plant was not repaired till June 1991. In June 1986 the machine was downgraded as beyond economical repair and a loss statement for Rs.0.19 lakh was prepared in June 1989 which was yet to be regularised.

9.5.19 In December 1984, the workshop received a manufacturing work order from COD Delhi Cantt. for manufacture of 6237 sliding glass windows for fitment in certain vehicles. The work order was ultimately cancelled (July 1989) by the COD due to drastic fall in requirement owing to phasing out the vehicles from services. By the time, the workshop had already spent 7431 manhours costing Rs.0.82 lakh on the job relating to tooling. Stores worth Rs.20.39 lakhs were also procured during December 1985-January 1989 against the job. As these spares were rendered surplus, they were transferred in October 1989 to workshop 'D'. In order to complete the above manufacturing work order the COD Chheoki despatched an indented quantity of 1,30,000 metres of welding electrodes costing Rs.2.52 lakhs to the workshop in July 1987. The electrodes were also found unserviceable due to defects.

Workshop 'F'

9.5.20 A wheel arbator swing table valued at Rs.7.99 lakhs received in the workshop in January 1986 was installed and commissioned in July 1991, after a lapse of over five years due to delay in completion of connected civil works. In the meantime, the requirement of the workshop continued to be met under the existing arrangement.

9.5.21 200 ton hydraulic press (costing Rs.2.18 lakh) required for fabrication of Loading Passer Trucle (LPT) Cabe in February 1980 was received in the workshop in February 1990 and could be commissioned only in October 1990. By that time, the fabrication commitment itself was met by the workshop. The workshop authorities, however, stated (January 1991) that the press would be utilised in future commitments like fabrication of water trailers in the workshop. The ordnance supplies required for the fabrication of water trailers are not likely to materialise before 1992-93.

9.5.22 An Ultrasonic flaw detector (cost Rs.0.39 lakh) required in May 1983 for detection of cracks and establishing reliability of components being manufactured in the workshop was received only in May 1990. Further, the flaw detector could not be commissioned as yet (January 1991)

for want of certain accessories. It was noticed that the required accessories were neither included in the supply order placed by the DGEME at the time of procurement of the machine nor was it provided for separately by the workshop.

Workshop 'G'

9.5.23 A salt bath furnace costing Rs.1.84 lakhs was received in the workshop in February 1987. It could not be commissioned till May 1988 due to certain technical flaws. The defective furnace was replaced by the supplier and installed in September 1988. During inspection in April 1990 it was observed that the time taken to reach a temperature of 1230 c was about 7 hours as against the requirement of 2 1/2 hours. Further, the thermocouples were also found corroded. Though the defects were rectified by the supplier in April 1991, the machine was yet (May 1991) to be inspected by the authorities concerned. Thus, the furnace received in February 1987 and replaced during September 1988 further rectified in April 1991 was not put to any use till May 1991.

9.5.24 Four universal tools and cutter grinders (costing Rs.1.04 lakhs) were received in the workshop during 1983-84 in defective condition. Despite repeated requests to rectify the defects, the supplier did not rectify. The TGEME suggested (September 1989) that the machines be repaired locally or a Court of Inquiry be instituted to look into the defective procurement. In the meantime, one of the grinders was transferred (April 1989) to workshop 'B'. It was enquired (May 1991) in audit whether the machines were since repaired and put to use but no reply from the workshop authorities was received as yet (June 1991).

9.5.25 A Demagnetizer was imported from abroad in August 1987 at a cost of Rs.4.55 lakhs for this workshop. The machine was not put to any use in 1987 and 1988. The machine was put to use during 1989 in the workshop. The equipment was stated to be under repairable condition since March 1990.

9.5.26 A 1.5 ton Fork lift, costing Rs.4.24 lakhs was received in the workshop in September 1987 and installed/commissioned in October 1987. According to the workshop's Report on utilisation of the machine rendered to TGEME, it was put to some use in 1988 and 1990, whereas the log book of the machine indicated that it was off road during May

1989 to March 1991.

