- 5-2 Effect of CWS on Truck/Bus life of revenue earning
- 5-2-1 Effects of Curtailment of Foreign Currencies by extension of vehicle life.
 - (A) The amount of vehicles to be replenished by BRTC and time to purchase them are presumed under condition that CWS is in full-operation, also,
 - (B) same presumption is made under condition that BRTC has no workshop like CWS.

Under these conditions in (A) and (B) aforementioned, the total funds (Nos. of Bus/truck to be purchased x price of them) required for purchase at respective time were worked out referring Table 5-7.

In order to estimate the effect of curtailment of foreign currency, these total funds under condition of (A) and (B) are adjusted as present value in 1981 when CWS will start its operation.

Thus, the comparison table can be prepared utilizing following formula.

 $X = \Sigma x$ $x = \frac{N \times Bp}{(1 + r)^n}$

n: Year of purchase, 1981 shall be starting year to purchase thereafter.

N: No. of buses purchased

Bp: Price of bus/truck
 (Assumed C&F price =
 300,000 Taka)

X: Present value in 1981

r = Interest (forward rate)

Note 1: In view of the balance with the number of vehicles in the starting year of (A), 970 vehicles are added to (B).

Note 2: CWS operating expenses are presumed to be TK 840 lakh per year.

(B) _n	N N	0.1 lakh x	(A) _n	N	0.1 lal	(W)	Operating expenses
1	375	10,305	9	375	5,175		8,064
4		7,987	17	11	2,598		7,056
7	11	6,075	10	455	5,733		6,468
10	TI.	4,725	18	11	2,866	26	5,964
13	11	3,600	11	600	6,966	8400 (1+0.09)	5,376
-16	Ħ	2,812	19	11	3,420	n=1	4,956
18	n	2,362	8	970	14,550		4,536
2	455	11,466	16	11	7,275	ļ	4,200
5	71	8,736		, 			3,864
8	tt	6,825					3,528
11	11	5,282					3,192
14	11	4,081					2,940
17	11	3,152					2,688
20	11	2,429					2,436
6	1570	28,071					2,268
9	11	21,666					2,100
12	11	16,485					1,932
15		12,717					1,764
18	11 	9,891				<u> </u>	1,596
21	11	7,536					1,428
0	11	47,100					
3	"	36,361					
		05.066.4.18	akh			asa alak	 h
	XB	= 25,966.4 ¹⁸			$x_A = $	4,858.3 ^{1ak}	1 alcli

 $W = 7,635.6^{lakh}$

As seen from the above calculations, obvious effects are produced. Therefore, as mentioned later on, after operation is executed effectively, and extension of vehicle, reclamation of parts, partial domestic production of parts, etc. are realized, more than 2,400 vehicles can be placed under service, and it is still possible to curtail huge amount of foreign currencies.

5-2-2 Possibility of Vehicle Replenishment Utirizing the Profit to be Obtained through Separate Investment

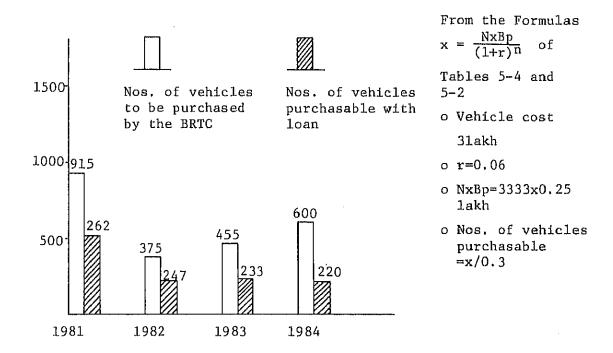
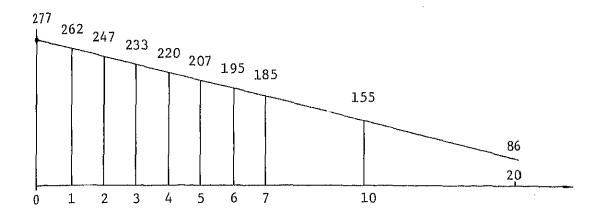


Table 5-8

Suppose an amount of TK 3333 Lakh (\(\frac{\fir}{\frac

In order to work out the number of vehicles possible to purchase by said profit, the formula mentioned in 5-2-1 can be applied. In this formula; x: No. of vehicles possible to purchase.



N x Bp = 3333 lakh TK x $\frac{25}{100}$ = 833.25 lakh
TAKA of profit/year

(1 + r) = 1 + 0.06 = 1.06 (commodity price up)

n: year of purchase

vehicle price: supposed as 3 lakh TAKA (=\frac{4}{4},500,000)

Table 5-9

According to this calculation, it is clear that by only profit, the purchase of necessary amount of vehicles (average 800 units/year in case there is not like CWS) is impossible.

It is natural that maintenance/repair works always accompany the skill and know-how, and intellecturize those who working in this field in addition to get longer vehicle life, saving energy and saving foreign currency.

5-3 Effective Operating Means in the Future
As a mission of CWS having the function to reclaim parts,
although its scale is not large, therefore, if, as an emergency
measure, the rehabilitation of parts is pushed forward very
possitively, stabilized vehicle operation and curtailment
forein currencies are possible. In order to attain such purpose,
capable advisers should be utilized throughout all the stages
including the planning stage, after the stage where the operation gets on the right track, if the adjustable layouts of the
departments, the firmly-established documents flow system and
the inspection system are used effectively, and further, if

technics are familialized with, such as portfolio administration to pursue rationalization, it is certain that, with the cooperation of Government and private organs concerned, possitive rehabilitation and DOMESTIC production of parts can be realized, thus making BRTC able to continue a smooth operation of vehicles and diffuse such technics to other industries in Bangladesh, and at the same time, to cut down foreign currencies.

When the percentage of the wages, parts cost, depreciation cost, interest, etc. in the production cost are looked at, covering 15-year period, the following table 5-10 is obtained.

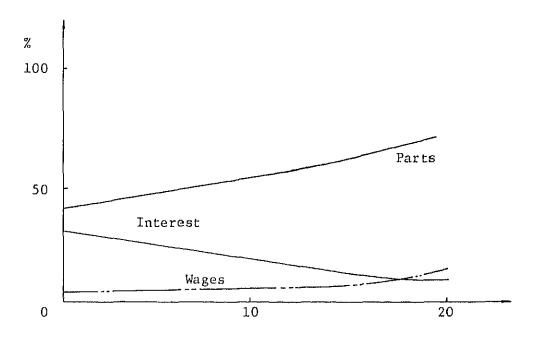


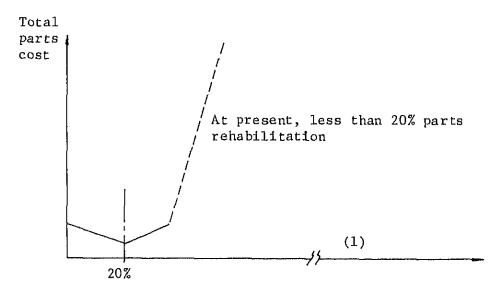
Table 5-10

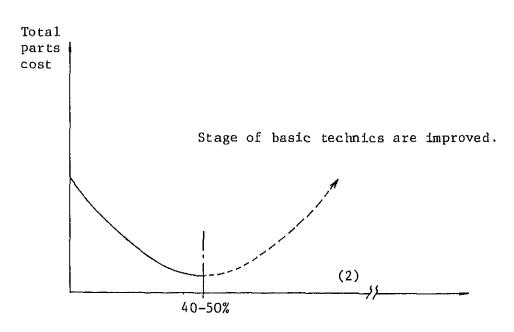
The percentage of wages is very low, 3.5% during the 1st half period and 4.5% during the 2nd half period only.

