

PRO7
PD-ABA-110

January 6, 1988 63870

MEMORANDUM

TO: Distribution

FROM: ANE/PD Patricia S. Matheson *PSM*

SUBJECT: Afghanistan: Commodity Export Program AAM
Amendment - Vehicle Maintenance and Training Center
Project Committee Meeting

You are invited to a Project Committee review of the AID/Rep's proposed for establishing a vehicle maintenance and training center under the CEP project, on January 12, 10:00-12:00 noon, room 3320 N.S.

FYI, an ANPAC review is scheduled for January 21, 2:00-3:00 pm, room 6660 N.S..

Your participation is invited.

Attachments: Islamabad 26375 (LOU)
Vehicle Maintenance and Training Center Proposal

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VEHICLE MAINTENANCE AND TRAINING ACTIVITY
AFGHANISTAN COMMODITY EXPORT PROGRAM (CEP)
Project No. 306-0205

I. Summary

This paper describes a new activity of the Commodity Export Project (306-0205) which consists of the establishment and operation of a Vehicle Maintenance and Training Center (VMTC). The purpose of the VMTC is to assure that there exists a maintenance capacity for Alliance parties to maintain the vehicle fleet available to the Alliance for the transport of humanitarian supplies into Afghanistan. Of particular and initial interest in this regard is the fleet of vehicles already supplied and planned for procurement by A.I.D.

A technical description of this activity and as rationale for its necessity has been prepared by Morris Anderson, a consultant supplied by the American Manufacturers Export Group (AMEG), the contractor implementing the CEP. That report is attached and incorporated as a technical annex to this paper.

The estimated cost of this activity will be \$1.5 million over two years. That figure does not include the cost of U.S.-sourced technical assistance, but does incorporate certain spare parts costs. This is believed to be a reasonable investment to maintain vehicle purchases expected to approach \$9 million by the end of FY 88.

Rather than a new direction, the activity discussed in this paper represents a logical component of the policy, approved in the CEP AAM, of supplying transport assets to the resistance parties and assisting in the establishment and operation of transport systems for the movement of humanitarian goods. Although not previously identified as a discrete activity, the magnitude of the transport problem and A.I.D.'s support for response, argue for consideration of this activity within the existing parameters of the AAM.

II. Program Rationale

On August 8, 1986, the Activity Approval Memorandum (AAM) for the Afghan CEP was approved by Assistant Administrator, Bureau for Asia and Near East. The AAM described the CEP as a project that would utilize many innovations and experiences, and basic concepts of commodity logistics developed over many years by A.I.D. in developing countries.

In the AAM "Executive Summary", it was recognized that the CEP would be a unique and complex activity that would require flexibility and innovation in meeting a changing political, military, and developmental environment. In the process of implementing the CEP, it would:

1. Identify and clarify the major functions of an effective humanitarian commodity supply system for Afghanistan;
2. Assess existing commodity supply services in terms of resources, strengths, and weaknesses; and

3. Implement improvements in humanitarian commodity supply, combining solid commodity management principles with an understanding of the conditions unique to the Afghan situation.

On October 14, 1986, the first meeting on initiating implementation of the CEP was held with the logistical representatives of the Afghan Seven Party Alliance. From the very inception of the program, it was determined that transportation (both vehicular and pack animals) to move humanitarian commodities to the border staging areas and into Free Afghanistan was critical to the success of the program. As envisioned in the AAM, an "Animal Holding Facility" (AHF), was established by the project technical assistance contractor and procurement of pack mules initiated.

In order to meet the critical requirement for truck transport, \$1.9 million was immediately committed to the procurement of vehicles (90 3/4-ton, 18 3.5-ton, and 35 5-ton trucks). These trucks arrived in Pakistan and were distributed to the Seven Afghan Alliance Parties, and a second procurement was initiated for 119 3/4-ton and 42 5-ton trucks. The increased transport capability had an immediate impact as evidenced by the fact that approximately 130 tons of PL-480 wheat have been moved across the border into Afghanistan daily.

Based on the immediate positive impact of the CEP provided truck fleet on the distribution component of the CEP logistics cycle, a third procurement of vehicles was initiated for 70 seven-ton trucks and a fourth procurement has been authorized for the purchase of 105 7-ton trucks in December 1987. A total of 374 CEP financed transport vehicles with a carrying capacity of 1,095 tons have been distributed to the Seven Party Alliance. The total amount of CEP financing expended for vehicle transport is \$6 million, and the total amount is expected to approach \$9 million.

The Animal Holding Facility (AHF) evolved from an original concept of a live animal warehouse for procuring, receiving, storing and issuing pack animals to a center for maintaining animals (veterinary care, inoculations, shoeing) and the training of Afghans in the care, handling, packing and general transport utilization of this important transport asset. Similar maintenance and training needs are now apparent in relation to vehicular transport equipment.

The AAM stated that one of the essential ingredients of the CEP would be commodity distribution/transportation and that one of the technical assistance contractor's major focuses would be in this area. The initial concentration was directed toward purchase and delivery of sufficient truck transport assets to the Alliance parties to move humanitarian commodities from CEP warehouses in Peshawar and Quetta to the border staging areas and into Afghanistan.

It was recognized that the CEP does not achieve its ultimate purpose by efficiently purchasing and issuing critical humanitarian commodities to the Seven Parties in Pakistan. This is only accomplished when the food, clothing, medicines, and other goods are moved across the border into Afghanistan and eventually issued to the Afghan population. The real

measurement of program success depends in large measure upon the availability and effective deployment of operational truck transport. The AAM states that "where truck transport is possible, primary reliance will be placed on party owned vehicles."

While it is recognized that such conditions as war attrition, road conditions, operator capability, etc. will impact on the sustained operation of CEP furnished transport equipment, it is felt that every reasonable and prudent effort should be made to protect and maintain this large and important A.I.D. investment. A parallel effort to the CEP animal maintenance and training component is required for vehicle transport. Simply financing spare parts, assemblies, and mechanic tool sets is not enough. The Office of the A.I.D. Representative proposes that the CEP technical assistance effort be expanded to provide adequate maintenance facilities, mechanics and spare parts inventory to maintain CEP financed transport equipment and other Seven Party Alliance vehicles utilized in the distribution of commodities.

A second and major goal of this CEP component would be the training of Afghans in such skill as truck operations, operator maintenance, spare parts supply and inventory control, and up to third echelon maintenance mechanics which involves the capability to disassemble/assemble engines, transmissions and differentials.

These acquired skills will not only be extremely valuable in assuring that A.I.D. financed equipment is properly maintained and utilized to the maximum extent possible, but should circumstances permit the skills are also readily transferable and would be beneficial to the economy of a post-war Afghanistan. While it is difficult to concentrate on long-term developmental aspects of the Afghanistan A.I.D. program while the country is involved in a war and deprived of the basic necessities of food, shelter and health care, one potential to provide such assistance should not be ignored.

The AAM states that the "opportunities for increasing the effectiveness of cross-border humanitarian commodity delivery through the CEP program are significant." In the first year of program implementation, this statement has proved to be factual. The CEP has continued to focus directly on the supply of a broad range of humanitarian commodities cross-border into Afghanistan and has been highly successful in achieving its goals. It has not deviated in its focus on resource allocation systems, commodity selection, procurement, distribution, and end-use monitoring. Where it has taken on additional training and commodity related technical service activities, they have been directly relevant to the supply of commodities for humanitarian needs.

The AAM clearly stated that it was a "starting place," not a source of instant solutions, and that the successful implementation of the ideas presented in the AAM required a commitment to support the principles embodied in the project. This support has been forthcoming to date, and the CEP has achieved its intended purpose of delivering large amounts of commodities on schedule to many needy Afghans located in isolated areas with extremely difficult access.

II. The Problem

The trucks and equipment provided to the Alliance by A.I.D. are of good quality and are well received by the Alliance Parties. The trucks are wearing faster than they would under normal operating conditions. This is due to the rough terrain they are used in, unskilled drivers, lack of preventative maintenance, paucity of spare parts, and the lack of a properly equipped maintenance facility. If parts and maintenance were available, the trucks could be used more effectively and downtime could be reduced by 35 percent.

When the Parties have available funds, only 5 percent to 6 percent of the needed new Hino truck parts can be procured locally at any given time. The balance of the needed parts are scrounged from the Shuba Bazar near Peshawar in used or rebuilt condition. This causes considerable downtime for urgently needed trucks to transport humanitarian commodities.

The Alliance experience with the local truck repair facilities, either in repairs or obtaining spare parts was not proven satisfactory. As a result, all Parties of the Alliance have their own parking yards where they try to do their own maintenance. The quality of this maintenance is minimal because they do not have skilled mechanics, tools or spare parts to do a proper job. The parties state that they have an urgent need for all types of spare parts, a good preventative maintenance program and an adequately equipped service center. The result of this situation is that the A.I.D.-supplied vehicles, some of which are approaching a year's time on the road, will become increasingly susceptible to malfunction and long down times.

AID/REP has considered the provision of spare parts in terms of merely another CEP commodity. The obvious problem with this approach, and the reason we have not gone ahead is because of the high value of these items, coupled with our inability to determine an appropriate monitoring and control mechanism for these stocks. A carburetor for a Hino, for instance, could easily cost \$1,000. The problem of maintaining the A.I.D.-supplied fleet suggests a more holistic approach than simply the delivery of spares.

III. Repair Facilities

Existing indigenous private sector truck repair facilities are ill equipped to do normal routine maintenance. All work is done on the streets or in back ally lots located in the Shuba Bazar area near Peshawar. Work is done on a negotiable flat rate charge, and by local standards, repairs are expensive and poorly done. None of the shops have a cement floor or a hard stand. Further, there is little or no security for vehicles. In general, the dirt and dust that enters an engine or transmission in these shops probably does more damage than the hard usage the trucks are subjected to. The situation is, of course, no better in more rural areas or in Afghanistan.

Only two maintenance facilities have expressed an interest in doing contract work with spares being furnished by the user. Neither shop is equipped to do complete echelon-three maintenance, and neither can take more than two trucks at one time. It would be nearly impossible to maintain the end usage of furnished parts in such facilities.

IV. Spare Parts

Neither of the two suppliers of Hino parts in Peshawar carry an adequate supply. As Alliance vehicles average 78,000 KM annually, the availability of spare parts is critical in maintaining a transportation system for humanitarian commodities. The largest dealer in the area, Peshawar Motors, can only fill 15 percent of a spare parts requisition and most of those parts are for Toyota pickups, not Hino trucks. Needed parts are either back ordered from Karachi or the factory, or they send the customer to the Shuba Bazar to scrounge for rebuilt or used parts. Further, the factory spares furnished by the local dealers are 42 percent higher in cost than the parts that A.I.D. could import duty-free.

Most remanufactured spares are reworked from old parts. Some gears, axles, piston rings and cylinder sleeves are manufactured in Karachi and Peshawar. Their dependability and wear life has not proven sufficiently satisfactory. The spares have no guarantee, the conformity to factory specification in hardness and clearances are not precise enough to warrant the cost and the downtime a vehicle has in waiting for a remanufactured part.

Very few non-factory items are available in the Peshawar markets. There is a supply of non-factory spares for Mercedes and Bedford trucks, but hardly any for Hino-manufactured trucks. There is little or no interchange of parts between German, English and Japanese built trucks.

V. Training

While not addressed in detail in the AMEG study, the need for training of drivers and a mechanic work force is readily apparent to anyone who has witnessed road conditions in Pakistan. An easy comparison can be made between the behavior and condition of the general truck fleet on the road (not appreciably different from that of the resistance we can assume) and that of the National Logistics Cell (NLC), the Pakistani parastatal for transport. The noticeably safer driving habits of NLC drivers and the obviously well maintained condition of the fleet are a testament to the benefits of both adequate maintenance and driver training.

Training for drivers at a central maintenance facility would not only have benefits in terms of improved safety, but provide for improved preventive maintenance and an early alert system for more serious mechanical problems. Training for party mechanics would have immediate benefits for the non-A.I.D.-supplied fleet of the parties and also contribute to the skilled manpower pool for post-war development. Considering the total investment in the center for facilities, spare parts, tools and labor, any addition attributable to training costs would be marginal.

VI. Cost Implications and Budget

Normally when budgeting annually for maintenance, a figure of 12 percent of the vehicle original acquisition costs is used as a guide. The 12 percent figure represents an average wherein the initial years spare parts inventories are built up as more maintenance is required in later years. This 12 percent figure is made up of both labor and parts costs. A more accurate percentage rate for the CEP program might be closer to 7-8 percent, due to the lower labor costs in Pakistan and the ability of A.I.D. to procure spares duty-free. While these somewhat theoretical figures are to a degree offset by the need to capitalize a facility and staff, it must be considered, as pointed out above, that the alternative - reliance on contracting out - is an unsatisfactory course of action.

Budget

The budget below does not include cost of technical assistance provided under the contract. The services of one vehicle maintenance specialist is envisioned to operate the facility.

<u>FIXED COSTS</u>	<u>FIRST YEAR</u> (US \$)	<u>SECOND YEAR</u> (US \$)
Lease	12,000*	12,000*
Building Construction/Rehabilitation	75,000*	10,000*
Shop Equipment - Tools	92,000	10,000
Maintenance Trucks/Other Support Vehicles	74,000	20,000
Office/Warehouse/Class Room Furniture and Equipment	<u>20,000</u>	<u>5,000</u>
	273,000	57,000
<u>OPERATING COSTS</u>		
Spare Parts	500,000	200,000
Salaries & Benefits (2nd Year Increase due to Staff Development Stable Thereafter)	110,000	180,000
Utilities	6,000	8,000
Subsistence - Trainees 40-50	40,000	60,000
Office & Warehouse Supplies	5,000	6,000
Other Operating Costs: Fuel, Oil, Lubricants	<u>5,000</u>	<u>5,000</u>
	666,000	463,000
 TOTAL:	 <u>\$939,000</u>	 <u>\$520,000</u>

*Assuming raw land requiring construction of buildings

VEHICLE MAINTENANCE AND TRAINING CENTER

PREPARED FOR

USAID REPRESENTATIVE
UNITED STATES AGENCY FOR
INTERNATIONAL DEVELOPMENT

SUBMITTED BY

~~AFRICAN~~ MANUFACTURERS EXPORT GROUP
(AMEG)

DECEMBER 1987

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EXECUTIVE SUMMARY

This Maintenance Feasibility Study is in response to the following scope of work.

In consultation with GOP personnel, AMEG/Staff, and by means of a survey of repair/maintenance facilities available on the local market, the consultant will determine the feasibility of establishing a central maintenance facility for Alliance owned vehicular transport, principally heavy and light trucks. Feasibility will be determined through a comparison of costs for maintenance/repair available through the local economy and/or through the importation and donation of spare parts. Comparison will consider, for instance, options of local procurement of rebuilt parts, non-factory procurement or any other cost-saving measure with respect to the provision of spares. Feasibility would necessarily involve experienced-based estimates of the maintenance/repair requirements, up to third echelon, of the available Alliance fleet. Information on this fleet will be provided to the consultant upon arrival.

Should the central repair facility appear feasible, the consultant will prepare, as part of his report, an outline of those elements required to establish such a facility. This outline should include:

- Proposed staffing pattern including required experience and skills.
- Brief outline of training program likely to be necessary for the facility staff.
- List (with estimated cost) of tools and equipment necessary.
- List of recommended initial spare parts inventory.
- Recommendations on building/site requirements.
- Recommended course of action with regard to provision of spares per the options for new or rebuilt discussed above.

Each of the above activities are addressed in this paper.

SURVEY OF ALLIANCE MAINTENANCE REQUIREMENTS:

The Alliance experience with the local truck repair facilities, either in repairs or obtaining spare parts have not proven satisfactory. Due to this, the Parties have their own parking yards where they try to do maintenance. The maintenance is minimal because they do not have skilled mechanics, tools or spare parts to do a proper job. The Members of the Parties state that they have an urgent need for all types of spare parts, a good preventative maintenance program and an adequately equipped service center.

- Local Truck Maintenance Facilities

Existing indigenous private sector truck repair facilities are ill equipped to do normal routine maintenance. All work presently is done on the streets or in back alley lots located in the Shuba Bazaar area near Peshawar. Work is done on a negotiable flat rate charge by local standards, and repairs are expensive and poorly done. None of the shops surveyed had a cement floor or a hard stand. Further, there was little or no security for the vehicles. In general, the dirt and dust that enters an engine or transmission in these shops probably does more damage than the hard usage the trucks are subjected to.

- Contracting Repair Work and CEP Furnishing the Spare Parts
Only two of eight facilities surveyed expressed an interest in doing contract work with spares being furnished by the user. Neither shop was equipped to do complete echelon three maintenance, and neither could take more than two trucks at one time. It would be nearly impossible to maintain the end usage of furnished parts and diversion would undoubtedly result.