9.5.27 A 10 tonne crane costing Rs.8.8 lakhs was installed in the workshop in December 1986. The crane was expected to be utilised after re-alignment of the existing railway line to the machine shop. The work of re-alignment was entrusted to the Railways in August 1987 and an advance payment of Rs.5.10 lakhs was made to them. The work had not commenced till February 1991 as no final decision to go ahead with the work had been taken in view of the prohibitive cost (Rs.20 lakhs). **The crane remained uninstalled since 1986 (June 1991).**

9.5.28 A press (1.6 tonne capacity) required for fabrication/body building of Nissan ambulance/RCL Jonga was contracted with M/s Uniter Engineers Corporations, New Delhi in December 1986 with delivery schedule by July 1987. It was received in the workshop in December 1988 at Rs.8.23 lakhs. By that time, the fabrication/body-building commitments had been completed. The workshop authorities had intimated TGEME in September 1988 well before its receipt that the machine was no longer required as the specific commitment had been completed and it may be transferred (January 1989) to some other workshop. **While the press was transferred to workshop 'B', it was observed from their records that the press was not at all required there also. It was ultimately transferred in January 1991 to an Ordnance Factory.**

9.5.29 In September 1985, a supply order was placed by Department of Defence Production and Supplies on a private firm for purchase of five dynamometer hydraulic together with spares at Rs.9.41 lakhs each. Two of them were for this workshop and the other three for workshop 'A'. In April 1986, the workshop intimated TGEME that the design of the dynamometers was highly defect prone and not adaptable to latest panel technology. As application of micro processor base control was not possible in them, the panels were not required by them. However, it was decided by Army HQ that these should be received by the workshop to avoid contractual obligations. Both were received in the workshop, one in February 1989 and the other in April 1989. In August 1989, TGEME, issued instructions to transfer one of them to workshop 'A'. The other was installed in workshop 'G' in November 1989. **It was evident that their initial procurement was not necessary.**

9.5.30 An indent was placed in August 1982 for procure-

ment of a hydraulic press (200 tonne capacity) required for reclamation of AFV wheels. The contract for procurement was, concluded five year later in July 1987 at a cost of Rs.2.18 lakhs including spares with delivery schedule as January 1988. The machine was found to be defective during inspection (September 1988) in the premises of the supplier. Accordingly, the delivery period was extended upto July 1989. In the meantime, an imported hydraulic press (cost:Rs.11.96 lakhs) was also received in the workshop in November 1987 against a contract placed in 1984 on a foreign firm. The imported press was commissioned in November 1987. The workshop intimated TGEME in May 1989 that the press indigenously manufactured would be surplus to requirement. TGEME insisted (May 1989) that the press should be received in the workshop as it was procured against their firm demand. The press which was received in the workshop in February 1990 remained unutilised (June 1991). It was also observed that the imported press was also not put to optimum use since receipt.

Workshop 'H'

9.5.31 An indent on the DGSD was placed in April 1986 for procurement of a press brake (200 tonne). The DGSD concluded a contract in February 1987 for procurement of the press at Rs.8.23 lakhs. The machine was scheduled for delivery by August 1987. However, the machine was supplied by February 1990. Due to delay in commencement of civil works (cost:Rs.0.06 lakh) for its installation the machine could not be commissioned till April 1991. The workshop authority stated in April 1991 that there were complications in allotment of funds for the civil works.

10. Body-building/fabrication work

10.1 Interesting cases of body-building/fabrication work observed are dealt below:

Workshop 'A'

10.1.1 Machinery workshop lorries

As per the body building programme for the period from April 1988 to March 1993 formulated by HQ TGEME, 246 machinery workshop lorries were to be fabricated on Shaktiman chassis (cost: Rs.2.95 lakhs each) and fitted with a lathe, a drilling machine, a grinding machine and 3 refacing (WET) benches. The fabrication work and the fitment

was entrusted to Workshop 'F'.