As for interest and depreciation, a 35% ratio during the 1st half period is 41% and 57% during the 2nd half period.

From the above description, the importance of the meaning of parts rehabilitation can be known, however, to perfect the parts rehabilitation function alone is not a wise policy.

If too much input is made for parts rehabilitation in the early days after the commencement of operation, securance of sufficient number of buses in operation and their reclamation which is original objective of CWS will become difficult. In order to attain a full-scale parts rehabilitation objective, the enhancement of Bangladesh basic industrial technics is essential under coordination with national and private mechanical factories. Therefore, go through the below-mentioned three steps is desirable. (Table 5-11)





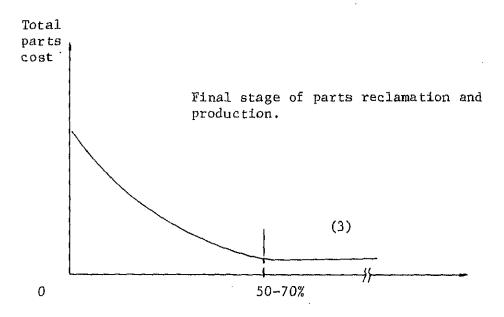


Table 5-11

5-4 Effects on National Economy

Since buses and trucks are the main transport means in Bangla-desh in the aspect of industry and life, the effects of the establishment of CWS on the industries are very great because buses and trucks transport industrial consumption materials and human resources, resulting one of the prime activities in the economical improvement of Bangladesh.

At the Training Institute, where on-the-job training is conducted mainly (the whole institute and CWS have practical learning function), and trainees are upbrought as men of capability, in other words, "accumulation of fualified human resorces" is done; while at the CWS, its organizational setup is so arranged that it emphasizes good human nature of advance and improvement, as a result, a very favorable environment and atmosphere is created, showing an example of a modern factory to the industrial area near Joydepor.

Thus, it is convinced that this CWS combined with Training Institute will become the foundation for the industrial development of Bangladesh.

Description is here made further in detail of what was mentioned above.

To implant the custom of systemized maintenance and the securance of continued vehicle operation due to extension of vehicle life. By the establishment of vehicle maintenance facilities and Training Institute, capable people can offer necessary maintenance, resulting coninous, stabilized operation of vehicles for long years.

In the past, there has been no periodical vehicle inspection system is Bangladesh, which is regulated by law in Japan, consequently, there are many troubles in the opration of vehicles and accidents even now. These obstacles can be avoided by the establishment of CWS.

2. Curtailment of Foreign Currencies by the extension of Vehicles Life and Extended Effects on the National Economy

As described in detail in the Paragraph 5-2-1, profitable operation can be executed for 15 to 20 years after the commencement of CWS operation, and at the same time, foreign currencies can be curtailed in an amount of several folds more than the invested amount of capital.

In addition, rehabilitated vehicles will increase rapidly in number, thus BRTC contributing immensely to the people's transportation.

To express straightforwardly, "the queues of vehicles waiting repair/maintenance in Depots will be changed into the queues of rehabilitated vehicles."

3. Utilization of Training Institute Graduates and Their Prospects

The trainees at the Training Institute, who receive training of thoroughly on the job basis, by the full utilization of facilities of both T.1 and CWS will, after their graduation, not only utilize their aquired skills and abilities fully at CWS and Depots, but also apply their heavy maintenance

skills sufficiently to the fields of agricultural, vessel and construction machinery, thus, contribute greatly on the improvement of maintenance technics and the progress of the economy of Bangladesh people.

4. Improvement of Basic Industrial Technics

The industrial level of Bangladesh is low, the ratio being occupied by the industrial product in the GNP was merely 6% in 1976, especially, the industrial foundation is very weak. Therefore, if integrated factories like CWS can operate orderly under fixed normae and targets. Those factories are possible to implant in their employees the systems, methods and procedures of modern basic industry through the works.

At the same time, the management power in which the profitability occupies in big percentage, will upbrought through the reclamation of vehicles, rehabilitation of parts and even production of local parts.

5. Acceleration of Employment

Thanks to the establishment of CWS, a large number of people will be employed, a significant matter in Bangladesh where many people are being unemployed.

More than 1,000 people are expected to be employed by CWS against approx. 200 employees being employed at existing WS. The works of CWS by modern facilities and absorption of highly qualified labor will be expected to affect much over other enterprises in the aspect of economy and technical matters. This extended influence can not be overlooked.

As mentioned above, the effects to be extended over the national economy and the life of the people are very significant.

In view of such contribution to be made, this project may be said to have great meaning.

6. COST ESTIMATION

AUJ	AUTOMOBILE REPAIR & MAINTENANCE WORKSHOP (TOTAL COST)	& MAINTENANCE	WORKSHOP (TOTA)	. cost)	
	Phase-I	Phase-II	Phase-Ⅲ	Total (Thous and-Yen)	Remark
Building Work	2,063,073 (US\$11,335,565)	313,849 (US\$1,724,445)	286,281 (US\$1,572,972)	2,663,203 (US\$14,632,982)	
Electrical Installation Work	328,080 (US\$1,802,637)	25,938 (US\$142,516)	16,828 (US\$92,461)	370,846 (US\$2,037,614)	
Cooling & Ventilating Installation Work	24,354 (US\$133,813)		5,348 (US\$29,384)	29,702 (US\$163,197)	
Plumbing Installation Work	199,848 (US\$1,098,065)	26,879 (US\$147,687)	18,674 (US\$102,604)	245,401 (US\$1,348,355)	
Crane Installation Work	36,854 (US\$202,494)			3 6, 854 (US\$202,494)	
Furniture	84,068 (US\$461,912)	2,839 (US\$15,598)	2,255 (US\$12,390)	89,162 (US\$489,900)	
Machine	1,603,356 (US\$8,809,648)	,603,356 245,639 ,809,648)(US\$1,349,664)	127,426 (US\$700,142)	1,976,421 (US\$10,859,454)	
Grand Total	4,339,633 615,144 456,812 (US\$23,844,134)(US\$3,379,904)(US\$2,509,953)	615,144 (US\$3,379,904)		5,411,589 (US\$29,733,996)	
	1	:			