- Local Procurement and Supply of Spare Parts

As the Parties have Hino and Toyota trucks, this survey focused only on suppliers of corresponding spare parts. Neither of the two suppliers of Hino spare parts carry an adequate supply. As Alliance vehicles average 78,000 KM annually, the availability of spare parts is critical in maintaining a transportation system for humanitarian commodities. The largest dealer in the Area, Peshawar Motors, could only fill 15 percent of a spare parts requisition and most of those parts were for Toyota pickups not Hino trucks. Needed parts are either back ordered from Karachi or the factory, or they send the customer to the Shuba Bazaar to scrounge for rebuilt or used parts.

Further, the spares furnished by the local dealers are 42 percent higher in cost than the parts that AID could import duty-free.

- Re-manufactured Spare Parts/Costs and Availability

Most remanufactured spares are reworked from old parts. Some gears, axles, piston rings and cylinder sleeves are manufactured in Karachi and Peshawar. Their dependability and wear life has not proven sufficiently satisfactory to warrant their cost. The spares have no guarantee, the conformity to factory specification in hardness and clearances are not precise enough to warrant the cost and the down time a vehicle has in waiting for a re-manufactured part.

- Non-Factory Supplied Spare Parts

During this survey, very few non-factory items were located in the Peshawar markets. There was a supply of non-factory spares for Mercedes and Bedford trucks, but hardly any for Hino manufactured trucks.

- Yearly Maintenance Costs

This topic was not included in the scope of work, but it needs to be considered in making decisions on the feasibility of a spare parts and maintenance facility. Normally when budgeting annually for maintenance, a figure of 12 percent of the original acquisition costs is used as a guide. The 12 percent figure represents an average where in the initial years spare parts inventories are built up as more maintenance is required in later years. However, as explained later, a seven percent figure is used for Pakistan. Bearing this in mind, the data collected indicates that a sizeable cost savings could be made if the Alliance had their own maintenance and spare parts center.

- Equipment Other Than Trucks (Tractors)

Maintenance support for the CEP provided Massey Ferguson Tractors was studied near the end of this survey. The conclusion was that the number of tractors provided is low, spare parts are manufactured in country and are readily available and that the tractors go into Afghanistan and their return is doubtful. Based on this it is recommended that CEP be concerned only with pre-delivery servicing and in providing a training course on tractor service and operation in the proposed VMC.

- Consolidation of Survey and Recommendations

This survey was accomplished through consultations with the AMEG Staff, a transport/logistics representative of the Afghan Seven Party Alliance, GOP personnel, USAID/Pakistan General Services and by means of surveying local repair/maintenance facilities and vehicle spare parts dealers. Upon examination and evaluation, an effort was made to determine the most economical and efficient method of supporting the Alliance truck fleet. The results strongly indicate that the CEP should import the needed spare parts and provide a parts warehouse and repair and training facility. This is not only deemed to be feasible, but critical to maintain the large investment in AID financed transport equipment. Over time the VMTC might be able to service other Party vehicles as well and perhaps open a similar VMTC unit in Quetta.

- AID Financed Central Vehicle Maintenance Center and Spare Parts Facility

A real measurement of the success of the AID program for Afghanistan depends in large measure upon the availability and effective deployment of operational truck transport. A total of 374 CEP financed vehicles have been distributed to the Alliance and additional trucks are being purchased with a total original acquisition cost (OAC) of approximately \$8 million. A technical assistance supported vehicle maintenance and spare parts center is recommended to provide adequate maintenance facilities, mechanics, spare parts inventory and operator/mechanic training to maintain and support the objectives of the program.

The proposed activity will not only be extremely valuable in helping assure a continued flow of humanitarian commodities to "Free Afghanistan", but the skills experience and knowledge gained could be readily transferable and beneficial to a post-war Afghanistan.

- Estimated Cost of Recommended Facility

As approximate cost of \$1.5 million is required to establish the recommended facility. This will provide funding for all operating costs including site mobilization, personnel, spare parts and tools and equipment for a two year period.

MAINTENANCE FEASIBILITY STUDY

1. BACKGROUND:

During November and December 1987, a survey of the Seven Party Alliance vehicular maintenance and spare parts requirements and problems was conducted as part of the Office of the AID Representative's effort to assist the Alliance through the provision of humanitarian commodities and commodity related services under the Commodity Export Program (CEP).

The object of the study was to determine the most feasible method to assist the Alliance with their vehicular maintenance and spare parts supply for light and heavy duty trucks, to include training.

2. PURPOSE OF STUDY:

This survey studied the local maintenance conditions, facilities, and the spare parts situation to determine the most practical approach to transport equipment support. The options of having Alliance vehicle repairs accomplished through the indigenous private sector maintenance and parts supply infrastructure/network, or alternatively establishing a new central maintenance and spare parts supply center were examined and evaluated. An effort was made to determine the most economical and efficient method to provide spare parts and accomplish required maintenance. A major determination was whether spares should be purchased locally, or would it be more economical and effective to import the parts directly from the vehicle manufacturers. Another consideration was, that if parts are purchased through the CEP, should they be issued directly to the Alliance Parties, provided to a local private contract vehicle maintenance repair firm(s), or supplied and/or utilized by a new CEP project maintenance and spare parts facility, to be referred to as the Vehicle Maintenance and Training Center.

The purpose of this study was not to analyze the Alliance's transportation system or capability. However, the records maintained at a CEP Maintenance Center would provide a great deal of useful information which could later be analyzed by a consultant. These questions include, but are not limited to:

1. Number of kilometers used which would possibly relate to the number of trips into Afghanistan and how far into the country commodities are being delivered.

2. Vehicle down time which effects the total carrying capacity for each Party during a certain period.
3. The amount of underutilization of vehicles due to weather, security conditions, organizational aspects of the logistic system, etc.

3. COURSE OF ACTION:

- a) Survey of Alliance maintenance requirements.
- b) Survey of local maintenance facilities and costs of contracting vehicle repair work.
- c) Survey costs of furnishing imported spare parts through the CEP.
- d) Survey of procurement and supply of spare parts manufactured locally.
- e) Survey of re-manufactured spare parts costs and availability.
- f) Survey of non-factory supplied spares.
- g) Consolidate surveys and make recommendations for the most economical and practical solution in maintaining the Alliance's fleet of vehicular equipment.

4. ALLIANCE MAINTENANCE REQUIREMENTS:

The starting point of this survey was to meet with the Alliance transport and logistics representatives to determine their maintenance needs and requirements.

The findings were that even though the Alliance's trucks are of recent acquisition, many of the vehicles are already in need of repair. There are many reasons for the poor condition of the trucks, namely; poorly trained operators, lack of preventative maintenance, shortage of skilled mechanics - either in Alliance repair yards or in the local shops; and, the lack of a dependable source of spare parts.

All seven Parties have vehicle yards where they do there own maintenance. One reason for this is that the local private shops supply parts and perform repairs on a strict cash basis and the Parties do not have adequate funds for such purposes. A second problem is that most frequently when the Alliance Parties take delivery of repaired trucks, parts have been stolen off the trucks while they were in the shop. The Director of Maintenance for one of the Alliance Parties

showed a truck that was in the local dealer's shop for repairs and when the truck was returned, a U-bolt off the rear axle and spring had been stolen. Another case was where one Alliance member had a transmission repaired in a local shop for 14,800 Rupees and the locally manufactured bearings arings failed before the truck got to Quetta from Peshawar. Complaints about the local repair facilities were made loud and clear during this survey. The results of this survey are:

- a) Experience with local repair facilities have not been satisfactory.
- b) There is a country-wide shortage of oil filters.
- c) Reliable spare parts are not available on the local markets.
- d) Qualified repairmen for fuel injection pumps and nozzles are one of the major causes of truck down time.
- e) The need for good brake linings is urgent. Some trucks only make two trips on locally purchased linings.
- f) Trucks under repair wait 10 to 14 days for a transmission gear to be found or manufactured.
- g) Some of the most needed spare parts are:
 - Universal Joints
 - Oil Filters
 - Shifting Cables
 - Clutch Plates
 - Brake Lining
- h) Mr. Koche, Chief Mechanic of N.I.F.A., advises that most operable Alliance trucks travel an average of 6,500 km per month (78,000 km annually). Mr. Koche feels this could be raised to 10,000 km per month (120,000 km annually), if reliable spare parts were available. This non-availability of parts equates to a 35 percent down time.
- i) Knowledgeable GOP officials and party members, indicate overwhelming support for a vehicle maintenance and training center on a neutral location. No one Party has an adequate existing facility with enough warehouse space and bays in a secure area to accommodate all Seven Parties. It is highly doubtful if one Party did have such a facility whether the other Parties would allow their vehicles to be serviced there. This could alienate some parties as they might feel AID/REP was showing favoritism.

5. LOCAL MAINTENANCE FACILITIES (TRUCKS):

Eight local truck repair facilities were visited, namely:

Peshawar Motors	-	Hino, Toyota Dealer
*United Motors	-	Isuzu Dealer
Rainbow Motors	-	Suzuki Dealer
Caterpillar	-	Caterpillar Dealer
Farib Auto	-	Non-Dealer
Suzuki Truck Repair	-	Non-Dealer
Mauqaded Garages	-	Non-Dealer
Haji Abraham Shop	-	Non-Dealer

*United Motors formerly had a vehicle maintenance contract with the U.S.A.F. covering 38 light vehicles. However, now it sends the truck work to Farib Autos in Shuba Bazaar.

The first four repair shops are located in the Cantonment Area and the other four are located in the Shuba Area of Peshawar. The later is noted for the supply of new and rebuilt spare parts. With the exception of Caterpillar, which has no interest in repair work unless it is Caterpillar powered, the first three shops do repair work in the streets in front of their offices. The last four facilities are back-alley dirt lots in which truck repairs are carried out, as shown in Annex-A. In the U.S. this would be referred to as "shade-tree" maintenance, except in this case there are no trees.

All the shops visited, except Caterpillar, are ill equipped tool wise and none have a regular staff of trained mechanics. All repair work is done on a flat rate basis and the price is always negotiable.

The results of this survey are:

- a) None of the listed shops are equipped or capable of working on more than two trucks at one time. The work must be done outside, with inadequate tools, in the elements, and with no security.
- b) With the exception of the supervisors, foremen, etc the mechanics are called off the street and work on a flat rate basis. United Motors pays the mechanics 50 percent of the labor costs. The other shops only pay the mechanics 40 percent.

- c) During the winter season trucks have trouble entering the Shuba shop area and little or no work is accomplished at any of the repair facilities during inclement weather.

6. CONTRACTING VEHICLE REPAIR WORK & CEP FURNISHING PARTS:

Only two of the above listed repair shops, Peshawar and United Motors, showed any interest in contracting truck repair on a labor basis only. The Shuba shops expressed a desire to contract repair work, if they were also allowed to furnish the parts. This is probably just as well, as it would be extremely difficult to monitor the end use of parts issued to a Shuba repair facility.

A comparison of "labor-only" costs for certain repair work follows:

<u>JOB</u>	<u>UNITED MOTORS</u>	<u>PESHAWAR MOTORS</u>	<u>USA FLAT RATE</u>	<u>*USAID PESHAWAR</u>
Required Values	Rs. 700.00	Rs. 675.00	Rs. 200.00	
6 Cyl. Hino Engine	\$ 40.22	\$ 38.79	\$148.00	\$ 11.49
Install a New Set of Piston Rings-Hino	Rs.1,200.00 \$ 68.96	Rs.1,500.00 \$ 86.20	\$380.00	Rs.1,200.00 \$ 68.96
Replace U. Joint Truck	Rs. 350.00 \$ 20.11	Rs. 500.00 \$ 28.73	\$108.00	Rs. 150.00 \$ 8.62
Replace Differential Hino	Rs. 800.00 \$ 45.97	Rs. 800.00 \$ 45.97	\$150.00	Rs. 250.00 \$ 14.36
Reline a Set of Brakes	Rs. 800.00 \$ 45.97	Rs. 700.00 \$ 40.22	\$240.00	Rs. 120.00 \$ 6.89
Re-Pack Front Wheel Bearings	Rs. 350.00 \$ 20.11	Rs. 475.00 \$ 27.29	\$ 48.00	Rs. 150.00 \$ 8.62

*Local Quoted Rupee price was converted to U.S. Dollars at
Rs.17.4 = \$1.00

*While USAID Motorpool does not service trucks, their labor charges shown are for performing the same work on a "Fajero". The figures are provided for further comparison, if a vehicle maintenance center is deemed feasible.

The results of this part of the survey are:

- a) Only two companies of the eight that were interviewed expressed any interest in labor only vehicle maintenance contracts.
- b) The Alliance experience with both of the two companies has been negative and some Alliance members would be reluctant to use the two facilities again.
- c) Six truck repair shops in the Shuba Bazaar area are not interested in labor only contracts.
- d) In all cases, security is non-existent and the trucks and furnished spare parts would be subject to pilferage and loss.
- e) Local labor costs, while well below the U.S. flat rate charge, are still 50 percent higher than the hourly charges made by the Peshawar USAID Motorpool for similar types of vehicle repairs.
- f) Tools and shop equipment at local garages are of minimal standards or non-existent.

7. LOCAL PROCUREMENT AND SUPPLY OF SPARE PARTS:

The term local procurement has two meanings in this environment: (1) procurement from the local dealer; and (2) procurement from the bazaar.

Concerning the local dealer, only Peshawar Motors carries a fast moving line of spare parts for the Hino trucks and Toyota pick-ups. Peshawar Motors has a fill rate of 15 percent for a requisition of 30 common Hino or Toyota spares. United Motors, which also carries Hino Parts, could fill only 1 percent of the same list of 30 spare parts. When the local dealers do not have the part in their stock, they refer the customer to the Shuba Bazaar.

In the Bazaar there are three types of spares: new, rebuilt and/or locally manufactured. The new spares, for the most part, are smuggled into the country. The rebuilt spares are salvaged from wrecked or discarded trucks. See figure 2 for

the supply of rebuilt parts. The following chart shows the comparison of duty free parts, new parts from the dealer, and the Shuba Bazaar spares:

<u>ITEM</u>	<u>* DUTY FREE (US \$)</u>	<u>** NEW LOCAL DEALER (US \$)</u>	<u>** USED RE-BUILT SHUBA BAZAAR (US \$)</u>
Seat Valve - Hino	8.00	19.00	New - 8.00
Cyl.Liner - Hino	72.00	107.00	Made - 112.00
Pump Assy.Oil - Hino	187.00	280.00	R.Built - 175.00
Radiator Assy.- Hino	392.00	560.00	R.Built - 700.00
Seal Oil Trans.-Hino	2.01	4.00	- N/A
Spring Assy.FR.-Hino	140.00	221.00	R.Built - 287.00
Leaf Fr.Spring -Hino	257.00	369.00	R.Built - 114.00
Nut Hub LH - Truck	.85	1.04	Used - .86
Starter Assy. - Truck	387.00	503.00	R.Built - 220.00
Disc. Clutch - Truck Assy.	57.00	92.50	R.Built - 45.00
Cover Assy. - Truck Clutch	115.00	179.00	R/Built - 240.00
Bearing Assy.Throw out	23.55	35.00	Used - 30.00
Lining Brake shoe	1.27	2.35	- 4.00
Ring Gear & Pinion	299.75	404.00	Used - 165.00
TOTALS	\$1,942.43	\$2,777.39	\$2,070.86

*Prices converted to Dollars at 170 Yen = One Dollar

**Prices converted to Dollars at 17.4 Rupees = One Dollar

Note: The Yen rate is now approaching 120 Yen = One Dollar which will affect all of the above prices proportionally as the Pakistan Rupee is tied into the U.S. Dollar.

The results of this survey are:

- a) The principal local dealer for Hino can only supply 15 percent of the required spare parts in a timely manner.
- b) The local prices of new, genuine manufacturers' spares are *42 percent higher than duty free parts, which could be imported under the CEP.
- c) Spare parts supplied from the Shuba Bazaar are used or rebuilt parts, and are unreliable.
- d) The savings on importation of duty free parts would easily cover the costs of receipt, storage, issuing and controlling the badly needed spares for the Alliance.

*Will be used later in this Survey.

B. REMANUFACTURED SPARE PARTS, COSTS AND AVAILABILITY:

In Peshawar, manufacturing of spare parts is limited to (see Figure 3 for manufacturing shops):

- Front and rear springs
- Piston Rings - Made from soft cast iron
- Cylinder Sleeves from steel pipe
- Some rear truck axles
- Pistons turned down from old larger sized pistons
- Bushings made from brass stock
- Various thrust washers made from brass drums

The Karachi manufacturing of spare parts covers other items such as gears, complete piston and sleeve sets, and water and oil pumps.

The reliability of re-manufactured spare parts from either Karachi or Peshawar is dubious. The cost is whatever the market will bear (see chart - page 10).

Availability is a matter of luck. One Alliance truck waited 14 days for a transmission gear that was not available locally, but was made in Karachi. In general, a complete truck spring can be manufactured in 4-5 days.

The results of this part of the survey are:

- a) Locally manufactured vehicle parts should be the last resort in obtaining required spares.
- b) Locally manufactured parts have no guarantee or conformity to the original spare parts specifications.

- c) Vehicle down time awaiting the manufacture of a spare part is unwarranted and too costly.