Fabrication of 122 lorries were completed by the end of March 1988 leaving a balance of 124. In the meantime workshop 'F' was entrusted with another commitment and the fabrication work off-loaded to workshop 'A' in April 1988. As per the production schedule, 30 lorries were to be completed by 1988-89, 47 in 1989-90 and another 47 during 1990-91. Workshop 'A' could complete fabrication work of 27 lorries by March 1989. The programme was again rescheduled (December 1989) for completion of 70 lorries in 1989-90 and balance 27 during 1990-91. In January 1990, the requirement for the machinery workshop lorries was revised to 78 against the earlier requirement of 124. At that stage, the workshop pointed out to TGEME that complete fabrication materials/procurement action for the entire quantity of 124 lorries had already been taken and it would not be prudent to reduce the requirement which might lead to audit objection. Consequently, status-quo ante was restored.

Workshop 'A' completed fabrication of 75 lorries during 1989-90 and 5 in 1990-91. Thus, in all 107 lorries were completed during the three years (1988-89 to 1990-91). It was, however, observed that fitments required to make them workshop lorries were not completed while lathes - were fitted in all the 107 vehicles, drilling benches could be fitted only in 5 vehicles and refacing (WET) benches in only 54 of them as the required benches were not made available by the ordnance.

The lorries with part fitment were sent in batches between July 1989 and November 1990 to the concerned CVD. Subsequent to handing over the incomplete machinery lorries to the CVD, the workshop received (January/February 1990) 124 plant welding cutting sets required to be fitted in the lorries. Consequently, the workshop informed (March 1991) the CVD to collect the stores and make further "disposal" at their end.

In reply to an audit query as to how the lorries without fitment of machineries required could be issued to CVD, the workshop stated (April 1991) that whatever fitments available were fitted and non-availability certificate issued in respect of those which could not be fitted and CVD may be asked to furnish the reasons for collecting the incomplete vehicles. It was verified from the CVD that all the incomplete workshop lorries were

held by them without issue (April 1991). The cost of 107 chassis alone worked out to Rs.3.16 crores. The value of manhours booked by the workshop was not available although the estimated manhours amounted to Rs.10.70 lakhs. The Ministry stated that they have no comment to offer.

Workshop 'F'

10.1.2 Diesel servicing lorries

Fabrication of Diesel servicing lorries on Shaktiman chassis (DSL) was allotted to the workshop in April 1988. A proto-type was fabricated in 1984-85. In June 1989, TGEME transferred this commitment to workshop 'D' although workshop 'D' did not have the requisite drawings, necessary material estimates, jobbing proformae, sources of supply of items of modification kit as also tools, jigs, fixture etc to take up the work. Thereafter workshop 'F' was instructed by TGEME to transfer all materials/stores to workshop 'D'. On this workshop 'F' requested (December 1989) that the commitment might be retained with them in order to utilise their surplus capacity as also since drawings jigs and fixtures were available with them. Accordingly, the fabrication commitment of DSL was retained with workshop 'F'. As per the re-scheduled programme, six lorries were to be completed by January 1991, six by February 1991 and another three by March 1991. The workshop could, however, complete fabrication of only eight lorries by end of March 1991. Fabricating the balance seven lorries could not be undertaken as the ordnance could not make available seven chassis. Further, it was observed that though fabrication work of eight lorries had been completed by March 1991, the lorries could not be made functional for want of FIP test benches for fitment in them. It was also observed that ten such lorries fabricated earlier by the workshop could not also be fitted with the FIP test benches and remained non-functional. The workshop authorities stated (January 1991) that fabrication of the DSLs without FIP test benches was undertaken in under instructions from TGEME. The fact, however, remained that 18 DSLs (cost:Rs.70 lakhs) fabricated upto March 1991 were lying idle with the VSD/workshop, pending fitment of the FIP test benches (June 1991). The value of manhours utilised was not available.