Exchange Rate: 1 U.S.\$ = 182 Japanese Yen

AUTOMOBILE REPAI	e repair & Mail	TENANCE WORKS	R & MAINTENANCE WORKSHOP (DIRECT CONSTRUCTION)	STRUCTION)	
	Phase-I	Phase-II	Phase-∭	Total (Thousand-Yen)	Remark
Building Work	1,216,435 (US\$6,683,708)	166,234 (US\$913,373)	144,295 (US\$792,829)	1,526,964 (US\$8,389,910)	
Blectrical Installation Work	193,444 (US\$1,062,879)	13,739 (US\$75,489)	8,482 (US\$46,604)	215,669 (US\$1,184,972)	
Cooling & Ventilating Installation Work	14,360 (US\$78,901)		2,697 (US\$14,818)	17,057 (US\$93,719)	
Plumbing Installation Work	117,835 (US\$647,445)	14,237 (US\$78,225)	9,413 (US\$51,719)	141,485 (US\$777,389)	
Crane Installation Work	21,730 (US\$119,395)			21,730 (US\$119,395)	
Furniture	49,569 (US\$272,357)	1,504 (US\$8,263)	1,137 (US\$6,247)	52,210 (US\$286,867)	
Machine	945,375 (US\$5,194,368)	130,106 (US\$714,868)	64,227 (US\$352,895)	1,139,708 (US\$6,262,131)	
Grand Total	2,558,748 (US\$14,059,053)	325,820 (US\$1,790,218)	230,251 (US\$1,265,112)	558,748 325,820 230,251 3,114,819 559,053)(US\$1,790,218)(US\$1,265,112) (US\$17,114,383)	

Phase - I	Building Work	Electrical Installation Work	Cooling & Ventilating Installation Work	Plumbing Installation Work	Plumbing Crane Installation Installation Work Work	Furniture	Machine	Total (Thousand-Yen)
1 General Office	94,994	7,308	736	4,900		17,180		125,118
2 Class Room	52,453	4,943		3,290		7,631		(88,317)
3 Dormitory	67,902	5,793	1,275	12,748		9,623		
4 Cafeteria	48,269	4,481	3,543	18,084		8,226		
5 Training Room	83,816	5,646		2,312	5,470		104,888	(US\$ 453,862) 202,132 (UC\$1 310,615)
6 Check Gate	6,876	1,432	30	1,650		1,433		(US\$1,110,UL) 11,421 (US\$ 62 752)
	4,056	626		1,681			22,158	
8 Heavy Repair Factory	372,778	15,303	1,532	14,748	13,760	3,313	405, 397	826,831 (US\$4,543,027)
9 Parts Storage	134,162	4,701	4,584	277		1,431	29,275	174,430 (US\$ 958,406)
10 Retreading and Metal Casting	131,107	6,161	975	9,034		732	274,675	422,684 (US\$2,322,439)
11 Car Washer	6,073			629			25,524	32,226 (US\$ 177,065)
12 Paint, Grease & Oil Storage	7,073	268						7,341 (US\$ 40,335)
13 Sub-Station	9,005	73,941						81,093 (118, 445,565)
14 Watchman Station	2,645							
15 Gas Station	1,756		!				7,669	\$sn)

Phase - I	Building Work	Electrical Installation Work	Cooling & Ventilating Installation Work	Plumbing Grane Installation Installation Furniture Work Work	Grane Installation Work	Furniture	Machine	Total (Thousand-Yen)
16 Exterior Work	149,378	30,580		39,015				229, 325
17 Spare Parts	1,632	3,416	1,001	1,225			40,349	(US\$1,260,027) 47,623
18 Supervisor (M)	45,460	5,100 9,183(M)	684 (M)	10,952(光)	2,500		35,440)	(US\$ 264,664) 109,319 (US\$ 600,653)
Sub-Total	1,216,435	193,444	14,360	117,835	21,730	49,569	945 , 375 (1	945,375 2,558,748 (US\$14,059,044)
Marine Transportation Expenses, Common Temporary Expenses, Preparatory Expenses, General Caretaking Expenses	729,861	116,066	8,616	70,701	13,038	29,741	567,225	1,535,248 (US\$8,435,428)
Contingencies	116,777	18,570	1,378	11,312	2,086	4,758	90,756	245,637 (US\$1,349,653)
Grand Total	2,063,073	328,080	24,354	199,848	36,854	84,068	1,603,356 (t	4,339,633 (US\$23,844,137)
						:		

Remarks: (M) - Miscellaneous Expenses

Phase - II	Building Work	Electrical Installation Work	Cooling & Ventilating Installation Work	Plumbing Crane Installation Installation Work Work	tion Furniture	Machine	Total (Thousand-Yen)
l Inspection Factory	38,856	3,405		1,617	679	22,005	65,562 (US\$ 360,230)
2 Periodical Repair Factory	115,699	8,080		6,697	825	80,035	211,336 (US\$1,161,186)
Exterior Work		1,600		1,429			3,029 (US\$ 16,642)
Spare Parts	279					13,426	13,705 (US\$ 75,302)
Supervisor	11,400	(T) 654		(T)4,494		14,640	31,188 (US\$ 171,362)
Sub-Total	166,234	13,739		14,237	1,504	130,106	325,820 (US\$1,784,722)
Marine Transportation Expenses, Common Temporary Expenses, Preparatory Expenses, General Caretaking	99,740	8,243		8,542	902	78,063	195,490 (US\$1,074,120)
Expenses Contingencies	47,875	3,956		4,100	433	37,470	93,834 (US\$ 515,571)
Grand Total	313,849	25,938		26,879	2,839	245,639	615,144 (US\$3,374,413)
		;					

Remarks: (M) Miscellaneous Expenses

(T) Tool

Phase - III	Building Work	Electrical Installation Work	Cooling & Ventilating Installation Work	Plumbing Crane Installation Installation Work Work	Crane Installation Work	Furniture	Machine	Total (Thousand-Yen)
Paint & Body Factory	137,335	7,169	2,558	4,924		1,137	50,411	203,534 (US\$1,118,318)
Exterior Work		910		224				1,134 (US\$ 6.230)
Spare Parts	300		10				4,056	4,366 (IIS\$ 73,989)
Supervisor (M)	6,600	(M) 403	(M) 128 ((T) 2,465			9,760	21,216 (US\$ 116,571)
Sub-Total	144,295	8,482	2,696	9,413		1,137	64,227	230,250 (US\$1,265,108)
Marine Transportation Expenses, Common Temporary Expenses, Preparatory Expenses, General Caretaking	86,577	5,089	1,619	5,647		682	38,536	138,148 (US\$ 759,054)
Contingencies	55,409	3,257	1,035	3,614		436	24,663	88,414 (US\$ 485,791)
Grand Total	286,281	16,828	5,348	18,674		2,255	127,426	456,812 (US\$2,509,953)

Remarks: (M) Miscellaneous Expenses (T) Tool

AUTOMOBILE REPAIR & MAINTENANCE WORKSHOP (DIRECT CONSTRUCTION)

			r					
Remark								17.3 %
Total (Thousand-Yen)	1,526,964 (442,118)	215,669 (16,164)	17,057 (1,170)	141,485 (27,496)	21,730 (1,950)	52,210 (0)	1,139,708 (49,400)	3,114,819 (538,298)
Phase-III	144,295 (28,840)	8,482 (1,150)	2,697 (122)	9,413 (1,408)		1,137 (0)	64,227 (8,400)	230,251 (39,920)
Phase-II	166,234 (32,456)	13,739 (1,854)		14,237 (2,645)	,	1,504 (0)	130,106 (10,800)	325,820 (47,755)
Phase-I	1,216,435 (380,822)	193,444 (13,160)	14,360 (1,048)	117,835 (23,443)	21,730 (1,950)	49,569 (00)	945,375 (30,200)	2,558,748 (450,623)
	Building Work	Electrical Installation Work	Cooling & Ventilating Installation Work	Plumbing Installation Work	Crane Installation Work	Furniture	Machine	Grand Total

Notes: Figures in () indicate local portion.