9. NON-FACTORY SUPPLIED SPARES:

With the exception of the non-factory spare parts previously mentioned, the time spent on this part of the survey proved fruitless. The new non-factory spares that can be found in the local bazaars are parts that have been smuggled into the country. Very few of the parts are for Hino trucks, but rather for Mercedes and Bedford trucks. Mercedes parts are manufactured in Iran, and are smuggled into Pakistan. Consequently there is considerable trade built up around these spares.

10. YEARLY MAINTENANCE COSTS:

One important topic that should be touched upon in this survey is the yearly maintenance costs of trucks. A general rule of thumb established by the National Trucking Association and used world-wide for truck maintenance is that under normal operating conditions, yearly maintenance costs are projected to cost 12 percent of the vehicle's original acquisition cost (DAC). This 12 percent is divided nearly evenly between spare parts and labor costs. This being the case, the 162 Hino trucks that the Alliance already possess have an DAC of \$4,374,000.00, and yearly maintenance costs can then be budgeted. This percentage would probably be 7-8 percent here, as labor costs are low and spare parts could be purchased duty free. Therefore, a referenced maintenance cost figure of seven percent can be used as a budgetary estimate for maintenance costs. For the 162 trucks mentioned above, the annual maintenance costs would be approximately \$300,000.

11. COMPARATIVE COST OF SPARE PARTS FOR NON-STANDARDIZED VEHICLES:

Regardless of whether future vehicle procurement continue to be Toyotas and Hinos or other vehicle brands, the budgetary percent for spare parts previously indicated remains the same. There is no increase, therefore, in the total cost for spare parts should you change manufacturers as the price of the parts is a percent of the original acquisition cost of the vehicles. The only additional cost to the maintenance center would be for more binning and shelving for the new manufacturer's spares, as you cannot mix the spare parts from different manufacturers.

This might amount to an additional \$6,000. It would seem that exceptions to standardization, if only to generate the cost benefits of increased competition, would be worthwhile.

12. EQUIPMENT OTHER THAN TRUCKS (TRACTORS):

In addition to the Hino trucks and Toyota pick-ups, CEP has also provided twenty eight (28) Massey Ferguson Model MF-375 farm tractors that have been distributed to the Alliance parties. Fourteen tractors were given to the Alliance in Peshawar and fourteen more to the Alliance in Quetta. The purpose of the tractors are to pull a trailer for transporting humanitarian commodities in Afghanistan.

The following summarizes the best method to use in support of the tractors while still in Pakistan:

- a. Massey Ferguson Tractor Company has an assembly and manufacturing plant in Rawalpindi. Spare parts are readily available in Rawalpindi, Lahore, Peshawar and Karachi.
- b. The local Massey Ferguson dealer (Mr. Salim Kadir) in Peshawar (Peshawar Motors) uses a yearly maintenance figure of 10,000 to 15,000 Rupees (\$575 to 845). This figure includes lubricates, parts and labor costs.
- c. In the Survey of the truck repair shops mentioned elsewhere in this report, not one farm tractor was observed under repair. That includes the Massey Ferguson dealer shops.

The results of this study are:

- a. Spare parts are readily available throughout Pakistan. The spare parts usage per year is low and would not warrant CEP warehousing and storage costs.
- b. If a tractor would need lubricants, servicing or mechanical work, it could easily be done in the proposed vehicle maintenance center (VMC) without any other special tools or equipment.
- c. The local dealer upon request will give a short training course on tractor service and operation if an area was made available in the proposed VMC.

13. CONSOLIDATION OF SURVEY AND RECOMMENDATIONS:

The trucks and equipment provided to the Alliance by AID/REP are of good manufacture and are well received by the Alliance Parties. The trucks are wearing faster than they would under normal operating conditions. This is due to the rough terrain they are used in, unskilled drivers, lack of preventative maintenance, paucity of spare parts, and the lack of a properly equipped maintenance facility. If good parts, proper maintenance and trained mechanics and operators were available, the trucks could be used more effectively and down time could be reduced by 35 percent as indicated in example 4 h on page 3.

The local maintenance facilities are inadequate, expensive and insecure. During this survey, not one truck repair garage was found to have a cement floor, proper tools or shop equipment. None of the local shops do work on credit or time payment and it is doubtful that the Parties will always have up-front funds to pay for parts and repairs, even if a well equipped garage existed in the Peshawar Area. Every trucking company in the Peshawar area has its own repair yard. The local shops are kept busy servicing transit truckers and in fabricating parts.

Only two local truck dealers expressed an interest in a labor only contract. It was discovered that they do not have a garage to do truck repair work and end up sending the trucks to the Shuba Bazaar shops for the work. For example, United Motors sends trucks to Farib Auto for repairs. See figure 1 (Farib Auto Shop).

Local labor charges are 50 percent higher than those of the USAID motorpool facility, which has a clean environment to work in, good tools and security. Two of the Alliance members claim that they would not send their trucks to any local shop and that they would rather make do in their own yards.

When the Parties have available funds, only 5 percent to 6 percent of the needed new Hino truck parts can be procured locally at any given time. The balance of the needed parts are scrounged from the Shuba Bazaar in used or rebuilt condition. This causes considerable down time for urgently needed trucks to transport humanitarian commodities. One of the member Parties complained of being unable to meet urgent trucking schedules due to the lack of spare parts and service. The problem undoubtedly goes beyond that party.

Re-manufactured spare parts in Peshawar are limited to items that can be re-built, welded-up, or made from a larger like

item, i.e., a small piston from a used larger one. Precision spare parts, such as ring and pinion gears, crankshafts, camshafts, balanced and hardened transmission gears, etc. are not manufactured in Pakistan.

Non-factory spare parts are those smuggled into the local bazaar. There is a good supply of Mercedes and Bedford new spares available. However, for the Hino trucks, any new spare parts are difficult to find. There is little or no interchange of parts between German, English and Japanese built trucks.

14. RECOMMENDATIONS:

- 1) The Alliance vehicles are in urgent need of spare parts that cannot be obtained in new, used, rebuilt or re-manufactured quantities to maintain their fleets. It is strongly recommended that the CEP be utilized to import a two to three year supply of spares immediately. The importation and issuing of parts to the Alliance would increase the trucks productive life by 35 percent, which translates into ten extra days per month of useful road time (35 percent of 30 days/month = 10 days).
- 2) In conjunction with the above recommendation, it is further recommended that USAID locate a suitable area in the vicinity of Peshawar, and lease or construct a maintenance facility and a warehouse needed for the spare parts. Some AID/REF supplied Party trucks are nearly a year old and will soon be needing some major repairs. Local facilities are not adequate or equipped to do the repairs in a timely manner. A repair facility could cut the down time of a vehicle by 35 percent.
- 3) The Alliance drivers are in urgent need of operation and preventative maintenance training. AID should, in conjunction with the vehicle maintenance and spare parts components of the CEP, consider a training program to meet this need. It is, therefore, highly recommended that provisions be made for conducting this training and it be incorporated into the proposed vehicle maintenance and training center.
- 4) Due to the urgency of establishing a maintenance and training program, it is recommended that a full time U.S. hire motor transport and training specialist be contracted to supervise establishing the facility, oversee building renovation and/or construction, hiring of a competent local staff, and organizing maintenance

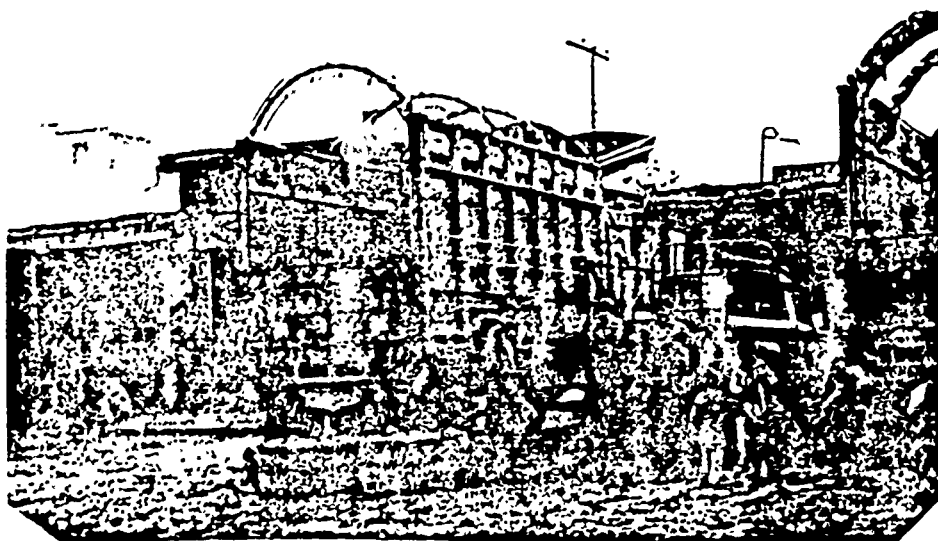
training courses. While the current CEP technical assistance contractor has a couple of competent maintenance supervisors, they will need help in establishing a maintenance facility, shop organization and management, spare parts control, personnel training, vehicle repair scheduling etc.

- 5) The center should be situated in or near Peshawar because that is where the bulk of the Parties logistic and administrative capacity is located and the majority of their vehicles based. However, it is recommended that consideration be given to establishing a similar vehicle maintenance and training center in Quetta, as this is also a major hub for Alliance commodity distribution and vehicle transport activities. If a central service area is established first in Peshawar, trained personnel could be easily transferred to Quetta. A Quetta VMC will not require any increase in the amount budgeted for spare parts. A redistribution only would become necessary. The Quetta VMC cost would be similar to the cost incurred in Peshawar for a similar facility, tools, equipment and personnel.
- 6) As the Alliance trucks continue to operate under the present service conditions, they will soon be having major road failures. This will necessitate rapid action to move the trucks to a secure area or make rapid on site repairs. To do this, it is recommended that the Alliance be provided the capability to move a broken down truck to the maintenance center or make rapid on site repairs with mobile touring and repair units. This can be accomplished with the purchase of two mobile utility service trucks. These utility service trucks should be equipped with a towing capacity, maintenance tools, welder, air compressor and competent mechanics. The estimated cost of each utility service truck is \$37,000, CIF Karachi.
- 7) Based on the above recommendations a central vehicle maintenance and training facility is deemed not only to be feasible, but also critical in maintaining the Parties' transport equipment in which A.I.D. has made a large investment. As part of this report, recommendations have been included for those elements required to establish and operate the facility. The elements include:
 1. Recommendation on building and site requirements. (Annex-E)

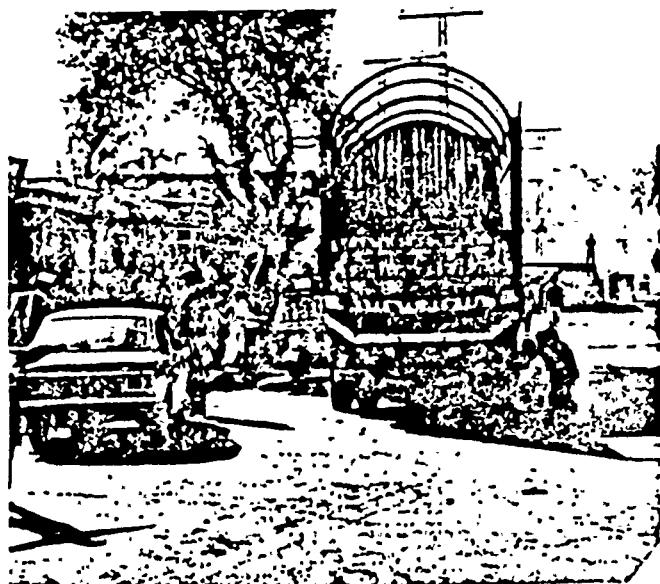
2. Lists of recommended tools and equipment needed for the vehicle maintenance center. (Annex-F)
 3. List of recommended spare parts. (Annex-G)
 4. Proposed staffing pattern and required skills. (Annex-H)
 5. Outline of a training program for the facilities personnel. (Annex-I)
 6. Estimated cost for maintenance facility. (Annex-J)
- 8) This survey and attendant cost estimates deal with a facility geared to supporting AID-supplied vehicles. The resistance parties' fleets are significantly larger than the component supplied by AID, however, and based upon operating experience of the facility, and the development of additional information about the total resistance transport fleet, it may be useful at a later date to address the feasibility of having the vehicle maintenance and training center support the entire fleet.