10.1.3 Conversion of trailers

Three hundred General Services 1 Tonne two wheeled

trailers were required to be converted into 1000 litre water trailers by the workshop during 1990-91. In early 1990, a team deputed by the workshop to COD, confirmed the suitability of the trailers for conversion into water trailers. Accordingly, 144 GS trailers were stock moved from COD Agra to VSD, Meerut for feeding them to the workshop. In August 1990, another technical team deputed by Ordnance Directorate Army HQ to inspect them observed that the trailers were unserviceable. The workshop accepted only six GS trailers, rejecting the remaining 138 trailers as unsuitable for conversion. Moreover, the workshop expressed its inability to progress the work for want of requisite material support being made available by the ordnance. The fact, however, remained that the fabrication programme was formulated by the EME and undertaken without necessary material support resulting in shifting and holding of the trailers in the VSDs. The Ministry stated that they have no comments to offer.

11. Civil engineering works

Workshop 'F' procured in July 1988/June 1989 an electrical and hydraulic system costing Rs.18.69 lakhs for washing of hulls during overhaul of a sophisticated gun. The requisite civil works for construction of washing chamber had not been completed so far (June 1991). The plant has not therefore been installed/commissioned (June 1991). In the meantime, washing of the hulls was carried out manually.

The workshop was carrying out the engine repairs in a building situated at a considerable distance from the workshop. As the arrangement was adversely affecting the engine overhaul capacity of the workshop buildings for new engine repair shop was constructed within the workshop itself in June 1989 at a cost of Rs.81.20 lakhs. However, the engine repair shop was yet to be shifted to the new buildings (June 1991).

12. Other interesting points

12.1 Consumption of manhours in excess of yardsticks

Yardsticks in standard unit of 100 manhours are laid down by Government for carrying out overhaul/repairs of 'A' and 'B' vehicles and engineering equipment. In certain cases of imported vehicles and equipments, the yardsticks prescribed by the suppliers are adopted.

It was, however, observed that in Workshop 'G', the actual man hours employed on repair of 'A' and 'B' vehicles and engineer equipments were far in excess of the prescribed yardsticks. Such excess varied between 15 and 1240 per cent as tabulated in Appendix 'F':

The cost of manhours deployed in excess of the prescribed yardsticks during the years 1987-88 to 1990-91 worked out as under:

Year	No. of hours involved (in SUs)	Cost per SU	Total Cost
		(Rs. in lakhs)	
1987-88	342	900.58	3.08
1988-89	244	959.02	2.34
1989-90	1638	1028.08	16.84
1990-91	3232	1082.92	35.00
		Total	57.26

12.2 Duplication of work due to injudicious planning

Workshop 'G' was entrusted with overhaul and unification of certain 'A' vehicles to the latest version. During the year 1987-88, 16 'A' vehicles were overhauled without carrying out the required unification due to non-availability of spares, testing facility and required technology. These vehicles were re-stripped for carrying out the unification work within 6 months. This led to duplication of work, involving 74112 manhours valued at Rs.7.40 lakhs.

12.3 Loss of production manhours due to power failure

12.3.1 Workshop 'D' receives power supply from the State Electricity Board. As the power supply was erratic and intermittent, a case was initiated in August 1980 by the workshop to install a standby generating set with prime mover set of capacity 300 KVA with panels at a cost of Rs.6.50 lakhs exclusively for the workshop which was considered to be the minimum requirement to run the essential machinery to obviate further loss of manhours and scheduled output. HQ central command accorded sanction in May 1987 after a lapse of over six years for provision of the generating set at an estimated cost of Rs.17.27 lakhs

The work was started only in 1989-90 and the genera-

ting set commissioned in July 1990.

In the meantime, the workshop suffered a loss of 20,19,780 productive manhours due to power failure involving Rs.85.77 lakhs.

12.3.2 In workshop 'E', the total productive manhours lost due to power failure during 1987-88 to 1990-91 worked out to 1,28,843, valuing Rs.15.20 lakhs. In workshop 'F' the total productive manhours lost during the same period on account of power failure was 2,30,187 costing Rs.19.11 lakhs.

12.3.3 It was observed in audit that a committee, appointed in 1983 by the Government to conduct a study on the capacities and other allied aspect of functioning of the baseworkshops observed in its report (January 1986) that there were frequent failures in power supply, which disrupted the repair line causing substantial production losses and had recommended installation of captive generators in all base workshops.