7.	CONSUMABLE	ARTICLE	ESTIMATION

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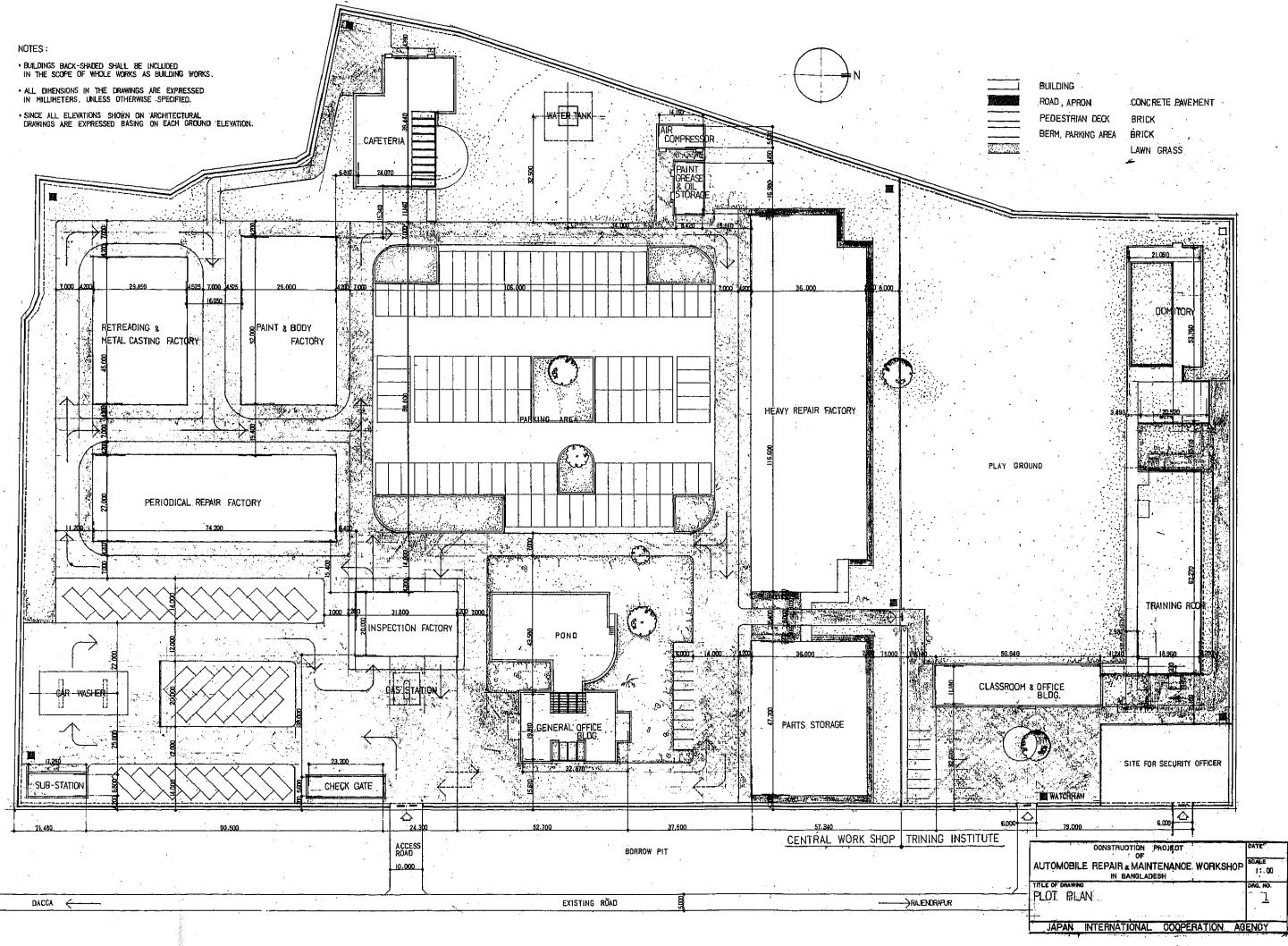
CHAPTER VII. CONSUMABLE ARTICLE ESTIMATION

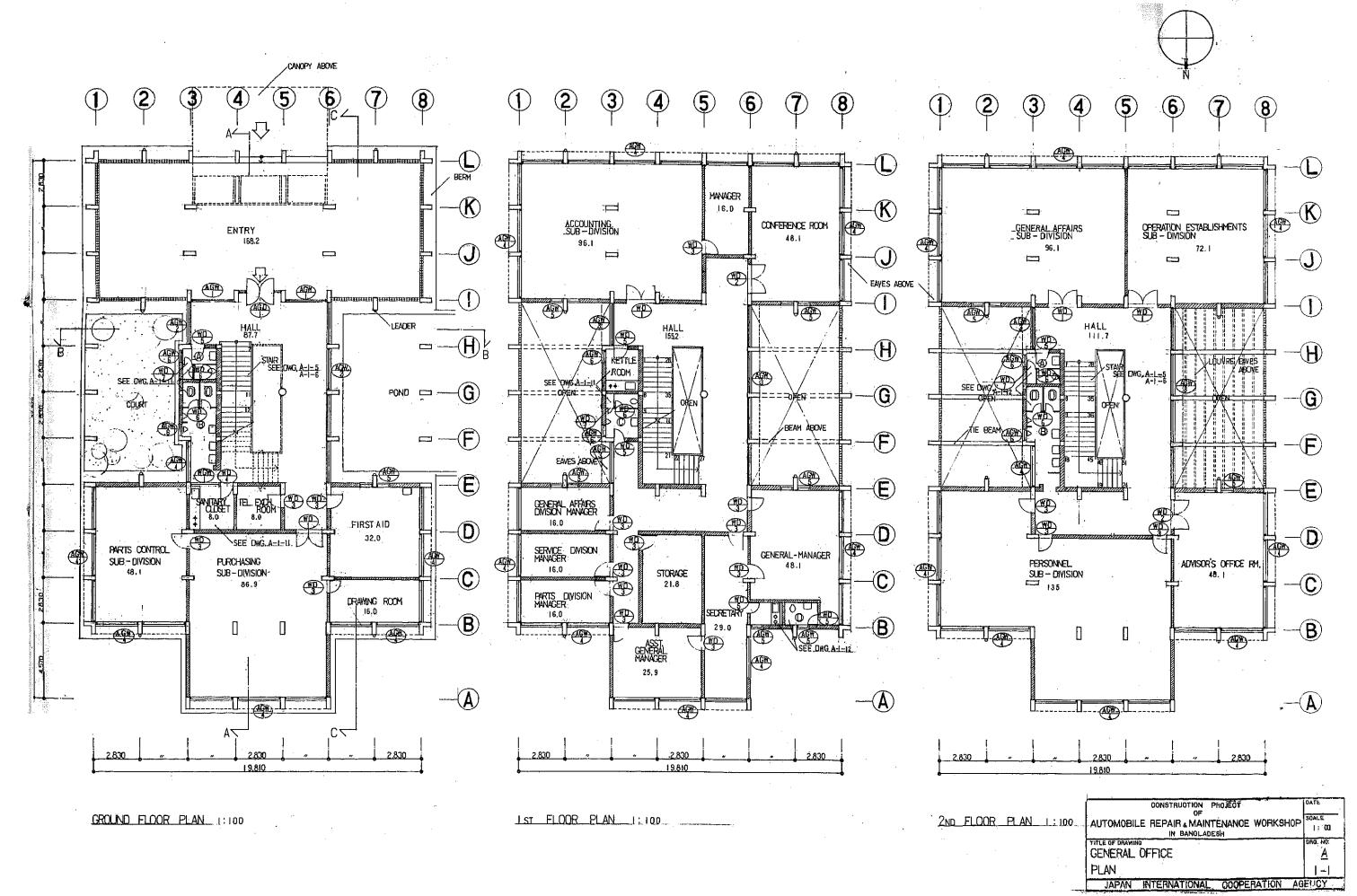
Cost Estimate for Principal Consumable for CWS and T/I