TYPICAL LOCAL TRUCK
REPAIR SHOP



INSIDE VIEW OF ABOVE



STREET ACTIVITIES



TYPICAL BAZAR REPAIR SHOP

TRUCK REPAIR SHOPS PESHAWAR

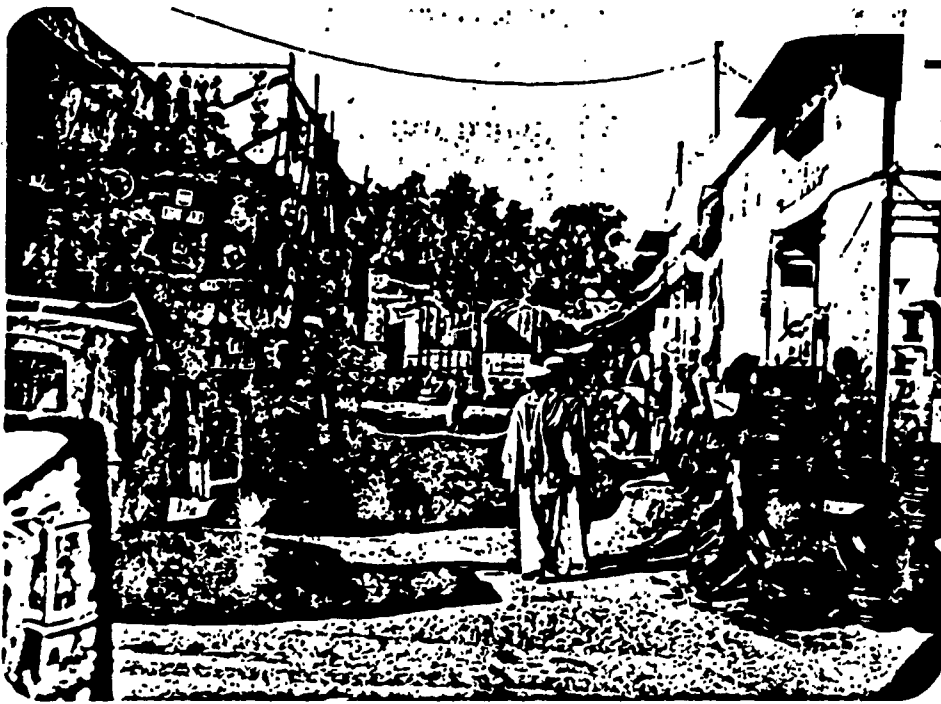
PESHAWAR MOTORS
SHOPS-MAIN WORKING
AREAS IN STREET



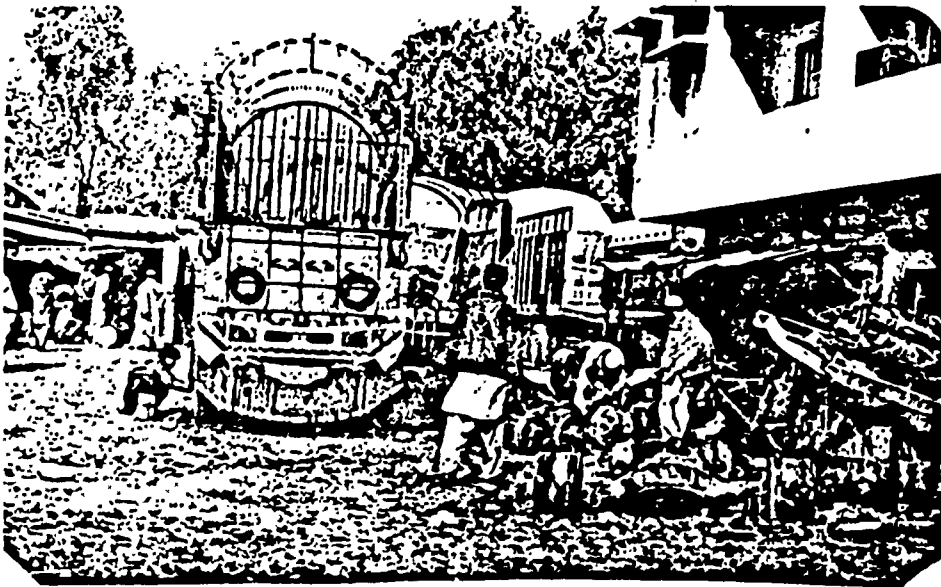
RAINBOW MOTORS
TRUCK WORK DONE AT
SUZUKI MOTORS IN
IN SHUBA BAZAR

UNITED MOTORS
TRUCK WORK DONE AT
FARIB AUTO IN
SHUBA BAZAR





FARIB AUTO
TRUCK REPAIR
SHOP-SHUBA BAZAR
ENTRANCE



FARIB AUTO
INSIDE VIEW



FARIB AUTO
INSIDE VIEW

-20-



SUZUKI
TRUCK-REPAIR
SHUBA BAZAR



MAUQADED GARAGES



MAUQADED GARAGE



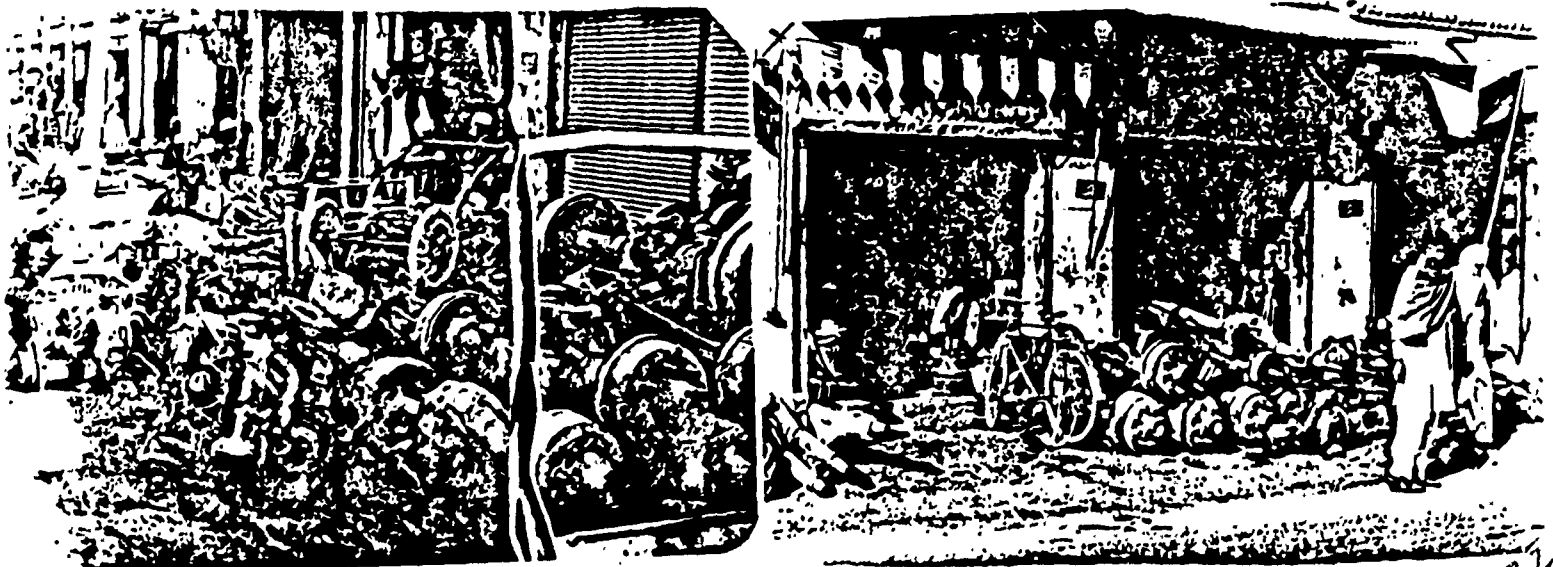
HAJI ABRAHIM SHOP

REBUILT PARTS SUPPLY



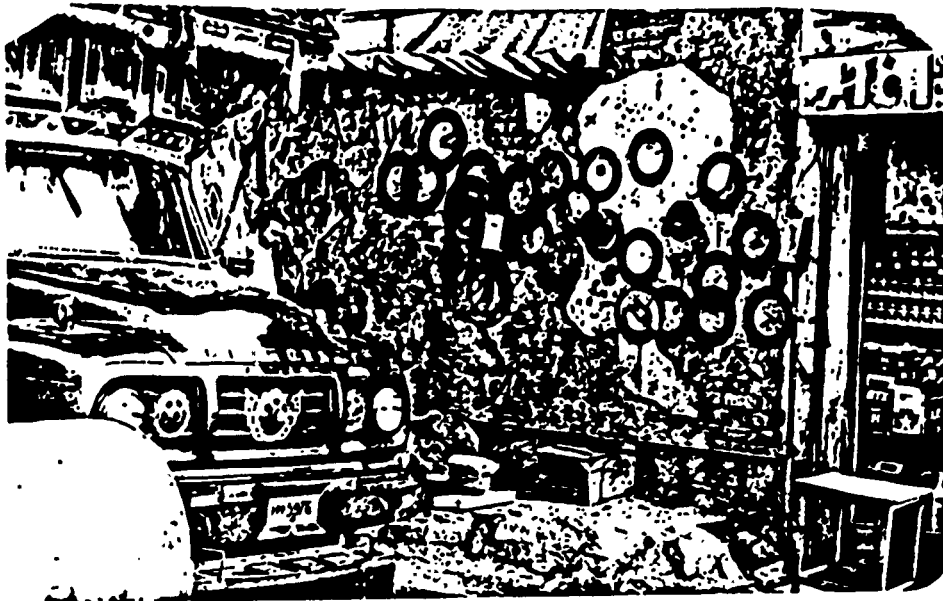
ENGINE BLOCKS USED
FOR SPARES AND
REMANUFACTURING

AXLES-DIFFERENTIALS
FOR REMANUFACTURING

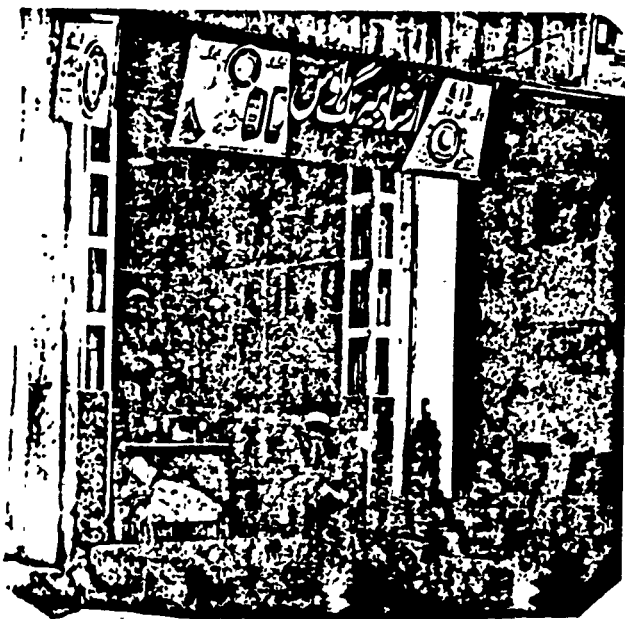


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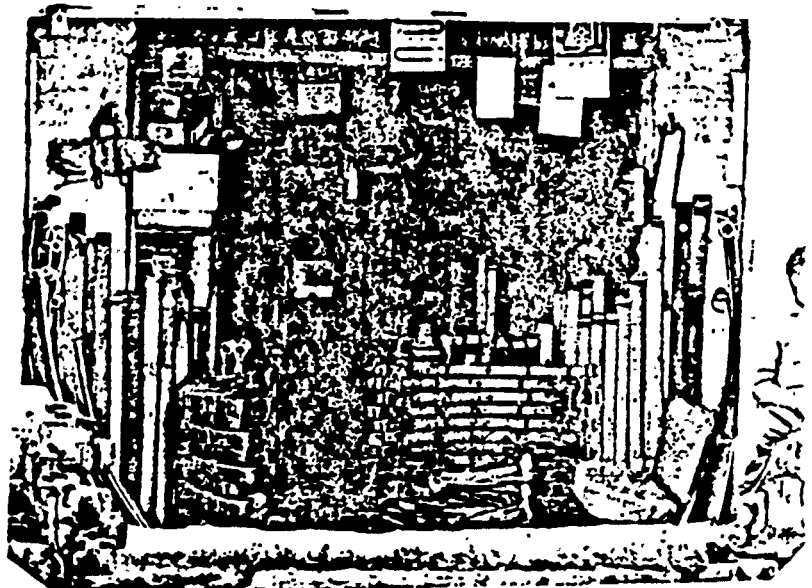
SPARE PARTS SUPPLY



NEW & USED CLUTCH
LININGS



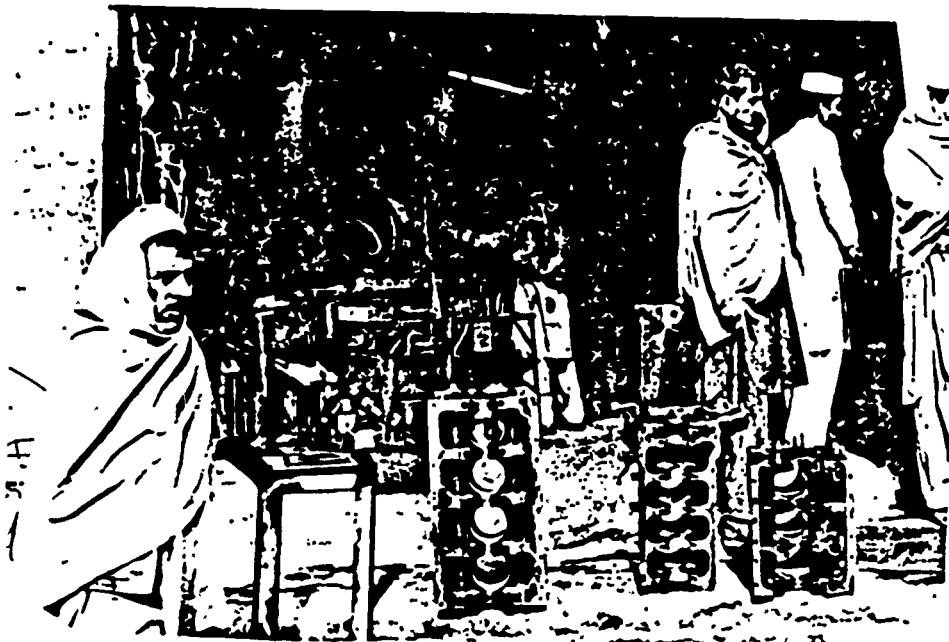
REBUILT BEARINGS



REBUILT SPRINGS



REBUILT STARTERS
GENERATORS
ALTERNATORS
VOLTAGE REGULATORS



REMANUFACTURING
OF ENGINE BLOCKS
PISTONS AND ETC



REMANUFACTURE OF
AXLE HUBS AND
BRAKE DRUMS



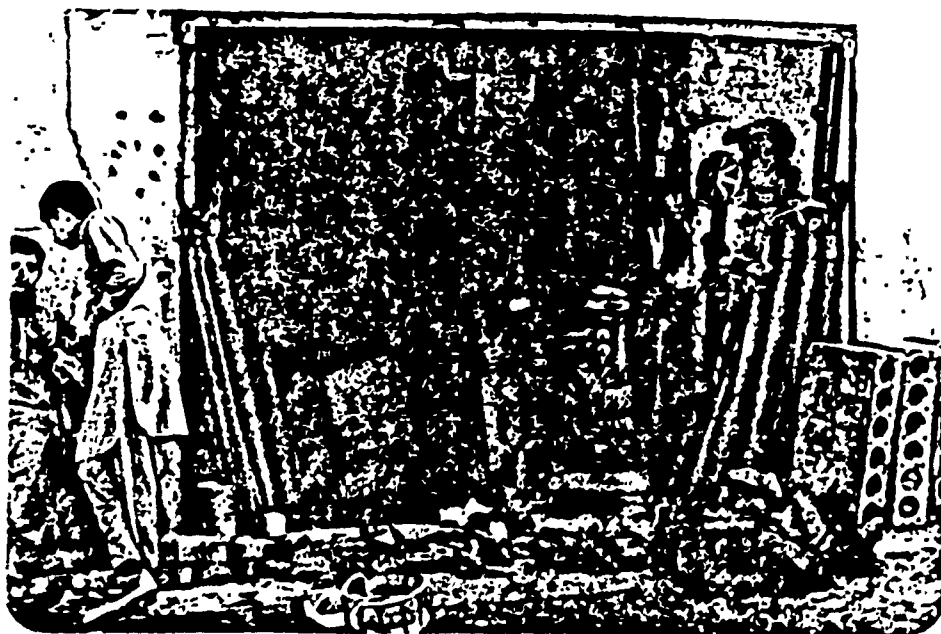
VEHICLE AXLE
MANUFACTURING
FACTORY



REMANUFACTURE OF
PISTON AND ENGINE
BLOCKS

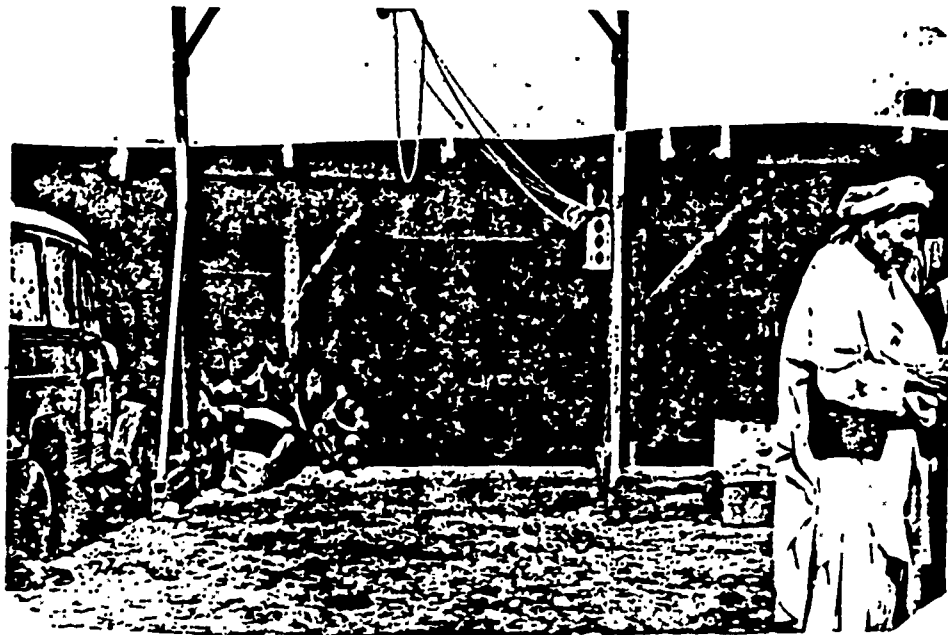


REMANUFACTURE
DIFFERENTIAL GEARS

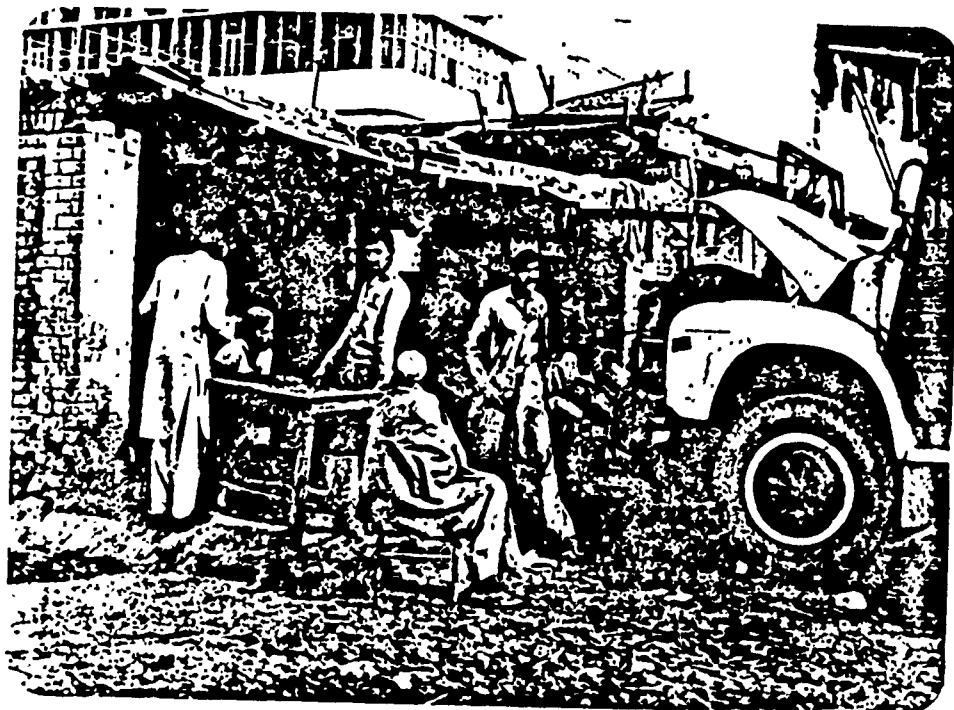


REBUILDING AXLES
DRIVE LINES

SHOP EQUIPMENT



FARIB MOTORS
TRUCK BAY



SUZUKI TRUCK REPAIR
AREA AND TOOLS



MAUQADED SHOP
(MODERN METHOD OF
MOVING ENGINE BLOCKS)