The Ministry stated (March 1992) that loss of production manhours due to power failure was basically beyond the control of the workshops. However, captive power plants have now been installed in seven workshops.

12.4 Non-accounting of items reclaimed from equipments and vehicles declared as Beyond Economical Repairs (BER)

Ordnance Service Technical Instructions No 20 lays down that the stores retrieved and reclaimed from beyond economical repair equipment and vehicles, etc. are earmarked for cannibalisation for utilisation in the repair and overhaul commitments. These stores reclaimed by the Base Workshops have to be sent to Ordnance Depots on a certified receipt voucher for accounting purposes.

It was observed that stores retrieved and reclaimed from the BER 'A' vehicles and engines in workshop 'E' and 'G', though stated (January 1991) to have been used in the repair commitment undertaken by them were not at all accounted for.

In reply to Audit, Workshop 'G' stated (April 1991) that the Base workshops are governed only by their own procedure (in which such accounting is not catered for).

Workshop 'E' indicated (January 1991) that the records would be maintained in future.

According to the TGEME's estimated figures, the value of components reclaimed by the base workshops from the BER vehicles and equipment were Rs.6.38 crores in 1988-89; Rs.8.66 crores in 1989-90 and Rs.9.38 crores in 1990-91. These had neither been accounted for nor were there any document available at the workshops indicating this position.

The Ministry stated (March 1992) that efforts are being made to ensure compliance with the laid down regulations regarding documentations of retrieval of stores from vehicles/equipment declared BER.

12.5 Detention of vehicles/equipments after completion of overhaul/repair

Workshops 'A' and 'G' were entrusted, among others, with the overhaul/repair of 'A' vehicles. A comparative study of detention of vehicles in the workshops after completion of overhaul/repair revealed that while there was hardly any delay in despatching the completed vehicles in workshop 'G', the delays in workshop 'A' ranged upto 3 months in respect of 57 vehicles; 3-6 months - 109 vehicles and beyond 6 months-33 vehicles during the years 1987-91. Workshop 'A' authorities stated (May 1991) that no time frame has been laid down for the collection of completed vehicle.

The Ministry stated (March 1992) that necessary remedial actions is being taken after scrutiny by TGEME.

12.6 Rectification of rejects

Repaired/overhauled transport and equipment are subjected to inspection by works Inspector (WI) (internal inspector). All defects notified by the 'WI' are rectified by the workshop and subjected to final inspection by the Resident Inspector (RI) who also belongs to the EME. On clearance by the WI/RI, they are sent to the concerned ordnance depot.

In Workshop 'H' rectification of rejected items accounted for 53,286 manhours in 1987-88; 56056 manhours in 1988-89; 94513 manhours in 1989-90 and 58398 manhours in 1990-91. The total cost of rectification incurred on

manhours alone during the four years worked out to Rs.26.21 lakhs.

In reply to audit, the workshop authorities stated (April 1991) that the rejection occurred during shop floor processing of fabrication work partly owing to variation in chassis and dimensions and also inexperienced work force engaged on the job.

Similarly, in Workshop 'D', rectification of rejected items accounted for 38794 manhours in 1987-88; 34356 in 1988-89; 55583 in 1989-90 and 44360 in 1990-91, involving Rs.13.31 lakhs. The Workshop authorities stated that the defects were detected in the final stage necessitating rectification of the rejects.

The Ministry stated (March 1992) that this aspect is closely monitored by TGEME though no compromise in quality is permitted. The percentages were within acceptable norms. The norms laid down could not however be explained.

12.7 Premature failure of overhauled engines

Mention was made in paragraph 8 and paragraph 18 of the Report of the Comptroller and Auditor General of India, Union Government (Defence Services) for the year ended 31st March 1982 and 31st March 1989 (No.12 of 1990) respectively about the premature failure of 'A' vehicle engines. In reply, the Ministry stated that improved technology measures for ensuring enhanced reliability of the overhauled engines would be taken.