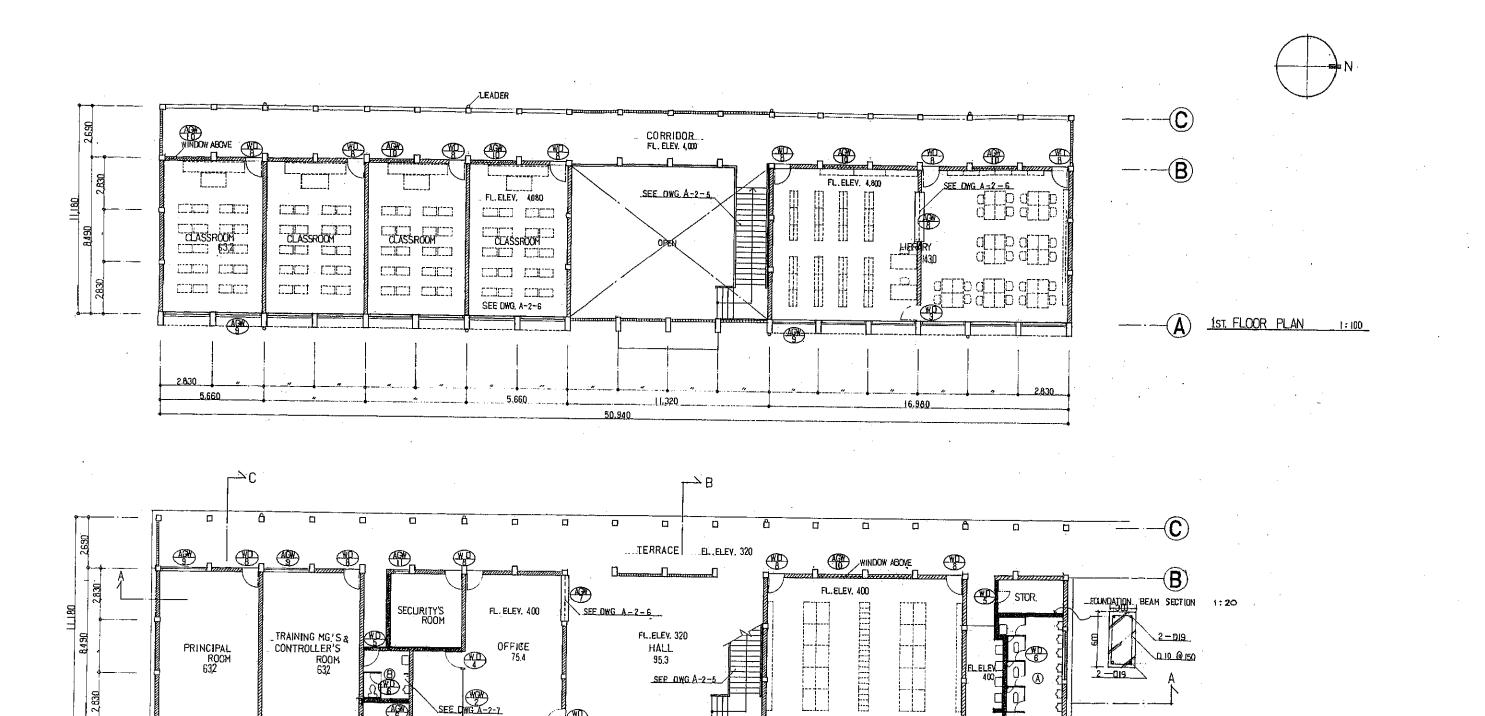
A cost estimate for consumable materials to be used for works in CWS and T/I has been prepared as follows. However, this cost estimate does not include the cost of stationaries to be used in office.

Item	Factory/Shop	Q'ty	Remarks
Water	All factories	200 ton/day	
	Others	105 ton/day	
	Total	305 ton/day	
Lubricant	Heavy Repair, Periodical Repair Shops	17,500 lit/month	
	Technical Institute	2,500 lit/month	
			Engine & Gear Oil
	Total	20,000 lit/month	
Grease	Heavy Repair Shop	90 lit/month	
	Periodical Repair Shop	250 lit/month	
	Body Shop	20 lit/month	
	Service Machinery maintenance	100 lit/month	•
	T/I	40 lit/month	
	Total	500 lit/month	
Fuel for Vehicle		32,000 lit/month	Refueling shall be done before release with 40 lit fuel
Compressed Air	30ps compressor w/400 lit tank	5	

Item	Factory/Shop	Q'ty	Remarks
Washing 0il	Heavy Repair & P/ Repair Shop	2,200 lit/month	
Fuel for bo	iler (Heavy Oil) (Retreading)	1,600 kg/day	
Electric Power	Service Factory including Training Factory		
Supply	220V Single Phase	460 kW	30% margin is included
-	400V 3 - Phase	215 kW	30% margin is included
	Tire Recapping Shop		
	Total	320 kWH	800 ^{kW} × 40 [%] D.f







2.830

CONSTRUCTION PROJECT	STAC
OF AUTOMOBILE REPAIR MAINTENANCE WORKSHOP IN BAMOLADESH	
CLASSROOM & OFFICE BLDG.	PRO. No.
PLAN	2-1
JAPAN INTERNATIONAL COOPERATION AC	ENOY