LOCAL SHOP EQUIPMENT AND TOOLS - PESHAWAR



ENGINE OVERHAUL
SHUBA SHOP

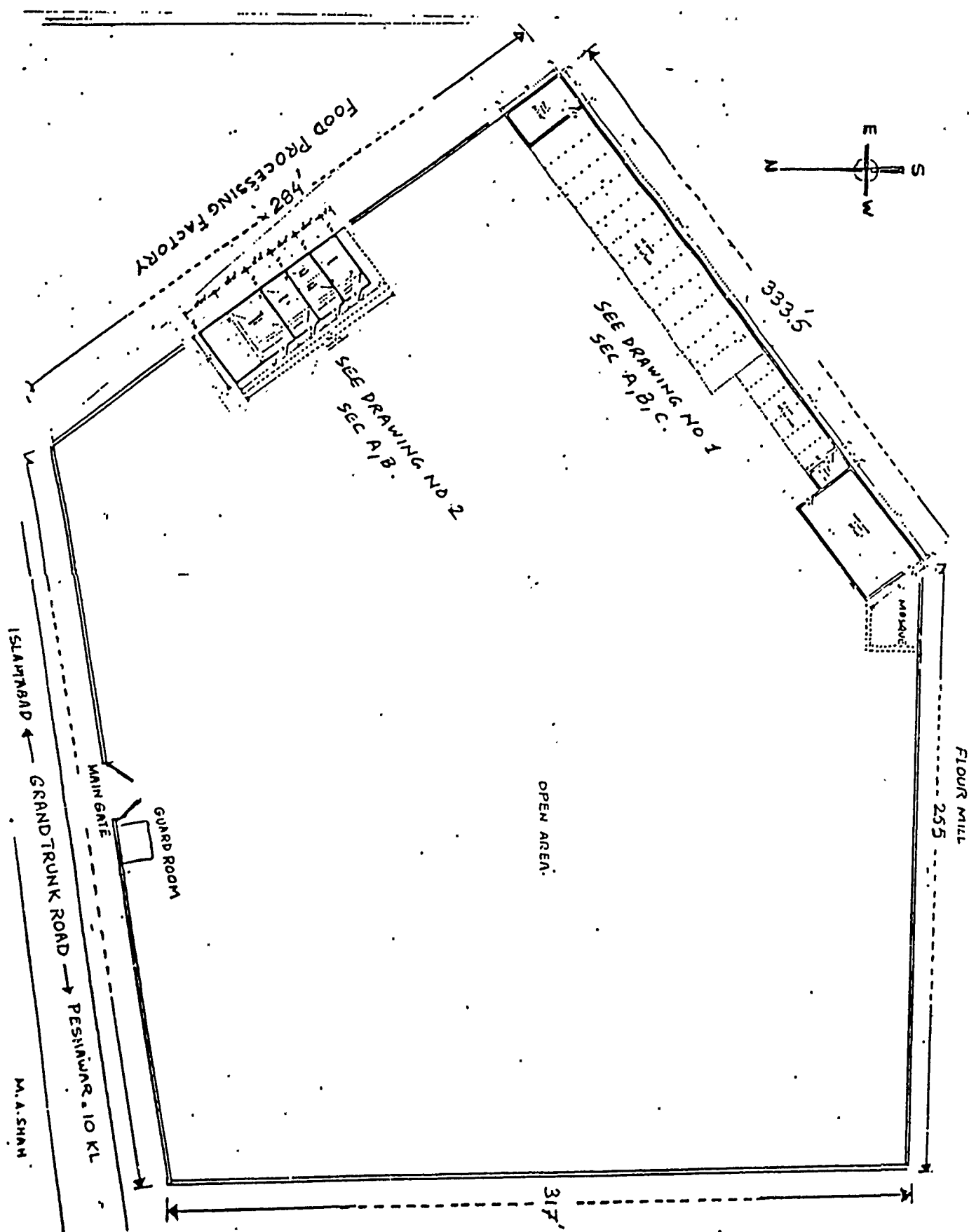


INSTALL AXLE TUBE
(MODERN PRESS)

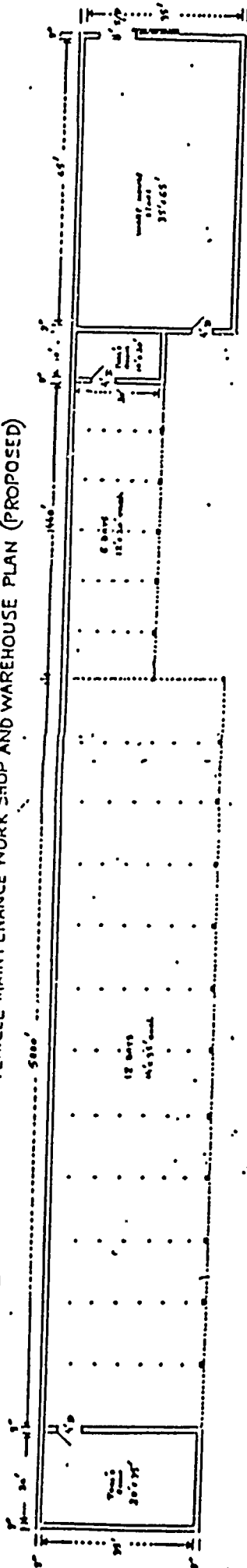


REBUILDING AXLE HUB
AND DIFFERENTIAL HOUSING

ILLUSTRATIVE VEHICLE MAINTENANCE AND TRAINING CENTER LAYOUT



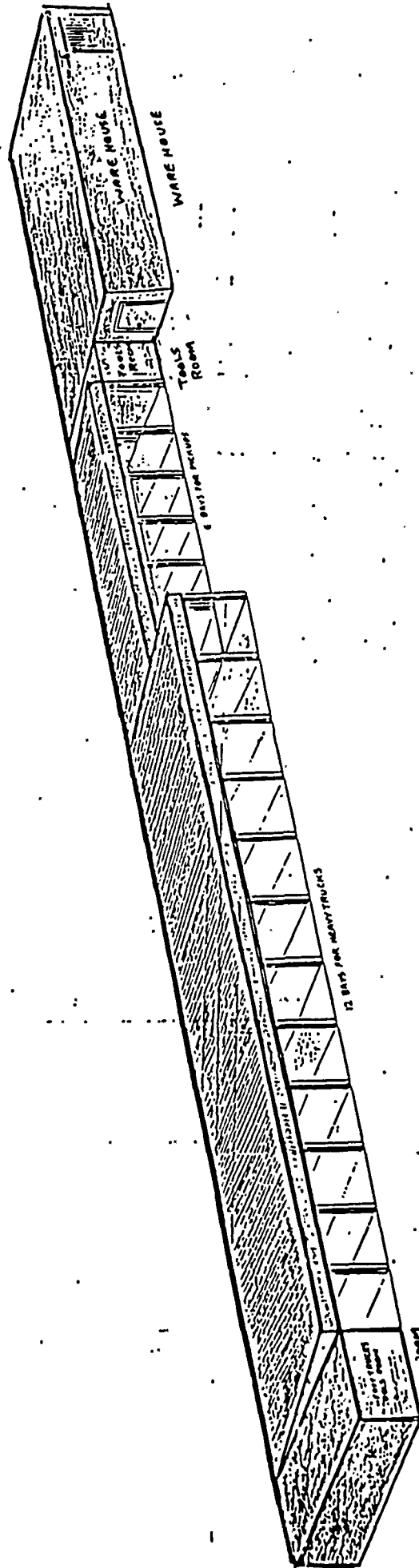
VEHICLE MAINTENANCE WORK SHOP AND WAREHOUSE PLAN (PROPOSED)



M. G. Smith
DEC 1/87

DRAWING NO 1
SEC (A)
SEC (B)

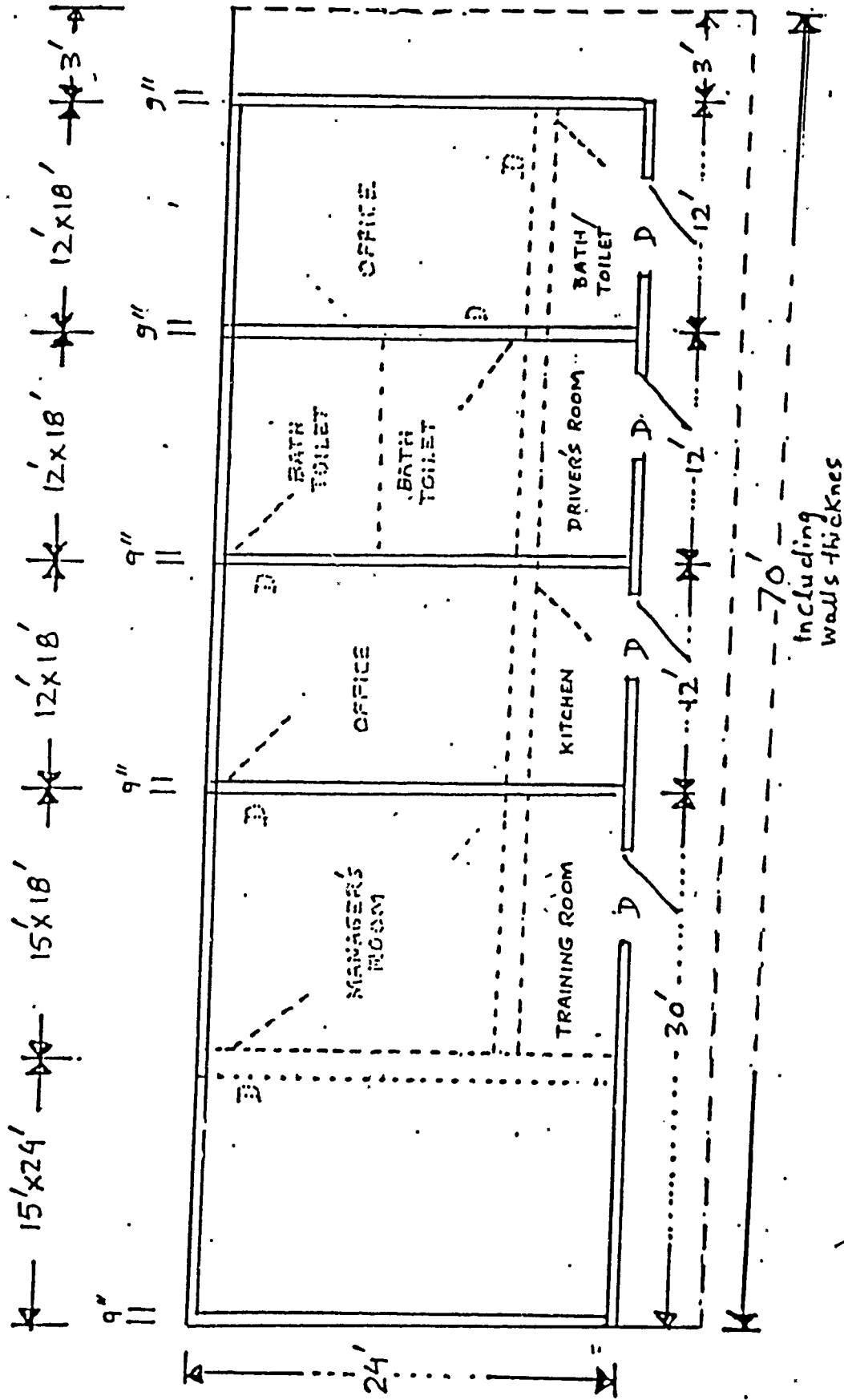
VEHICLE MAINTENANCE WORK SHOP AND WAREHOUSE BUILDING. (PROPOSED)



M. A. SMITH
DEC 2/87

DRAWING NO. 1
SEC (C)

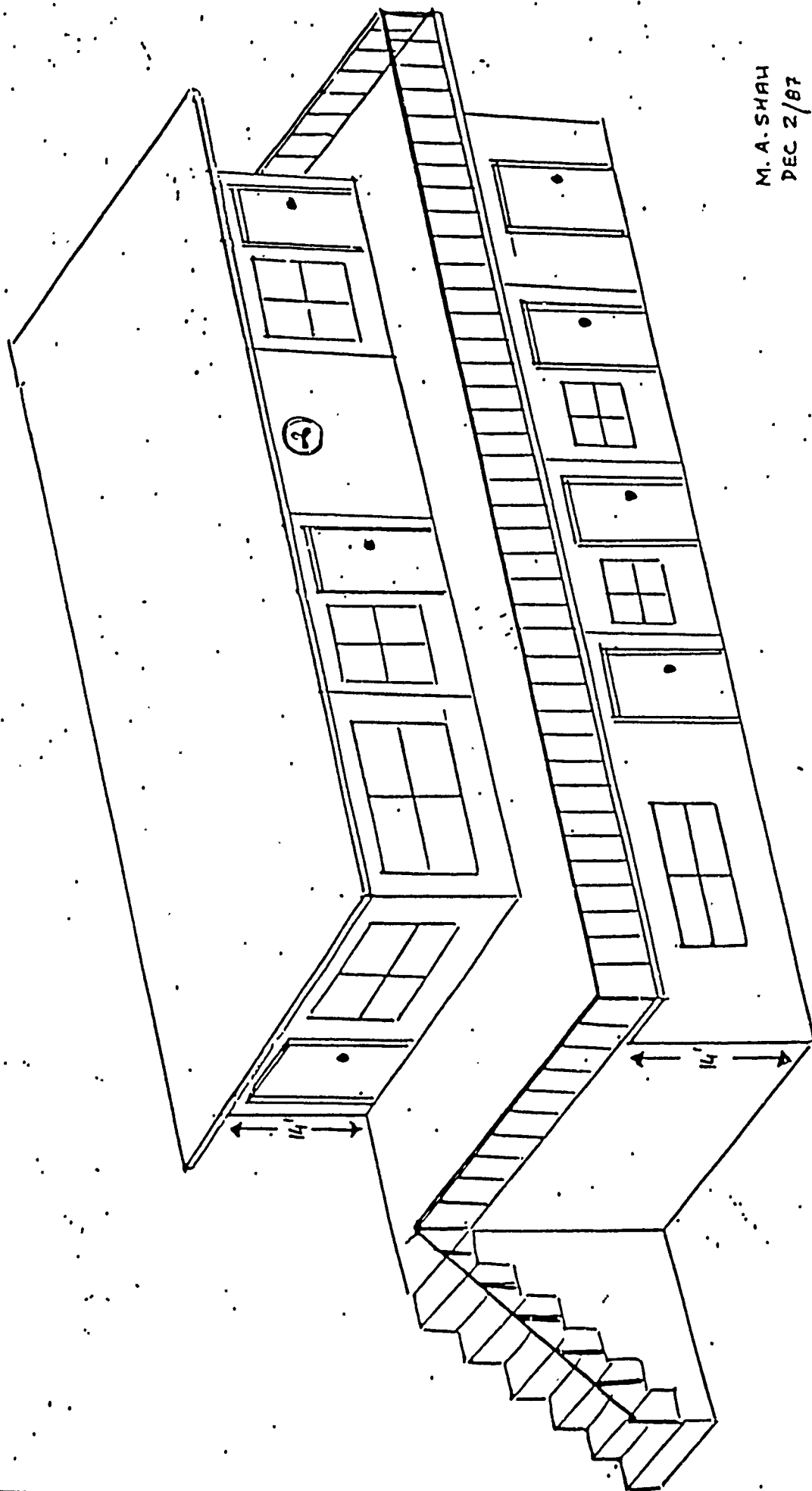
PLAN OF MAINTENANCE SHOP OFFICE D/STOREY (PROPOSED)



M. A. SHAH
DEC 2/87

DRAWING NO 2
SEC (A)

MAINTENANCE SHOP OFFICE-D/STOREY BUILDING (PROPOSED)



M. A. SHAH
DEC 2/87

DRAWING NO 2
SEC(B)

R E C O M E N D E D
SHOP EQUIPMENT

ITEM #	DESCRIPTION	QTY	PRICE	TOT/
1.	Grounded Trouble lights, 50ft, 10 AMP, Outlet and Switch MMC # 1550K2 Or Equivalent.	10 Ea.	30.49	304.90
2.	Liquid dispensers -Steel, 5 quart capacity, Flexible Spout MMC # 4313T4 Or Equiv.	6 Ea.	37.61	225.66
3.	Radiator Filler - Hot dipped Galvanized construction 3 gal cp. MMC # 4306T2 Or Equiv.	6 Ea.	17.28	103.68
4.	GI Gas Cans, 5 gal cap. made of 20 ga, steel. 5 gal cap. MMC # 4303T5	10 Ea.	24.18	241.40
5.	Welders Truck Center Reinforced column with lift ring pneumatic wheels 16"x4" W/Heavy duty lock, tool box MMC # 2527T13 Or Equiv.	4 Ea.	269.02	1076.08
6.	Hydraulic Jacks - 12 Ton Cap. Q/build in hand pump MMC # 8803T19 Or Equiv.	4 Ea.	79.98	320.02
7.	Hydraulic Jack - General Purpose 5 Ton Cap. wide sled type base build in hand pump. MMC # 2912T30 Or Equiv.	4 Ea.	75.17	310.68
8.	Hydraulic Maintenance Set 10 Ton Cap. Single acting hand Pump W/36 attachment W/Case. MMC # 2894T14 Or Equiv.	2 Ea.	848.00	1696.00
9.	Transmission Jack - Hydraulic 1/4 ton cap. Low Profile single speed hand operated 1/2 cap. MMC # 2906T14 Or Equiv.	2 Ea.	741.52	1483.04
10.	Hydraulic Service Jacks - 4 Ton Cap. Speed Pump. Manually operated steel front wheels swivel casters in rear. MMC # 2908T1 Or Equiv.	4 Ea.	974.21	3896.84
11.	Hydraulic Service Jacks - 10 Ton cap. speed pump. manually operated steel front wheels, swivel caster wheels in rear. MMC # 2908T2 Or Equiv.	4 Ea.	1685.21	6740.84
12.	Jack Stand - Leveling Jacks, 10 Ton H.D. Pin type welded steel tripo base, carrying handle MMC # 8825T20 Or Equiv.	4 Prs.	171.45	685.80
13.	Floor Cranes, Hydraulic, Hand operated Hydraulic System, rear mtd towing handle. 1 ton cap. MMC # 3255T16 Or Equiv.	2 Ea.	3271.17	6542.34
14.	Gantry Crane, 2 ton cap. legs adjustable for height 8" beam swivel type roller bearing wheels	1 Ea.	1697.39	1697.39