It was, however, observed that there were premature failures of overhauled engines of 'A' and 'B' vehicle (other than those mentioned in the aforesaid CAG's reports) in workshop 'C' and 'G' as indicated below which had been passed by the EME inspectors.

Type of engine	Name of workshop	Year				Total
		1987-88	1988-89	1989-90	1990-91	
'A' vehicle	'G'	13	36	33	25	107
'B' vehicle	'C'	45	40	19	13	117
	'G'	7	8	2	4	21

The cost of overhaul of the engines failed prematurely could not be worked out as the workshops did not follow low cost accounting system. However, a total of 106840 manhours were spent on the overhaul of the engines, involving Rs.10.68 lakhs on the basis of an average rate of Rs.10 per manhour.



NEW DELHI
Dated the **16 APR 1992**

(A.K. MENON)
Additional Deputy Comptroller and Auditor General

Countersigned



NEW DELHI
Dated the **16 APR 1992**

(C.G. SOMIAH)
Comptroller and Auditor General of India

Appendix-A

T=Target, O=Output, S=Shortfall

(Refer to paragraph 6.2)

Name of Army Base work-shop	Nature of equip-ment	1987-88		1988-89		1989-90		1990-91	
		T	<u>O</u> S	T	<u>O</u> S	T	<u>O</u> S	T	<u>O</u> S
'A'	'A'Vehi- cle O/H	91	62 29	80	84 -	90	53 37	80	11 69
	'A'Vehicle engine O/H	406	402 4	450	338 112	355	246 109	485	135 350
	'B'Vehicle engine O/H	250	257 -	300	278 22	513	385 128	510	436 74
	Body Building fabrica- tion	124	100 24	64	51 13	70	75 -	170	83 87
	Small Arms	700	703 -	1000	694 306	1000	973 27	2750	1339 1411
'B'	OH of Guns	271	219 52	264	223 41	269	229 40	334	249 85
	OH of Pistols/ rifles	10230	10965 -	12015	13715 -	19060	3068 15992	21220	16275 4945
	OH of Mortar/ Grenade	115	100 15	130	74 56	60	25 35	450	195 255
	Boat Assaut	37	28 9	-	13 -	-	- -	82	5 77
	Boat storm	30	3 27	-	1 -	-	2 -	-	- -
	Life Jacket	-	- -	76	35 41	160	50 100	-	- -

'C'	'A'	Vehicle	-	2	Relates to target of 1986-87					
				-						
	'B'	Vehi-	50	3	65	20	157	60	100	51
		cle O/H		47		45		97		49
	'B'	Vehi-	400	306	400	298	400	369	200	155
		cle engine		94		102		31		45
		O/H								
	Body		300	342	370	370	100	100	-	-
	Building			-		-		-		-
	Major	Assly.								
		(Mobile								
		Engg.								
	equip-	ment	18	10	10	5	12	1	76	7
				8		5		11		69
	Mobile	Engg.	98	59	71	53	72	39	70	19
	eqpt.	OH		39		18		33		51
	Upgrada-	tion of								
	CL IV		5	-	6	-	3	-	-	-
	'B'	Vehicle		5		6		3		-

'D'	'B'	Vehicle								
	Engine	O/H	2500	2039	2600	2215	2385	1770	1922	1214
				461		385		615		708
	'B'	Vehicle								
	Trailer		884	54	619	105	664	207	664	112
				830		514		457		552
	'B'	Vehicle								
	Body	Building								
	modifi-	cation	471	437	541	455	536	213	193	18
				34		86		323		175
	Bridge	repair								
	Prog-	ramme	115	11	123	60	150	90	150	43
		Fabrication		104		63		60		107

(Bus/ Coach)	-	-	25	16	25	9	-	-
				9		16		
Tractor (5070 Ton)	-	-	22	1	100	2	-	-
				21		98		
Gen. set charging	-	-	327	151	2127	809	-	-
				176		1318		

'E' Class 'A' repairs

Radio	1350	1268	1487	1555	1852	1741	1692	1677
		82		-		111		15
Line	1777	1342	1184	1219	1361	1357	1004	1094
		435		-		4		-
Generating sets charging	971	251	355	348	309	284	175	141
		720		7		25		34
Radar	30	28	29	28	33	33	28	27
		2		1		-		1