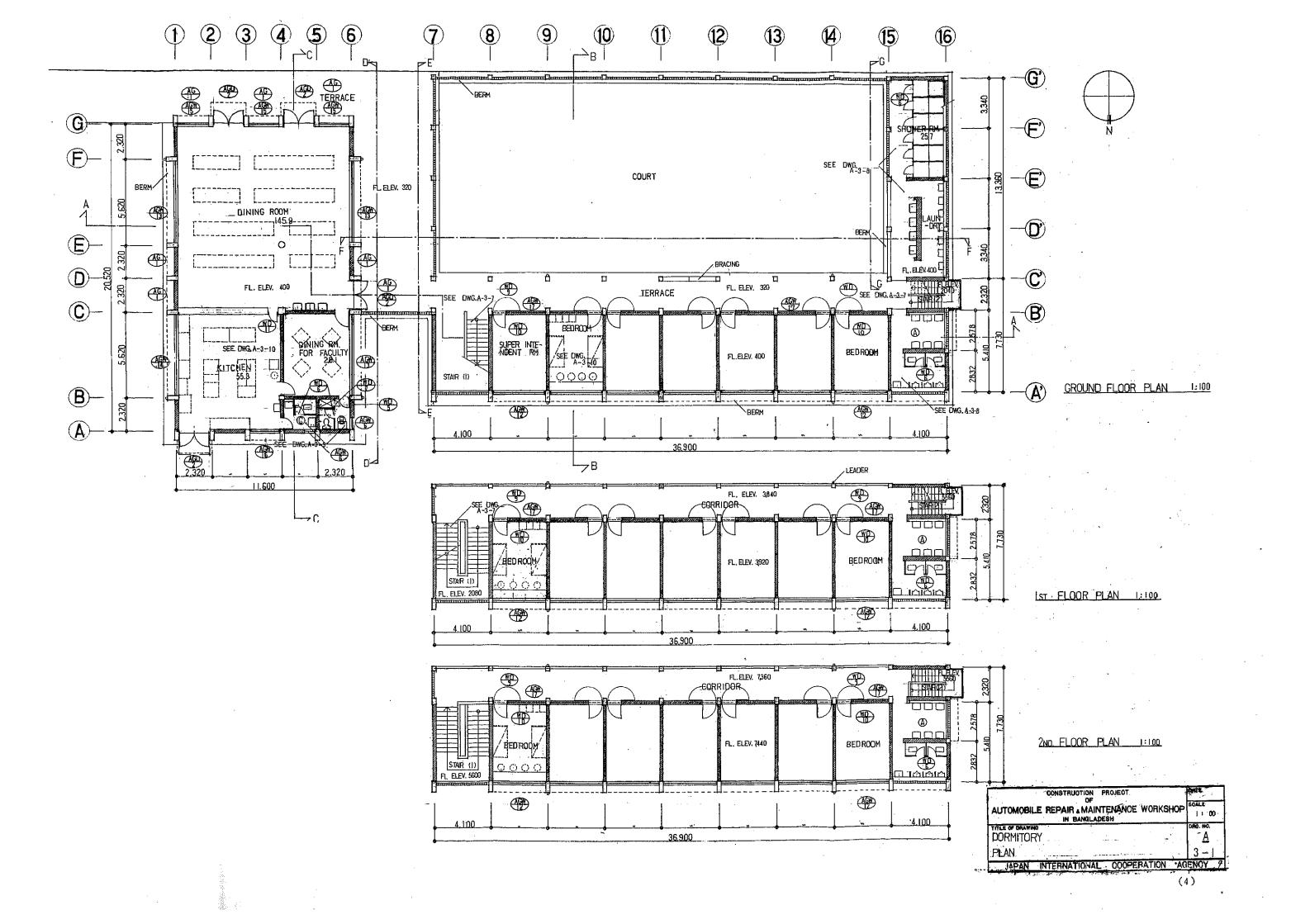
GROUND FLOOR PLAN

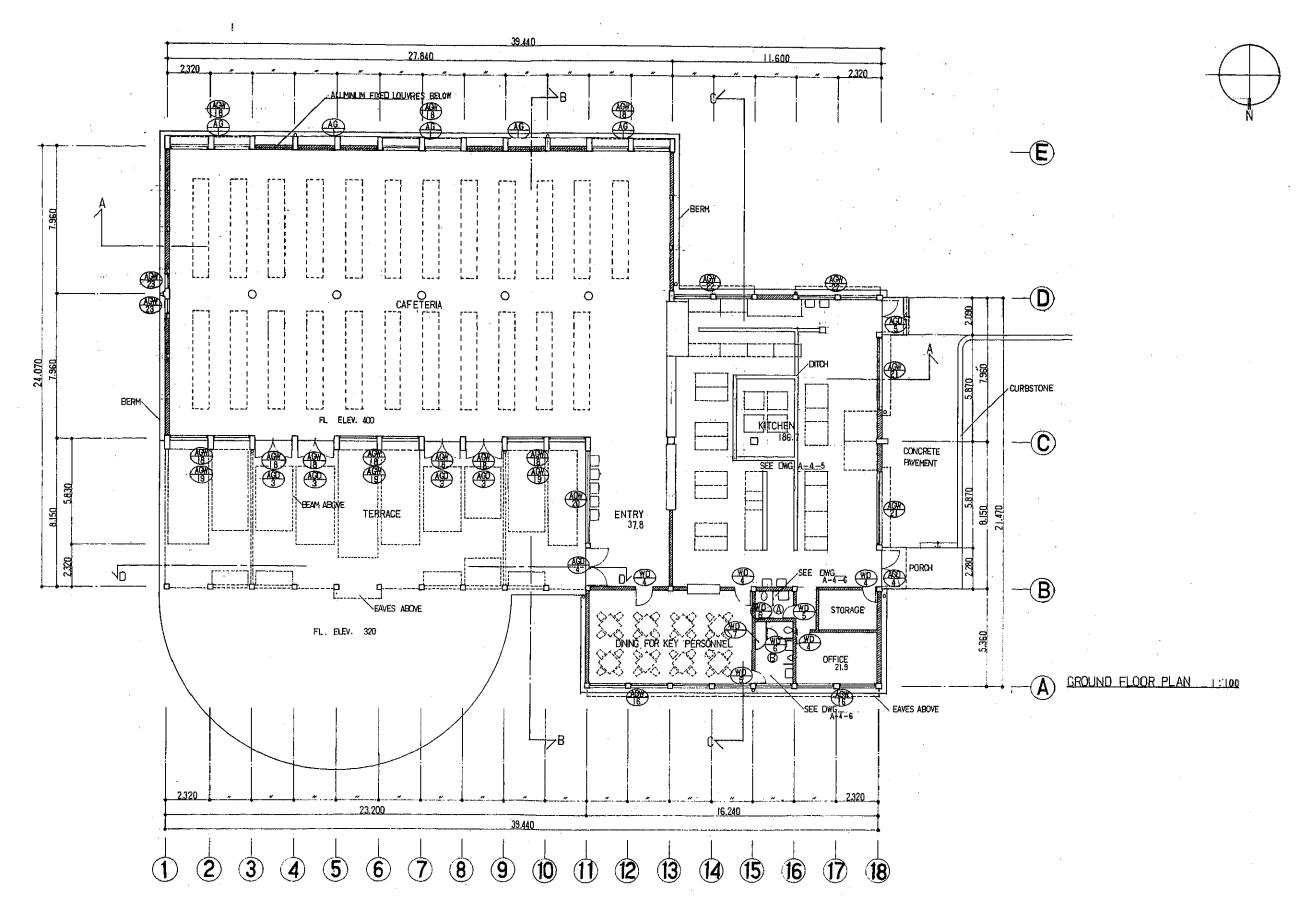
. TOTAL 1071,0

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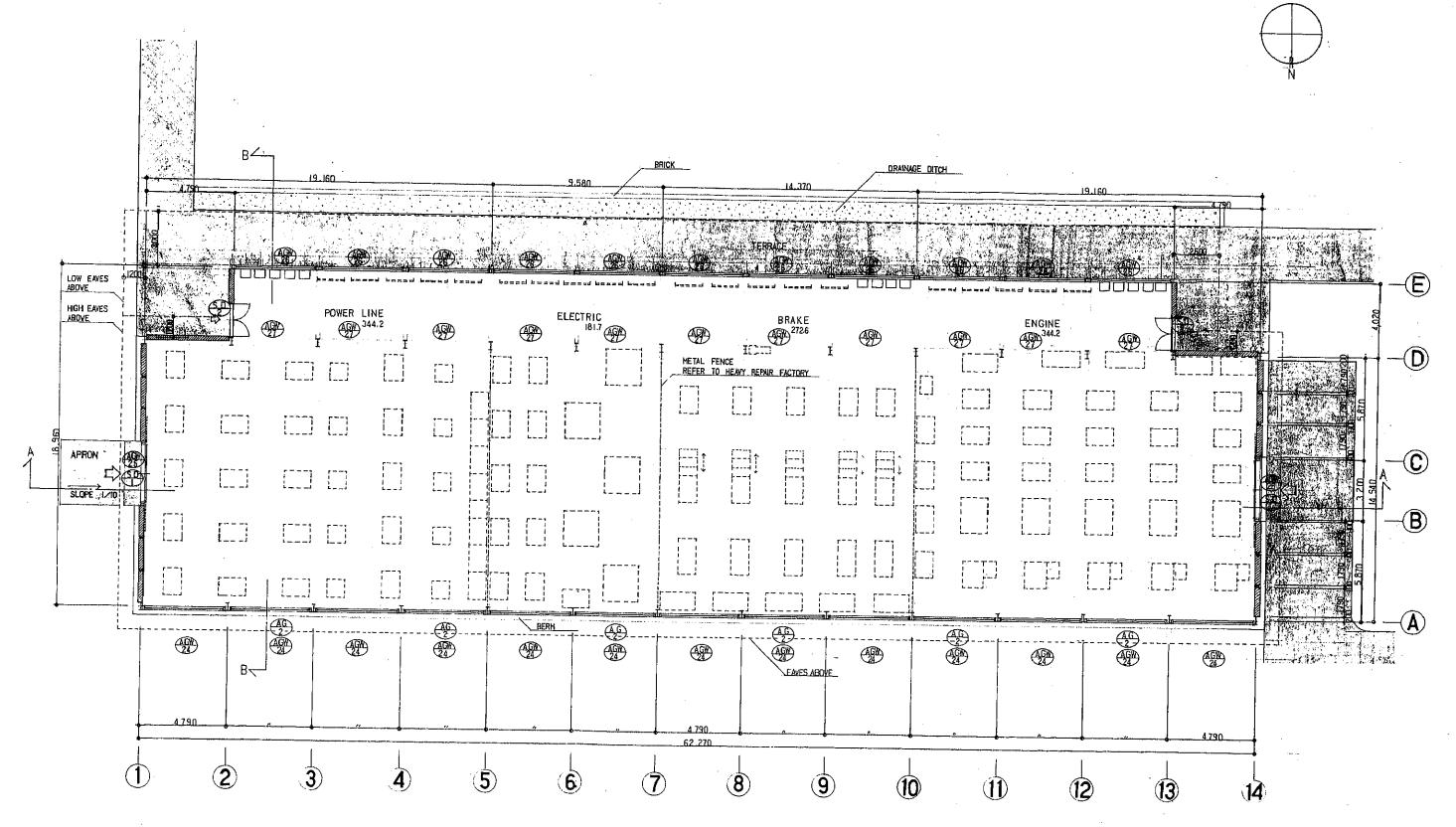