R E C O M E N D E D
SHOP EQUIPMENT

ITEM #	DESCRIPTION	QTY	PRICE	TOT
15.	Oilers - Hand, Steel finish cans 8 oz cap. Ridgid spouts MMC # 1258K12	12 Ea.	1.40	16.
16.	Oilers - Hand Steel finish. 8 oz cap. Flex spouts MMC # 1258K31	12 Ea.	2.08	24.
17.	Grease Guns - Hand operated, 20 oz cap. With Extension nozzle with snap on coupler MMC # 1055K11 Or Equiv.	12 Ea.	8.84	106.
18.	Gear Lubricant Dispensers Pump drum assembly clamps to drum w/dolly 5½ ft No totalizing meter. MMC # 1077K11 Or Equiv.	2 Ea.	255.70	511.
19.	Lube Service Aprt. Portable 10" wheels 30 lb cap. fluid pump. grease gun and air tank MMC # 1010K1 Or Equiv.	2 Ea.	466.67	933.
20.	Bearing Packers - H.D. Mode 1 Packs bearing ½" to 6½" MMC # 1074K2 Or Equiv.	2 Ea.	46.67	93.
21.	Grease Fittings Assortment. Metric 100 fittings 155'2 - S MMC # 1315K14	2 Sets	96.80	193.6
22.	Diesets - numbers 1/4 character heavy duty. MMC # 1556T420 Or Equiv.	1 Set	25.95	25.9
23.	Diesets - Letters 1/4 Characters H.D. MMC # 1556T230 Or Equiv.	1 Set	77.80	77.8
24.	Paint Spray Set - non Bleeder Die cast alum spray gun air transformer, 15 ft 1/4" hose w/Mtd bracket MMC # 7850T14 Or Equiv.	1 Set	120.20	120.2
25.	Pressure Washer -Cold water 230V 8"wheel casters rubber fixed wheels W/35' Pressure hose, nozzles and Fittings. MMC # 3332K14 Or Equiv.	1 Ea.	1499.03	1499.0
26.	Cleaning gun. HI-Pressure, W/18" extension MMC # 3379K11 Or Equiv.	2 Ea	36.70	73.4
27.	Blow Torch - Gasoline, General Purpose 1 Quart Cap. Flame length 6 - 7 inches W/Wrench, spare orifice, cleaner and washer, MMC # 3377K14 Or Equiv.	2 Ea.	52.16	104.3
28.	Rotary hand pump, self priming, basic pump to transfer liquids from storage to gas or diesel equip. 40" suction pipe fits 2" openings, 8 feet resistant hose and nozzle MMC # 4236K50 Or Equiv.	2 Ea	103.83	207.6

R E C O M E N D E D
SHOP EQUIPMENT

ITEM #	DESCRIPTION	QTY	PRICE	TOT
29.	Air Compressor - Single stage, 3 HP. 230/460 Volt. Horizontal Mtd. Thermal Overload Projection cut in pressure 80 PSI Cutoff 100 PSI. MMC # 4362K47 Or Equiv.	1 Ea.	2278.77	2278.
30.	Hose Clamp Assortment - worm drive 1/4" to 3" clamps. steel screw MMC # 5419K17 Or Equiv.	2 Sets	68.87	137.
31.	Compression & Flare tubing fitting assort. 211 Pc Set W/Plastic case - MMC # 5198K2 Or Equiv.	2 Sets	23.84	47.
32.	Pullers - STD Set, Jaw, Bearing, push, comp w/box wrenches, MMC # 6348K5 Or Equiv.	1 Set	650.70	650.
33.	Wheel Hub Puller - 3 Jaws, Tool Spread 7 1/2 inch, 5 1/2 inch MMC # 6130K11 Or Equiv.	1 Ea.	74.96	74.
34.	Battery Charger. Portable 230V. 50cy 6 & 12V batteries Thermal overload protector 50 AMP. Adjustable. MMC # 7322K52 Or Equiv.	2 Ea.	355.03	710.0
35.	Terminal Kits, Insulated and Non Insulated. Comp with Crimping tool/wire stripper and storage case 440 PC Set MMC # 7123K10 Or Equiv.	1 Set	74.85	74.8
36.	Growler. External & internal test armatures 6" to 12" Diameter 230V. MMC # 7275K13 Or Equiv.	1 Ea.	130.80	130.8
37.	Tape Rules Manual Yellow Blade 3mm/100ft. 1/2" wide MMC # 1978A34 Or Equiv.	12 Ea.	4.44	52.8
38.	Tape Rule - Long Yellow blade 30mm/100ft 3/8 wide MMC # 6838A53	1 Ea.	23.15	23.1
39.	Combination Squares-3 Pc Set W/Center head - 300 mm inch - Metric MMC # 2108A16 Or Equiv.	1 Ea.	44.00	44.0
40.	Micrometers - Metric Model outside 50 - 150mm. MMC # 2046A52 Or Equiv.	1 Set	155.48	155.4
41.	Inside Micrometer - Metric, Range 50-200mm, Rod 6, W/Case MMC # 2048A41 Or Equiv.	1 Set	72.50	72.5
42.	Dial Indicator - Starrett Set No 196. MMC # 2217A11 Or Equiv.	1 Set	70.00	70.0
43.	Levels - Aluminum - Inch/Metric ruled edge 18" MMC # 2137A1 Or Equiv.	2 Ea.	22.39	44.7

R E C O M E N D E D
SHOP EQUIPMENT

ITEM #	DESCRIPTION	QTY	PRICE	TOTAL
44.	Levels - Aluminum - Inch / Metric ruled edge 30" MMC # 2137A4 Or Equiv.	2 Ea.	28.01	56.0
45.	Arbor Press - 2 Ton Cap. Plain Lever MMC # 2425A12 Or Equiv.	1 Ea.	303.71	303.7
46.	Hydraulic Press - H.Frame, 50 Ton Hand operated, Floor space 36"X43½" comp with, VBlocks, Table Plates heads pressure gavgas, veenose & Flat Nose MMC# 2374/A20	1 Ea.	256.90	256.9
47.	Tube Flaring & Cutting Kits, Complete with Flaring tool, bending spaing, wrench & cuse. MMC # 2700A12 Or Equiv.	2 Kit	73,58	147.1
48.	Pipe Threaders -(ISO) metric 16-40 mm. High speed steel set, all dies in set enclosed type w/metal case MMC # 2536A999	1 Set	204.31	204.3
49.	Pipe Cutter. 1/8 to 2" single wheel & handle MMC # 2679A2 or Equiv.	2 Ea.	69.95	139.9
50.	Extra Cutters for pipe cutter MMC # 2680A13 or Equiv.	4 Ea.	4.32	17.2
51.	Tap & Die Set, 31Pc, 3 - 12 mm W/Case, MMC # 2646A13 or Equiv. Wrenches, MMC # 2629A16	1 Set	321.60	321.60
52.	Die & Drill Set. Metric 2.5 to 20 mm 3 Diestocks, 2 Tap wrenches W/Case MMC # 2601A11	1 Set	540.00	540.00
53.	Stud Remover - 1/4 to 3/4" stud size ½" Ratchet drive MMC # 2537A11	1 Ea.	17/04	17.04
54.	Screw Extractors - Straight Flute 5 Size Set, 1/4Thru 5/8" MMC # 8289A11	1 Set	10.91	10.91
55.	Restoring File - Metric Thread MMC # 8309A11 Or Equiv	4 Ea.	5.96	23.84
56.	Drill Sets - Metric 1.0 to 13.0mm by 5mm, 25 drills per set w/case MMC # 2788A13 or Equiv.	2 Set	75.00	150.00
57.	Drill Sets - Metric 6.0 - 10.0mm by 1mm, 41 drills per set w/case MMC # 2788A14	1 Set	126.47	126.47
58.	Auger Bits - 1/4 to 1" diameter, 13 Pc. MMC # 2898A1 or Equiv.	2 Set	61.32	122.64
59.	Brace Expansion Bit, Range 5/8 to 1 3/4 MMC # 2892A6 Or Equiv.	2 Ea.	11.61	23.22

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R E C O M E N D E D
S H O P E Q U I P M E N T

ITEM #	DESCRIPTION	QTY	PRICE	TO
60.	Reamer Set - 8 Pc 15/32 to 1 1/16" straight blades. MMC # 3141A81	1 Set	299.59	299.5
61.	Bit Brace - 12"sweep. Rd or Square bits 1/8 to 1/2". MMC# 2865A3 Or Equiv.	3 Ea.	41.77	125.3
62.	H.D.Electric Drill - 3/8" Variable speed 0-1200 Rpm. for & rev. 240V MMC # 2831A41	2 Ea.	151.00	302.0
63.	H.D.Electric Drill. 1/2 single Speed 240V. MMC#8863A13 Or Equiv.	1 Ea.	217.31	217.3
64.	H.D.Electric Drills. 1/4 inch. Single speed 240V MMC # 2830A31	2 Ea.	151.83	303.6
65.	Heavy Duty Drill Press. 20", 1 1/2 Hp Variable speed 230V 50 Hz Single Ph. MMC # 2776A43 Or Equiv.	1 Ea.	2436.00	2436.0
66.	Bolt - Metal Cutter. 24" H.D. MMC # 3759A10 Or Equiv.	1 Ea.	72.73	72.7
67.	Snips - Straight Pattern-3 Cut MMC # 3895A2 Or Equiv.	2 Ea.	21.05	42.1
68.	Snips - Straight or circular. 2 1/4 Cut MMC # 3902A4	4 Ea.	9.11	36.4
69.	Snips Circular cutting 2 1/4 cut. MMC # 3896A3	3 Ea.	10.38	30.9
70.	Nipper cutlers. STD quality 10". MMC # 3735A2 Or Equiv.	3 Ea.	10.99	32.9
71.	Puty Knives 2" MMC # 3464A5 Or Equiv.	6 Ea.	5.58	33.4
72.	Scrappers - 3" MMC # 3668A3	6 Ea.	4.37	26.2
73.	Bench Plane 2" side, 14" MMC # 3692A15 Or Equiv.	3 Ea.	43.17	129.5
74.	Wood Chisels Sets. 6 Pc Set 1/4 to 1 1/2" MMC # 3590A2 Or Equiv.	2 Set	41.09	82.1
75.	Hole Saws - General Purpose Metal units 11 inter changeable saws 1 to 3 1/2" diameters MMC # 4063A11 Or Equiv.	2 Set	43.01	86.0
76.	Hack saw Blades - 12" STD Flexible 18 teeth per in. MMC # 4050A50 Or Equiv.	200	60.00	60.0
77.	Saw Straight back - wood 26" MMC # 4088A32 Or Equiv.	4 Ea.	19.07	76.2

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R E C O M E N D E D
SHOP EQUIPMENT

ITEM #	DESCRIPTION	QTY	PRICE	TOTL
78.	FILES:			
	Flat - 12" MMC # 4219A15	1 Doz.	73.58	882.9
	Mill - 12" MMC # 4225A15	1 Doz.	58.69	704.2
	Half Round 12" MMC # 4221A15	1 Doz	97.40	1168.8
	Triangle 10" MMC # 4228A14	1 Doz	64.12	769.4
	Deep cut 12" MMC # 4224A13 Or Equiv.	1 Doz	80.94	971.2
	Filecards 8" MMC # 4332A12	6 Ea.	2.50	15.0
	Common File Handles MMC # 4320A3	2 Doz	6.30	151.2
79.	Wheel Dresser Grinding MMC # 4528A1	2 Ea.	7.07	14.1
	Replacement cutters MMC # 4530A2	4 Set	1.13	4.5
80.	Punch and Chisel Sets, 24 Prs MMC # 3470A20 Or Equiv.	12	71.25	855.00
81.	Punch Sets, H.D.Hallow, STD Kit, 9 Punches, MMC # 3494A11	6		
82.	Floor Shear. STD. W/Steel Handle MMC # 3800A2 Or Equiv.	1	755.65	755.65
83.	Extra Blades, Pair MMC # 3800A4	2	59.05	118.10
84.	Utility Knives, W/Blades MMC # 3682A11	6	5.39	32.39
85.	Extra Blades Pkg MMC # 3682A21	10Pkg	1.12	11.20
86.	Arbor Saw Tilt, Blade size 10 1/4" Table 35"x24", 6 inch Stand, Belts, Pulleys Equiped with 2Hp, 1ph 208.230V And Attachments. MMC #	1	742.86	742.86
87.	Tooth Blabes (40) 10"x5/8" Arbor MMC # 6901A27 Or Equiv.	4	37.35	149.40
88.	Power Saw, Worm Drive, 7 1/4" 240V. MMC # 4155A12	2	245.52	491.04
89.	Saw Blabes. All purpose, 7 1/4" MMC 4038A79 Or Equiv.	6	6.19	37.14
90.	Hack Saws. ADJ -10"-12", 3 1/2 Throat MMC # 4077A1 Or Equiv	12	10.12	121.44
91.	Bench Grinders, H.D.VT, 1, TY 7" Wheel 230V. 50Hz MMC # 4374A65	5	258.82	1294.10
92.	Grinding Wheels, 7"x3/4" 5/8 Bore, 60GRIT, MMC # 4461A470	5	23.65	118.25
93.	Wire Wheel Brushes; 7" 5/8 Bore, MMC # 4877A24	5	20.11	100.55

AB

RECOMMENDED
SHOP EQUIPMENT

ITEM #	DESCRIPTION	QTY	PRICE	TOTAL
94.	Grinder - Pedestal H.D. 12" 230V. 3Ph. Comp. Pedestal wheels, overload protection, switches MMC # 4606A20 Or Equiv.	1	1369.41	3169.41
95.	Grinding Wheels, 12"x2", 46 Grit MMC # 4606A50	2	66.08	132.16
96.	Lapping Polishing Compounds			
	Very Fine MMC # 4779A16	6	4.77	28.62
	Fine MMC # 4779A22	6	3.81	22.86
	Medium MMC # 4779A33	6	3.81	22.86
	Special Navy MMC # 4779A81	6	4.03	24.18
97.	Sharpening Stones Gen. Purpose Medium MMC # 4513A21 Or Equiv.	6	4.95	29.70
98.	C-Clamps-Steel:-			
	3" Openning MMC # 5027A13	2	12.20	24.40
	4" Openning MMC # 5027A14	2	13.60	27.20
	6" Openning MMC # 5027A15	2	18.80	37.60
	8" Openning MMC # 5027A16	2	27.35	54.70
	10" Openning MMC # 5027A17	2	34.70	69.40
	12" Openning MMC # 5027A18	2	45.84	91.68
99.	Pipe Vise, Tripod Stand 1/8 to 5" Cap. Chain Type. MMC # 5340A2 Or Equiv.	2	207.83	415.66
100.	Bench Vises 5"Jaw, MMC # 5310A4 Or Equiv.	12	83.75	1005.00
101.	HEX KEY Sets. Metric, 8Pc MMC # 8377A42 Or Equiv.	6	19.83	100.98
102.	Mechanics Tool Sets - 83Pc Metric - Sockets, Box wrenches, openend wrenches, pliers, Screw Drivers, Hunmurs Hacksaw & Blades, MMC # 7317A35 Or Equiv.	12	820.14	9,841.68
103.	Carpenters Tool Set. 19Pc Hammers, Square, Plane, Blade bits, hand saw MMC # 6553A14	2	289.82	579.64
104.	3/4" Drive Socket Set, Metric 12 Sizes, 19mm - 60mm MMC # 8362A12 Or Equiv.	2	379.07	1,137.21
105.	Tool Set. English, 93 Pc. MMC # 7207A	2	576.46	1,152.92
106.	Set. Metric Combination Wrench 6mm to 11mm. MMC # 7194A46	6	38.50	231.00