Class 'B' repairs

Electro- nics	-	-	-	-	81068	14528	2936	2015
						66540		921
Radar	-	-	-	-	2393	962	2651	874
						1431		1777
General	-	-	-	-	8799	3093	155	255
						5706		-
Instru- ment	-	-	-	-	25503	7261	1366	691
						18242		675

'F' 'A' Vehi- cle O/H	13	13	30	14	58	19	87	29
		-		16		39		58
'B' Vehi- cle O/H	62	62	124	90	108	96	358	57
		-		34		12		301
Fabrication work (BRL 4000S/Man; DSL ONS/Man)	-	-	-	-	-	-	49	42
		-		-		-		7

Conversion of GS

Trailers into

water	-	-	-	-	-	-	300	30
trailer	-	-	-	-	-	-		270

'G'	'A'Vehi-	111	37	190	108	211	149	196	112
	cle O/H		74		82		62		84
	'A'Vehi-	361	174	246	195	155	143	95	125
	cle engine		187		51		12		-
	O/H								
	'B'Vehi-	165	42	150	68	115	72	35	7
	cle O/H		123		82		43		28
	'B'Vehi-	275	60	100	75	97	72	100	22
	cle Eng.O/H		215		25		25		78
	Engg.								
	Eqpt.O/H								
	Maj								
	Assembly								
	Class	159	41	819	48	137	73	688	114
	'A'stores		118		771		64		574
	Class 'B'								
	stores								
	('A' & 'B' 4016	5381	1604	772	3753	1952	2451	2255	
	vehicles	-		832		180		196	
	Upgrada-								
	tion of								
	'B' vehi	20	1	12	5	-	-	1	2
	cles		19		7		-		-
	Small	1020	609	1010	1128	1533	1481	2110	2125
	Arms		411		-		52		-

'H' Fabrication/
Body Building

(a)Truck

1 ton 1000

ltrs.	188	96	174	60	140	52	233	233
Nissan		92		114		88		-

(b)Lorry									
3 ton 3000									
ltrs.	203	203	-	-	-	-	-	36	-
S/Man		-							36
(c)Car									
250 Kg	140	-	354	192	246	162	350	101	
Jonga		140		162		84		249	
(d)Ambulance									
(Nissan)	-	-	-	-	100	76	100	100	
		-				24			-
(e)St.Wagon	-	-	-	-	-	-	57	21	
Jonga		-						36	
(f)Manu-									
facture	3633	613	4365	682	4457	1062	4396	855	
of spares		3020		3683		3395		3541	

Appendix-B

(Refer to Paragraph 7.2)

Name of workshop	Year	Gross manhours available	Manhours not available	Net manhours available	Production manhours	Indirect manhours
'A'	1987-88	4022897	1107073	2915824	1385564	1530260
	1988-89	4553862	1286162	3267700	1591179	1676521
	1989-90	4615779	1216641	3399138	1656327	1742811
	1990-91	4078689	1084845	2993846	1416220	1577624
'B'	1987-88	3325213	1084716	2240497	1009965	1230532
	1988-89	3441382	1083430	2357952	1064828	1293124
	1989-90	3366415	861880	2504535	1203755	1300780
	1990-91	3025752	907260	2118492	1053081	1065411
'C'	1987-88	1170243	138338	1031905	476649	555256
	1988-89	1429000	270782	1158218	569083	589135
	1989-90	1561868	217725	1344143	679323	664820
	1990-91	1288943	328372	960571	471937	488634
'D'	1987-88	2977293	563883	2413410	1104460	1308950
	1988-89	3674748	967281	2707467	1371287	1336180
	1989-90	3885721	1030191	2855530	1251384	1604146
	1990-91	3480862	1084179	2396683	947236	1399447
'E'	1987-88	2824373	695272	2129101	984775	1144326
	1988-89	3098663	827240	2271423	1107516	1163907
	1989-90	3096064	749918	2346146	1167856	1178290
	1990-91	2890638	763830	2126808	1044015	1082793