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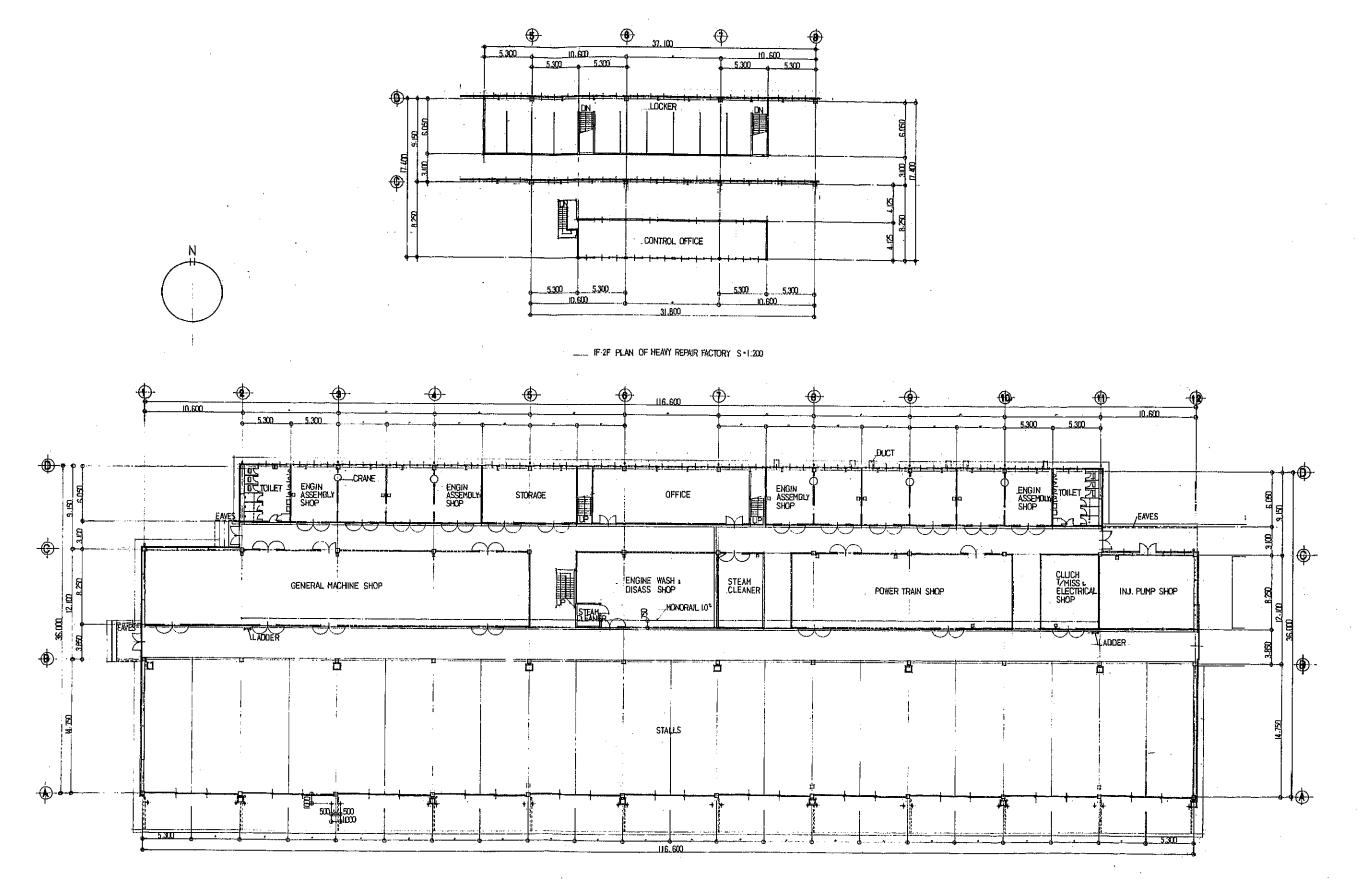
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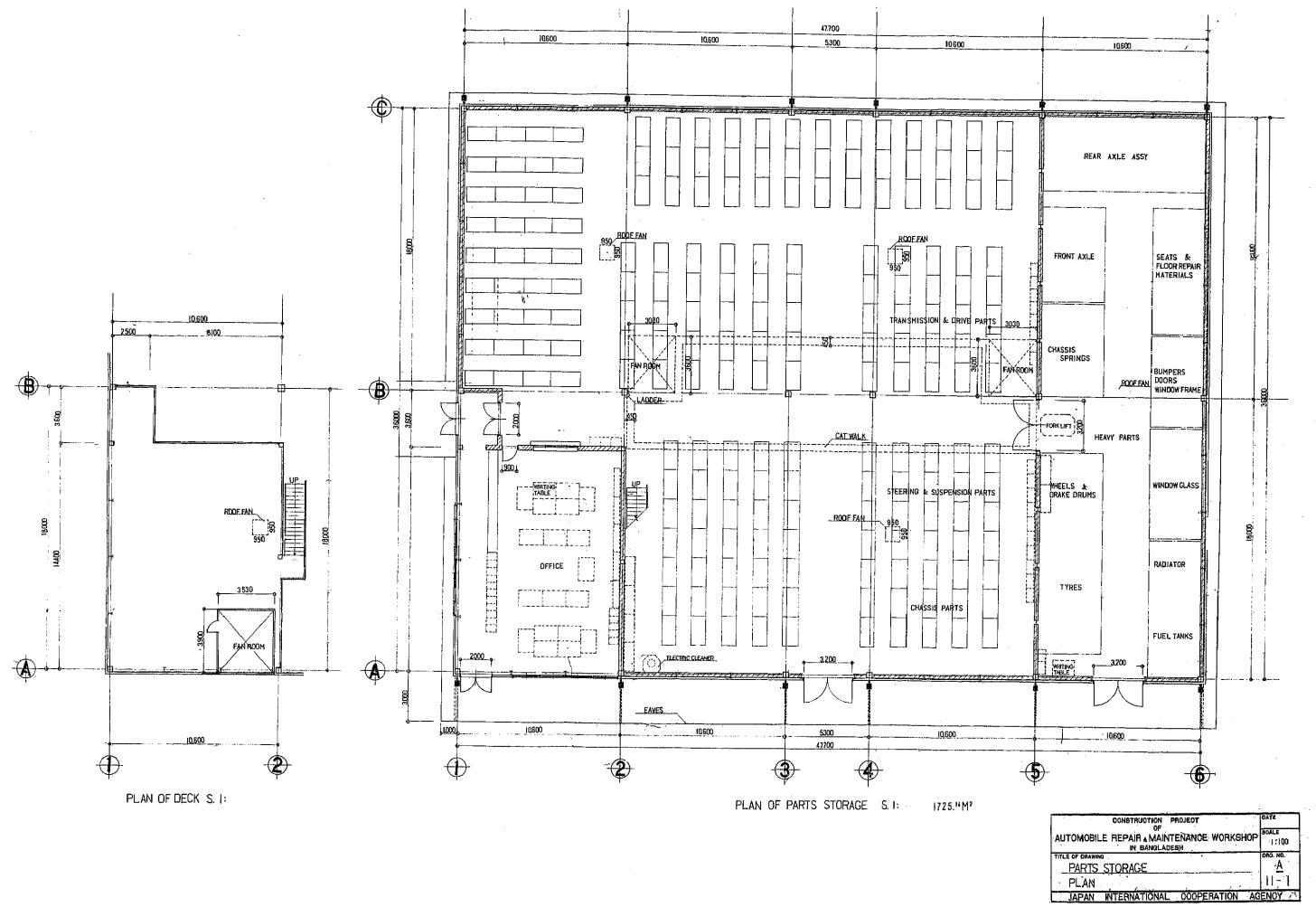
GROUND FLOOR PLAN