R E C O M E N D E D
S H O P E Q U I P M E N T

ITEM #	DESCRIPTION	QTY	PRICE	TOTAL
107.	Set Metric, Combination Wrench 8mm To 2mm. MMC # 7191A49	6	64.91	389.46
108.	Vise Grips - Straight Nose, 7" MMC # 5369A1 10" MMC # 5369A2	6 6	6.91 7.44	41.46 44.64
109.	Pipe Wrenches. Straight Type 6" Cap 3/4" MMC # 5357A121 8" Cap 1" MMC # 5357A122 10" Cap 1 1/2" MMC # 5357A123 12" Cap 2" MMC # 5357A124 18" Cap 2 1/2" MMC # 5357A126 24" Cap 3" MMC # 5357A127 36" Cap 5" MMC # 5357A128	2 2 4 4 2 2 1	8.50 9.95 13.15 13.15 24.70 38.85 82.10	17.00 19.90 52.60 52.60 49.40 77.70 82.10
110.	Adjustable Wrenches (Crescent) 6" Cap 3/4" MMC # 5385A12 8" Cap 1 5/16" MMC # 5385A13 10" Cap 1 1/8" MMC # 5385A14 12" Cap 1 5/16" MMC # 5385A15 15" Cap 1 11/16" MMC # 5385A16 18" Cap 2 1/16" MMC # 5385A17 24" Cap 2 7/16" MMC # 5385A18	6 8 6 6 2 2 1	6.85 7.76 9.79 14.24 22.96 38.50 65.26	41.10 62.08 58.74 85.44 45.92 77.00 65.26
111.	Ring Pilers External 7" MMC # 5773A14 Or Equiv.	2	9.07	18.14
112.	Retaining Ring Plier Set Internal & External MMC # 5626A15	2	7.56	15.12
113.	Plier Set - All Purpose. 5Pc. MMC # 5671A21 Or Equiv	6	55.38	332.28
114.	Plier Set. 3Pc. MMC # 5650A9 Or Equiv.	6	15.67	94.02
115.	Torque Wrench Direct Rending Eng/Metric, 34mm	2	150.16	300.32
116.	Hammers:- Babbitt Hammer 2 1/2 Lb MMC # 5910A3 Nail Hammers 22 Oz MMC # 6061A4 Ball Peen 12 Oz MMC # 5858A18 Ball Peen 24 Oz MMC # 5858A12 Sledges 4 Lb MMC # 5884A13 Sledges 8 Lb MMC # 5884A15	4 6 6 6 3 3	11.64 20.55 14.71 16.57 17.40 19.79	46.56 123.30 88.26 99.42 52.20 59.37

R E C O M M E N D E D
SHOP EQUIPMENT

ITEM #	DESCRIPTION	QTY	PRICE	TOTAL
117.	Nail Puller 18" MMC # 6460A11	1	126.00	126.00
118.	Crate Opener MMC # 6489A14	2	25.53	51.06
119.	Wrecking Bar 30" MMC # 6466A30	3	71.40	214.20
120.	Crow Bar 36" MMC # 6467A30	3	90.00	270.00
121.	Wire Brushes, wire. Long handle, MMC # 6531A20	6	9.34	56.04
	Flat Back. MMC # 6531A30	8	14.81	118.48
122.	Piston Ring Compressor 3.7" MMC # 6686A60 Or Equiv.	3	16.06	48.18
123.	Glaze Breaker 2" to 7" bores. MMC # 6678A12	2	22.13	44.26
124.	Stone 3 Replacement MMC # 6678A13 Or Equiv.	4	7.76	31.04
125.	Ridge Reamer 2 1/2 to 5 5/16 bore MMC # 6672A14 Or Equiv.	1	26.28	
126.	Extra Carbide Cutter MMC # 6672A17	2	8.54	17.08
127.	Brake Deliner & Riveter With tools MMC # 6132A12	1	1642.86	1642.86
128.	Blake & Clutch Bench Riveter MMC # 6660A12 Or Equiv.	1	362.07	362.07
129.	Battery Testers, Comp/Unit MMC # 4058K11 Or Equiv.	6	6.68	40.08
130.	Oxy - Acetylene weld & cut Sets, Medium Range Welds up to 1" cuts up to 2", 5 tips. MMC # 7865A1	2	329.52	459.04
131.	H.D. Welding Power Plant. 2Cyl. 4Cyl Eng. Gas			
	Powered Range 35.225Ac, 35.200 D.C. MMC # 7877A80	2	2566.92	5133.84
132.	Road Towing Trailer 2 wheel w/Accessories MMC # 7877A12	2	596.92	1193.84
133.	Accessory Kit. 35 of welding cable. Helmets MMC # 7877A60 Or Equiv.	2	124.62	249.24
134.	Hydro Air Kits, Trigger Model Comp. MMC # 5448A22 Or Equiv.	4	11.21	444.84
135.	Hose, Spray, Air, Water, 1/4" 300 PSI. MMC # 5624K21	100 ft	.45Ft	90.00
136.	Hose Coupling - Male End 1/4" Brass MMC # 5342K11 Or Equiv.	8	8.29	66.32

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R E C O M E N D E D
SHOP EQUIPMENT

ITEM #	DESCRIPTION	QTY	PRICE	TOTAL
137.	Hose Couplings - Male end 1/4" Brass. MMC # 5342K11 Or Equiv.	8	8.29	66.32
138.	Hose Coupling - Female end 1/4" Brass. MMC # 5342K18	8	6.29	50.32
139.	Clamp Assortment-worm drive 100 Pc. MMC # 5419K17	1 Set	68.87	68.87
140.	Machine Screw Assort. 940Pcs Sizes 143 to 146 metric MMC # 98746A35	1 Set	60.41	60.41
141.	Valve Seat Grinder; Comp. wheel dresser, stones. Roughing 1 1/2 to 1 7/8 General Purpose 1 1/2 to 2 1/2" finishing 1 1/2 to 1 7/8 . 220Volt. only 1Ph. MMC # 6877A11 Or Equiv.	2 Sets	1033.33	2066.66
142.	Valve face grinder. Comp Pomptank coolant. 220 Volt 1Ph MMC # 6889A21 Or Equiv.	2 Sets	1859.95	3719.90
143.	Fire Retardent Paper - for gaskets -.032 MMC # 9339K5	1 Roll	60.82	60.82
144.	Paper Sheets - Gasket Material. .060 Thick - 12"X 96" MMC # 8488K13 Or Equiv.	3 Roll	20.02	60.06
145.	Cork Sheets - Gasket Material 1/16 Thick 12"X36" MMC # 9487K1 Or Equiv.	18 Sheet	.48	8.64
146.	NOTE: Other shop Equipment to purchased - Metal, Lathe, Diesel Nozzle & Compression testors, line Battery charger and gas engine electronic equipment.	ESTIMATED COST		4,500.00
TOTAL	ITEMS 146. ESTIMATED	TOTAL	COST=====	\$ 92,253.97

RECOMMENDED THREE YEAR SUPPLY OF SPARE PARTS
70 EACH MODEL GT175KA AND 77 EACH MODEL GT173KA HINO TRUCKS

ITEM #	PART #	DESCRIPTION	QTY	UNIT	AMOUNT
67.	81271 - 1040	Lens	24	198	4,752
68.	81551 - 1010	Lens, RH	24	432	10,368
69.	81551 - 1020	Lens, RH	24	540	12,960
70.	81561 - 1010	Lens, LH	24	540	12,960
71.	81671 - 1050	Lens	24	225	5,400
72.	9008 -58101	Fusible Link	18	162	2,916
73.	9008 -58102	Fusible Link	18	162	2,916
74.	9008 -58103	Fusible Link	18	279	5,022

		FUEL TANK			
75.	83320 - 1040	Gage Assy	12	1,377	16,524
76.	83361 - 1020	Gasket	12	71	852
77.	77010 - 1010	Plug Assy Fuel DR.	6	1,400	8,400
78.	9659 -12115	Washer Soft	36	38	1,368
79.	9659 -13101	Washer Soft	72	108	7,776
80.	9659 -42101	Washer Soft	36	47	1,692

		RADIATOR			
81.	16081 - 3040	Radiator Sub Assy	12	86,220	1,034,640
82.	16401 - 1030	Cap Sub Assy RAO	36	1,323	47,628
83.	9001 -44571	Hose RAO	72	1,386	99,972
84.	9001 -44656	Hose RAO	72	2,142	154,244
85.	16404 - 1030	Cushion Pads	72	53	3,816
86.	16410 - 1050	Cap Sub Assy	12	2,148	25,776
.	16701 - 2230	Shroud Fan	3	3,200	9,600

RECOMMENDED THREE YEAR SUPPLY OF SPARE PARTS
70 EACH MODEL GT175KA AND 77 EACH MODEL GT 173KA HINO TRUCKS

ITEM #	PART #	DESCRIPTION	QTY	UNIT	AMOUNT
EXHAUST SYSTEM					
88.	17485 - 1150	Gasket Exhaust	48	432	20,736
89.	17403 - 2120	Pipesub Assy	12	4,100	49,200
AIR CLEANER					
90.	17801 - 2200	Element Sub Assy	300	7,020	2,106,000
91.	9002 -33539	Hose Air	18	1,020	18,360
92	17881 - 2090	Hose	18	1,360	24,480
ELECTRICAL CHASSIS					
93.	85300 - 1270	Washer Assy	6	4,760	28,560
94.	85110 - 1280	Motor Assy Wiper	6	6,460	38,760
95.	84510 - 1361	Switch Assy	6	1,530	9,180
CLUTCH					
96.	31210 - 1123	Cover Assy. Clutch	24	34,704	832,896
97.	31250 - 2730	Disc Assy Clutch	48	12,852	616,896
98.	9881 -17101	Bearing, Ball	36	1,548	55,728
99.	31420 - 1410	Cyl Assy. Master	18	5,562	100,116
100.	84380 - 1110	Switch Assy	6	1,080	6,480
101.	31242 - 1060	Bearing, Clutch Throwout	36	5,040	181,440
102.	31231 - 1110	Hub Clutch	12	12,500	150,000
103.	31233 - 1060	Yoke Clutch	6	6,460	18,360
104.	31245 - 1030	Shaft	6	3,060	18,360
105.	31470 - 1170	Cly Assy	18	6,468	116,280

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RECOMMENDEL THREE YEAR SUPPLY OF SPARE PARTS
70 EACH MODEL GT175KA AND 77 EACH MODEL GT 173KA HINO TRUCKS

ITEM #	PART #	DESCRIPTION	QTY	UNIT	AMOUNT
106.	31110 - 1550	Housing Assy	3	36,890	110,670
107.	47220 - 1780	Reservior Assy	3	3,060	9,180
108.	9004 -72104	Hose Clutch	6	2,040	12,240
109.	9004 -72125	Hose Clutch	6	2,040	12,240

		T R A N S M I S S I O N S			
110.	33010 - 4100	Transmission Assy	3	306,000	918,000
111.	33111 - 2040	Trans Case	3	51,000	153,000
112.	33131 - 1441	Retainer, Brg, FR	24	3,465	83,160
113.	33132 - 1370	Gasket, Brg, Reta	36	117	4,212
114.	33142 - 1502	Gasket, Brg Reta	36	180	4,480
115.	33311 - 3640	Shaft, Input	12	21,483	257,796
116.	33321 - 1951	Shaft, Output	12	26,460	317,520
117.	33333 - 2390	Gear, 3rd	18	15,489	278,802
118.	33333 - 1810	Gear, 1st	18	21,969	395,442
119.	33337 - 2270	Gear, 6th	18	13,491	242,838
120.	33338 - 1430	Gear, Rev	18	21,961	395,442
121.	33426 - 2150	Gear, Counter Drive	18	16,488	296,784
122.	33429 - 1970	Gear, Counter 6th	18	13,491	242,838
123.	33432 - 1280	Cover Seal	24	450	10,800
124.	33451 - 1190	Shaft, Rev Idler	12	918	11,016
125.	33461 - 1590	Gear, Rev Idler	18	10,755	153,590
126.	34605 - 1280	Bearing Sub Ass	24	1,449	34,776
127.	34605 - 1290	Bearing Sub Ass	24	1,449	34,776

RECOMMENDED THREE YEAR SUPPLY OF SPARE PARTS
70 EACH MODEL GT175KA AND 77 EACH MODEL GT 173KA HINO TRUCKS

ITEM #	PART #	DESCRIPTION	QTY	UNIT	AMOUNT
128.	34605 - 1300	Bearing Sub Ass	24	1,449	34,776
129.	9509 -04104	Pin	12	47	564
130.	9659 -30102	Washer, Soft	96	66	6,336
131.	9819 -40119	Ring, Retainer	24	234	5,616
132.	9819 -41102	Ring Retainer	24	216	5,184
133.	9819 -45101	Ring, Retainer	24	198	4,752
134.	9819 -50109	Ring, Retainer	24	216	6,264
135.	9819 -50117	Ring, Retainer	24	270	6,480
136.	9819 -52101	Ring, Retainer	24	270	6,480
137.	9819 -60102	Ring, Retainer	24	162	3,888
8.	9819 -83101	Ring, Retainer	24	88	2,112
139.	9828 -48102	Seal, Oil	48	585	28,080
140.	9828 -60119	Seal, Oil	48	900	43,200
141.	9867 -52104	Bushing	36	5,616	202,176
142.	9867 -58113	Bushing	36	2,331	83,916
143.	9871 -01108	Spring, Compression	48	54	2,592
144.	9883 -40107	BRG	36	2,825	101,700
145.	9883 -45109	Bearing, Cylindr	36	4,032	145,152
146.	9883 -50114	Bearing, Cylindr	36	4,446	160,056
147.	9885 -27102	Bearing, Needle Roll	36	1,692	60,912
148.	9885 -48105	Bearing, Needle	36	2,250	81,000
149.	9885 -65101	Bearing, Needle	48	864	41,472
150.	9885 -70102	Bearing, Needle	24	1,636	39,240
151.	9885 -75101	BRG	48	1,773	85,104

RECOMMENDED THREE YEAR SUPPLY OF SPARE PARTS
70 EACH MODEL GT175KA AND 77 EACH MODEL GT 173KA HINO TRUCKS

ITEM #	PART #	DESCRIPTION	QTY	UNIT	AMOUNT
152.	33162 - 1020	Gasket, T/M PTO	36	225	8,100
		SERVICE BRAKE			
153.	83380 - 1211	Switch Assy	18	1,449	26,082
154.	83380 - 1230	Switch Assy, Press	12	1,449	17,388
		PROPELLER SHAFT FA - RA			
155.	3770 - 2082	Shaft Assy	3	22,950	68,850
156.	37306 - 1810	Yoke Sub. Assy	6	36,550	219,300
157.	37315 - 1470	Yoke V. Voint	6	15,130	90,780
158.	37401 - 1172	Spider Sub. Assy	12	14,450	173,400
159.	37402 - 1251	Bearing Sub. Assy	48	2,550	122,400
160.	37709 - 2081	Shaft Sub. Assy	6	19,040	114,240
161.	37740 - 1161	Shaft Assy	6	26,000	156,000
162.	34401 - 1061	Spider V. Joint	12	14,450	169,800
163.	37402 - 1060	Bearing Needle	48	14,450	679,200
164.	37306 - 1880	Yoke Sub Assy	12	16,150	193,800
		SERVICE BRAKE AIR			
165.	47160 - 2130	Valve Assy	12	42,500	510,000
166.	44069 - 1420	Repair Kit - Brake	36	10,200	367,200
167.	47220 - 1640	Reservoir Assy - Oil	6	10,540	63,240
168.	46640 - 1340	Air Master	6	65,790	394,740
169.	44069 - 2340	Repair Kits # 1.	24	25,500	612,000
170.	44069 - 2330	Repair Kits # 2.	24	30,000	720,000

RECOMMENDED THREE YEAR SUPPLY OF SPARE PARTS
70 EACH MODEL GT175KA AND 77 EACH MODEL GT 173KA HINO TRUCKS

ITEM #	PART #	DESCRIPTION	QTY	UNIT	AMOUNT
171.	44780 - 1020	Valve Assy Safety	12	7,650	91,800
		P A R K I N G B R A K E			
172.	46510 - 1560	Brake Assy	9	21,250	191,250
173.	46531 - 1050	Linning P/B Shoe	12	3,910	46,920
174.	9873 -02121	Spring	24	510	12,240
175.	46506 - 1030	Adjuster	12	680	8,160
176.	46511 - 1040	Drum	12	4,760	57,120
177.	46566 - 1060	Cam Shaft	6	2,040	12,240
178.	9873 -03101	Spring	12	340	4,080
179.	9872 -02104	Spring	12	340	4,080
180.	46401 - 7460	Cable Sub Assy	12	7,947	95,364
181.	84550 - 1150	Switch Assy P/B	12	837	10,044
182.	46210 - 1502	Louer Assy	6	14,450	86,700
		F R A M			
183.	48411 - 1680	Bracket Spr.F.	12	3,060	36,720
184.	48414 - 1601	Bracket Spr.R.	12	3,060	36,720
185.	48416 - 1431	Bracket Spr.R	12	3,060	36,720
186.	48403 - 2040	Bracket Sub Assy	12	5,200	62,400
187.	12035 - 1990	Mounting Sub. Assy	18	5,100	91,800
188.	51401 - 3373	Mounting Brack	18	5,100	91,800
189.	51402 - 2832	Mounting Brack L.H.	18	5,100	91,800
190.	51404 - 1350	Mounting Brack R.H.	18	5,100	91,800