'F'	1987-88	3428775	995967	2432808	925489	1507319
	1988-89	3890851	1266792	2624059	1091240	1532819
	1989-90	4020964	921238	3099726	1280264	1819462
	1990-91	3498989	963376	2535613	989658	1545955
'G'	1987-88	4207390	1345669	2861721	1262856	1598865
	1988-89	4723983	1727180	2996803	1348054	1648749
	1989-90	5029708	1307777	3721931	1750147	1971784
	1990-91	4608498	1218930	3389568	1380973	2008595
'H'	1987-88	2571739	568875	2002864	766568	1236296
	1988-89	2586088	588943	1997145	791024	1206121
	1989-90	2785483	612083	2173399	873324	1300075
	1990-91	2494133	590767	1903383	765607	1137776

Appendix-C

(Refer to paragraph 7.4)

Name of workshop	<u>Value of Total manhours booked in excess of authorisation</u>					Total Cost (Rs.in lakhs)
	1987-88	1988-89	1989-90	1990-91		
'A'	342723	420928	339643	309894	1413188	146.24
'B'	452926	429567	221918	332367	1436778	106.89
'C'	-	-	-	83473	83473	6.59
'D'	-	269079	291334	422815	983228	81.61
'E'	158641	238494	161666	214609	773410	91.25
'F'	344500	527530	157255	298568	1327853	110.21
'G'	546265	829623	352132	343315	2071335	201.77
'H'	80245	97586	82841	116882	377554	37.75

					Total	782.31

Appendix-D

(Refer to paragraph 7.4)

Name of workshop	Value of total manhours booked towards overtime				Total	Cost (Rs.in lakhs)
	1987-88	1988-89	1989-90	1990-91		
'A'	273855	318098	326006	144203	1062162	09.40
'B'	-	397633	379354	79495	856482	71.09
'C'	-	-	-	12123	12123	0.96
'D'	-	334299	327230	-	661529	54.90
'E'	235615	135877	161906	39794	673192	67.64
'F'	158837	287783	323043	26945	796608	66.12
'G'	139370	281884	439324	331	860909	84.74
'H'	195000	178572	163152	63758	600482	58.83
Total						513.68

Appendix-E

(Refer to paragraph 7.5)

Name of workshop	<u>Value of total manhours booked in excess of authorisation</u>					Total Cost (Rs.in lakhs)
	1987-88	1988-89	1989-90	1990-91		
'A'	116985	53518	53357	133080	356940	37.12
'B'	200368	206999	72950	-	480317	34.40
'C'	69074	8670	-	7258	85002	6.72
'D'	182401	-	327734	382266	892401	69.09
'E'	189855	34241	-	17895	191991	22.65
'F'	563320	419754	513593	536504	2033571	166.75
'G'	310752	273734	186635	600003	1371124	138.36
'H'	454397	399277	425004	356857	1635535	221.48
					Total	696.57

Appendix 'F'

(Refer to paragraph 12.1.2)

Year	Nature of vehicles/equipment	Nos. repaired	Yardsticks specified (in SUs)	Manhours (SUs) required as per yardsticks	Actual manhours (in SUs) deployed	Excess	Percentage of excess
1987-88	Crawler Tractors	37	32	1184	1526	342	29
1988-89	Armoured Personnel Carrier (APC)	33	30	990	1234	244	25
1989-90	Tanks	125	58.3	7898	9223	1325	17
	Tanks Engines	111	5.5				
	Crawler Tractors	21	32	965	1278	313	32
	"	11	21.75				
	" (upgradation)	2	26.75				
1990-91	Tanks	111	58.3	7021	9593	2572	37
	Tanks Engines	100	5.5				
	APC	1	30	30	402	372	1240
	Crawler Tractors	16	32	653	750	97	15
	"	4	21.75				
	" (upgraded)	2	26.75				
	<u>Kraz</u>			187	378	191	103
	214 B	5	28				
	255 B	2	23.25				