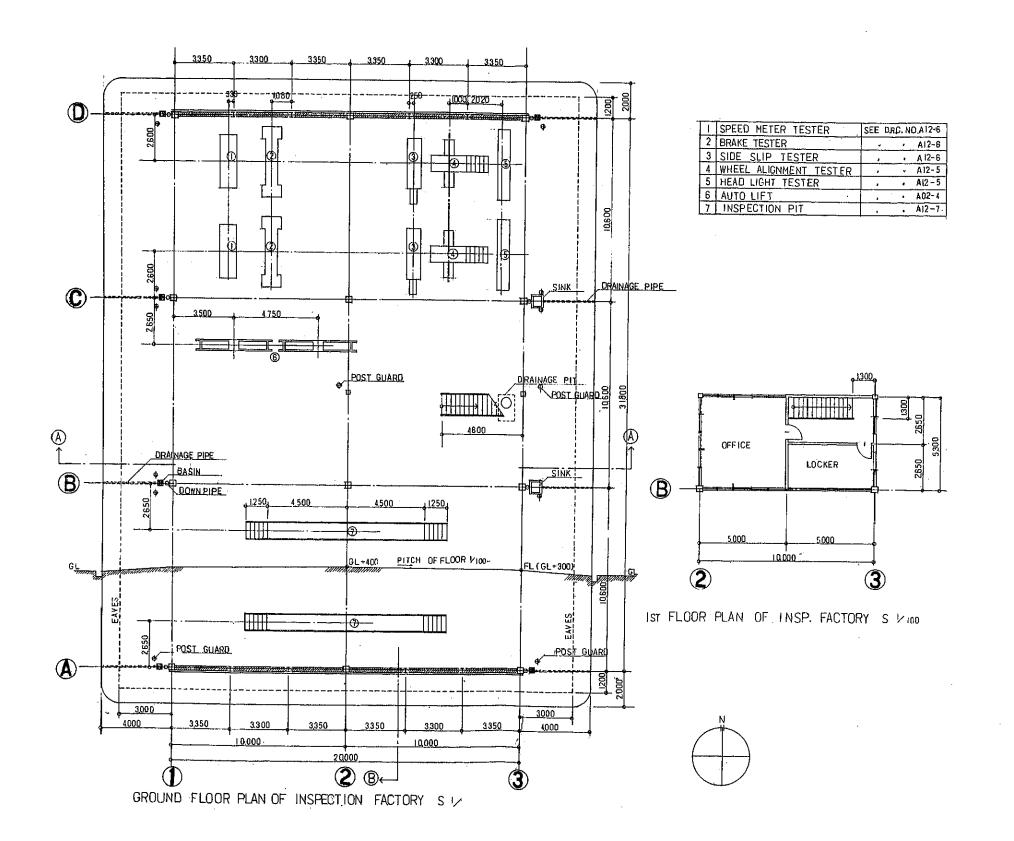
OONSTRUCTION PROJECT	DATE
AUTOMOBILE REPAIR MAINTENANCE WORKSHOP	90ALE 1: 00
TRAINING ROOM	Dho. No.
PCAN	5=



GROUND_FLOOR PLAN OF HEAVY REPAIR FACTORY \$-1:200

OONSTRUCTION PROJECT	DATE
AUTOMOBILE REPAIR MAINTENANCE WORKSHOP IN BANGLADESH	SOALE 1: 00
HEAVY REPAIR FACTORY	040. NO. <u>A</u>
JAPAN INTERNATIONAL COOPERATION, AG	10 - 1 ENCY





CONSTRUCTION PROJECT	DATE
AUTOMOBILE REPAIR & MAINTENANCE WORKSHOP IN BANGLADESH	1.,00
INSPECTION FACTORY PLAN) <u>A</u> 2-1
, JAPAN INTERNATIONAL COOPERATION AG	ENCY