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**RECOMMENDED THREE YEAR SUPPLY OF SPARE PARTS
70 EACH MODEL GT175KA AND 77 EACH MODEL GT 173KA HINO TRUCKS**

ITEM #	PART #	DESCRIPTION	QTY	UNIT	AMOUNT
		CAB MOUNTING			
191.	52309 - 1212	Hook Sub. Assy	6	22,100	132,600
192.	52038 - 1092	BR. Safety Lever	12	2,040	24,480
193.	51026 - 1311	Cab MTO Hook	12	3,400	40,800
194.	52307 - 1222	Bab MTO Hook	6	3,400	20,400
195.	52042 - 1090	Tilt Hinge	12	5,440	65,280
196.	52203 - 1270	Cushion Assy	12	2,040	24,480
197.	52470 - 1123	Cable Stopper	12	2,720	32,640
198.	52424 - 1190	Torsion Bar Tilt	6	5,643	33,858
199.	52424 - 1200	Torsion Bar Tilt	6	5,643	33,858
		FRONT SUSPENTION			
200.	9019 -22121	Tie Bolts	48	212	10,176
201.	9019 -22122	Tie Bolts	48	212	10,176
202.	9993 -12101	Bus Hing	36	430	15,480
203.	48522 - 1150	Pin FR	48	520	24,960
204.	48512 - 1260	BR Front	48	3,060	146,880
205.	48122 - 1340	Leaf SP	48	4,800	230,400
206.	48423 - 1561	Pin SPRG	72	1,360	97,920
207.	9004 -25331	Washer	144	340	48,960
208.	48041 - 1271	RH. Shackle Assy	18	2,550	45,900
209.	48014 - 1281	LH. Shackle Assy	18	2,550	45,900
210.	48110 - 9010	Spring Assy FR.	24	44,064	1,057,536
211.	48101 - 3040	Leaf Sub Assy	24	9,162	219,888
2.	48104 - 2600	Leaf Sub Assy	24	4,581	109,944

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RECOMMENDED THREE YEAR SUPPLY OF SPARE PARTS
70 EACH MODEL GT175KA AND 77 EACH MODEL GT 173KA HINO TRUCKS
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| ITEM # | PART #       | DESCRIPTION        | QTY | UNIT   | AMOUNT    |
|--------|--------------|--------------------|-----|--------|-----------|
| 213.   | 48112 - 3660 | Leaf FR SPRG       | 24  | 5,373  | 128,952   |
| 214.   | 48112 - 3670 | Leaf FR SPRG       | 24  | 5,139  | 123,336   |
| 215.   | 48114 - 2840 | Leaf FR SPRG       | 24  | 3,537  | 84,888    |
| 216.   | 48500 - 1700 | Shock Absorber     | 60  | 7,389  | 443,340   |
| 217.   | 9004 -81105  | Cushion - Shock    | 240 | 170    | 40,800    |
|        |              | -----              |     |        |           |
|        |              | REAR SUSPENSION    |     |        |           |
| 218.   | 48423 - 1730 | Pin SORG           | 48  | 1,360  | 65,280    |
| 219.   | 9004 -85152  | Spacer             | 48  | 340    | 16,320    |
| 220.   | 9004 -85339  | Spacer             | 48  | 340    | 16,320    |
| 221.   | 9004 -85340  | Spacer             | 48  | 340    | 16,320    |
| 222.   | 9993 -12104  | Bushing            | 36  | 2,100  | 75,600    |
| 223.   | 9994 -32150  | U. Bolt            | 48  | 3,060  | 146,880   |
| 224.   | 48201 - 2181 | Leaf Sub Assy      | 24  | 13,518 | 324,432   |
| 225.   | 48205 - 1740 | Leaf Sub Assy      | 24  | 6,192  | 148,608   |
| 226.   | 48210 - 7812 | Spring Assy R.R.   | 24  | 85,365 | 2,048,760 |
| 227.   | 48210 - 7822 | Spring Assy L.R.   | 24  | 85,365 | 2,048,760 |
| 228.   | 48212 - 1761 | Leaf RR SPG No. 2. | 36  | 9,459  | 340,524   |
| 229.   | 48213 - 3650 | Leaf RR SPG No. 3. | 36  | 6,282  | 226,152   |
| 230.   | 48213 - 3660 | Leaf LR SPG No. 3. | 36  | 6,399  | 230,364   |
| 231.   | 48215 - 3020 | Leaf LR SPG No. 5. | 36  | 4,572  | 164,592   |
|        |              | -----              |     |        |           |
|        |              | METER & COWL       |     |        |           |
| 232.   | 83710 - 7760 | Cable Assy Speed   | 24  | 4,023  | 96,552    |
| 233.   | 78015 - 2342 | Cable Sub Assy     | 24  | 2,414  | 57,936    |

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RECOMMENDED THREE YEAR SUPPLY OF SPARE PARTS  
70 EACH MODEL GT175KA AND 77 EACH MODEL GT 173KA HINO TRUCKS

| ITEM # | PART #       | DESCRIPTION                                     | QTY | UNIT   | AMOUNT |
|--------|--------------|-------------------------------------------------|-----|--------|--------|
| 234.   | 83710 - 6100 | Cable Assy Speed                                | 24  | 909    | 21,81  |
| 235.   | 78105 - 2282 | Lever Sub Assy                                  | 24  | 5,800  | 139,20 |
| 236.   | 78403 - 1620 | Cable Throttle                                  | 12  | 2,100  | 25,20  |
|        |              | S T E E R I N G                                 |     |        |        |
| 237.   | 44110 - 1153 | Gear Assy P.S.                                  | 6   | 18,000 | 108,00 |
| 238.   | 44120 - 1090 | Ball & Nut Assy                                 | 6   | 14,600 | 87,60  |
| 239.   | 44160 - 1030 | Cover Assy                                      | 6   | 2,800  | 16,80  |
| 240.   | 44107 - 1070 | Housing                                         | 6   | 5,600  | 33,60  |
| 241.   | 44199 - 1020 | Overhaul Set                                    | 24  | 6,000  | 144,00 |
| 242.   | 44109 - 1230 | Seat Set                                        | 12  | 1,200  | 144,00 |
| 243.   | 45440 - 4550 | Link Assy                                       | 18  | 5,600  | 100,80 |
| 244.   | 45411 - 2320 | Arm Pitman                                      | 6   | 9,600  | 57,60  |
| 245.   | 45312 - 1261 | Bracket                                         | 6   | 8,200  | 49,20  |
| 246.   | 45100 - 1191 | Wheel Steering                                  | 6   | 4,760  | 28,56  |
| 247.   | 84040 - 1240 | Switch Assy                                     | 6   | 10,200 | 61,20  |
| 248.   | 45224 - 1010 | Spider V. Joint                                 | 6   | 2,550  | 15,30  |
| 249.   | 9885 -10102  | Bearing                                         | 12  | 850    | 10,20  |
| 250.   | 9885 -10101  | Bearing                                         | 6   | 850    | 5,10   |
| 251.   | 45222 - 1200 | Cover STR                                       | 12  | 1,360  | 16,32  |
|        |              | F R O N T   A X L E   &   W H E E L   B R A K E |     |        |        |
| 252.   | 9004 -21112  | Nut Hub R/HX                                    | 60  | 252    | 15,120 |
| 253.   | 9004 -22114  | Nut Hub L/HX                                    | 60  | 243    | 14,580 |
| 254.   | 9004 -22104  | Nut Hub L/HX                                    | 60  | 243    | 14,580 |

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RECOMMENDED THREE YEAR SUPPLY OF SPARE PARTS  
70 EACH MODEL GT175KA AND 77 EACH MODEL GT 173KA HINO TRUCKS

| ITEM # | PART #       | DESCRIPTION          | QTY    | UNIT   | AMOUNT    |
|--------|--------------|----------------------|--------|--------|-----------|
| 255.   | 9004 -22106  | Nut Hub L/H          | 60     | 243    | 14,580    |
| 256.   | 42311 - 2910 | Shaft, AXLE          | 24     | 21,564 | 517,536   |
| 257.   | 42311 - 2920 | Shaft, AXLE          | 24     | 24,012 | 576,288   |
| 258.   | 9004 -25119  | Bolt, Hub, RH        | 96     | 495    | 47,520    |
| 259.   | 9004 -26105  | Bolt, Hub, LH        | 96     | 495    | 47,520    |
| 260.   | 9003 -15468  | Shim                 | 36     | 306    | 11,016    |
| 261.   | 9003 -15469  | Shim                 | 36     | 306    | 11,016    |
| 262.   | 9003 -15470  | Shim                 | 36     | 306    | 11,016    |
| 263    | 9004 -36165  | Plate, Lock          | 36     | 5,346  | 192,456   |
| 264.   | 9200 -08070  | Nut                  | 48     | 27     | 1,296     |
| 65.    | 9279 -85101  | Washer, Lock         | 12     | 261    | 3,132     |
| 266.   | 9280 -08200  | Lock Washer          | 36     | 11     | 396       |
| 267.   | 9280 -14350  | Lock Washer          | 36     | 11     | 396       |
| 268.   | 9659 -30102  | Washer, Soft         | 96     | 66     | 6,336     |
| 269.   | 9828 -01134  | Seal, Oil            | 24     | 1,134  | 27,216    |
| 270.   | 9828 -55108  | Seal, Oil            | 24     | 513    | 12,825    |
| 271.   | 9828 -55109  | Seal, Oil            | 24     | 639    | 15,336    |
| 272.   | 9851 -01165  | O-Ring               | 48     | 450    | 21,600    |
| 273.   | 9867 -57101  | Bushing              | 36     | 2,502  | 90,072    |
| 274.   | 9884 -32101  | Bearing, Tapered Rol | 18     | 2,097  | 37,746    |
| 275.   | 9884 -85106  | Bearing, Tapered Rol | 18     | 5,400  | 97,200    |
| 276.   | 9884 -92101  | Bearing, Tapered Rol | 18     | 10,683 | 192,294   |
| 277.   | 47441 - 4150 | Lining, Brake Shoe   | 1200   | 1,341  | 1,609,200 |
| 278.   | 47662 - 1130 | Lining, Brake Shoe   | 1200   | 1,476  | 1,771,200 |
| 279.   | 9479 -06105  | Rivet                | 12,000 | 33     | 396,000   |

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**RECOMMENDED THREE YEAR SUPPLY OF SPARE PARTS  
70 EACH MODEL GT175KA AND 77 EACH MODEL GT 173KA HINO TRUCKS**

| ITEM # | PART #       | DESCRIPTION          | QTY | UNIT    | AMOUNT  |
|--------|--------------|----------------------|-----|---------|---------|
| 280.   | 41203 - 2170 | Ring Gear & Pinion   | 6   | 108,765 | 652,590 |
| 281.   | 37304 - 2800 | Flange Sub Assy      | 6   | 31,790  | 190,790 |
| 282.   | 41131 - 1561 | Cage diff Carrier    | 6   | 24,000  | 144,000 |
| 283.   | 41101 - 1540 | Carrier Sub Assy     | 3   | 28,200  | 84,600  |
| 284.   | 47510 - 1170 | Cyl. Assy            | 24  | 4,760   | 114,240 |
| 285.   | 47510 - 1281 | Piston Wheel         | 48  | 255     | 12,240  |
| 286.   | 47532 - 1050 | Cup Wheel Cyl        | 48  | 255     | 12,240  |
| 287.   | 41331 - 1060 | Side Gear            | 12  | 8,226   | 98,712  |
| 288.   | 41341 - 1040 | Pinion               | 12  | 5,130   | 61,560  |
| 289.   | 41351 - 1050 | Washer               | 24  | 108     | 2,592   |
| 90.    | 41361 - 1100 | Washer               | 24  | 801     | 19,229  |
| 291.   | 41371 - 1070 | Spider               | 12  | 5,643   | 67,716  |
| 292.   | 9828 -65113  | Seal, Oil            | 36  | 1,161   | 41,796  |
| 293.   | 9883 -28101  | BRG CYL              | 24  | 3,744   | 89,856  |
| 294.   | 9884 -50108  | BRG                  | 24  | 4,185   | 100,440 |
| 295.   | 9884 -55101  | BRG                  | 24  | 4,185   | 100,440 |
| 296.   | 9884 -80104  | BRG                  | 24  | 5,598   | 134,352 |
| 297.   | 9884 -80105  | Eearing, Tapper Roll | 24  | 5,598   | 134,352 |
|        |              | -----                |     |         |         |
|        |              | REAR AXLE & BRAKE    |     |         |         |
| 298.   | 9004 -23101  | Hub Nut Inner RH     | 36  | 405     | 14,580  |
| 299.   | 9004 -42101  | Hub Nut Inner LH     | 36  | 405     | 14,580  |
| 300.   | 42311 - 1200 | Shaft Axle           | 15  | 26,637  | 399,555 |
| 301.   | 42321 - 1330 | Gasket Axle          | 24  | 63      | 1,512   |
| 32.    | 9004 -25101  | Bolt Hub RH          | 48  | 360     | 17,280  |

RECOMMENDED THREE YEAR SUPPLY OF SPARE PARTS  
70 EACH MODEL GT175KA AND 77 EACH MODEL GT 173KA HINO TRUCKS  
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ITEM #	PART #	DESCRIPTION	QTY	UNIT	AMOUNT
303.	9004 -26101	Bolt Hub LH	48	342	16,416
304.	9004 -36128	Plate Lock	12	531	6,372
305.	9004 -36167	Plate Lock	12	405	4,860
306.	9209 -20105	Nut	144	126	18,144
307.	9659 -18110	Washer Soft	72	47	3,389
308.	9659 -30102	Washer Soft	72	66	4,752
309.	9828 -01120	Seal Oil	96	747	71,712
310.	9828 -52115	Seal Oil	36	252	9,072
311.	9884 -75101	Bearing Taper Rol	24	3,978	95,472
312.	9884 -85104	Bearing Taper Rol	24	5,742	137,808
13.	9828 -65113	Seal Oil	23	1,161	27,864
314.	47443 - 1510	Linning Brake Shoe	1200	1,602	1,922,400
315.	47664 - 1160	Linning Brake Shoe	1200	1,710	2,052,000
316.	9479 -06105	Rivet	12000	33	396,000
317.	41203 - 2180	Ring Gear & Drive	18	108,765	1,957,770
318.	41331 - 1060	Side Gear	18	8,226	148,068
319.	41341 - 1040	Pinion	24	5,130	123,120
320.	41351 - 1050	Washer	36	108	3,888
321.	41361 - 1100	Washer	36	801	28,836
322.	41371 - 1070	Sptder	18	5,643	101,574
323.	9883 -28101	BRG CYL	18	3,744	67,392
324.	9884 -50108	BRG CYL	18	4,185	75,330
325.	9884 -55101	BRG	18	4,185	75,330
326.	9884 -80104	BRG	18	5,598	100,764
327.	9884 -80105	Bearing Taper	18	5,598	100,764

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RECOMMENDED THREE YEAR SUPPLY OF SPARE PARTS
70 EACH MODEL GT175KA AND 77 EACH MODEL GT 173KA HINO TRUCKS
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ITEM #	PART #	DESCRIPTION	QTY	UNIT	AMOUNT
C A B G R O U P					
328.	79411 - 4670	Glass W/S	36	44,154	1,589,544
329.	79413 - 1180	Weatherstrip W/S	36	4,230	152,280
330.	76111 - 1090	Bezel Headlamp	6	2,025	12,150
331.	76112 - 1070	Bezel Headlamp	6	2,025	12,150
332.	76301 - 1500	Grill Assy	12	21,969	263,628
333.	87902 - 1440	Mirror sub Assy	18	2,727	49,086
334.	87905 - 1450	Stay Sub Assy	18	5,130	92,340
335.	87906 - 1960	Stay Sub Assy	18	1,566	28,188
336.	87906 - 2280	Stay Sub Assy	18	6,300	113,400
O T H E R T R U C K					
337.	15609 - 1220	Element Set-Oil	1200	900	1,080,000
338.	15691 - 1190	Gasket Oil Filter	600	80	48,000
339.	43512 - 2310	Drum Brake	24	25,500	612,000
340.	43512 - 2600	Drum Brake	24	21,000	504,000
341.	9.00X20X14PR	Tires Bridgestone	840		
342.	9.00X20X14	Tubes - Tire	900		
T R A N S F E R C A S E					
343.	36120 - 1052	Case Assy	6	88,000	528,000
344.	36124 - 1040	Cover Case	6	24,500	147,000
345.	36011 - 1250	Bracket	6	8,600	51,600
346.	36134 - 1031	BRG	12	5,420	65,040
347.	36311 - 1040	Fork Shift	6	3,750	22,500

RECOMMENDED THREE YEAR SUPPLY OF SPARE PARTS
70 EACH MODEL GT175KA AND 77 EACH MODEL GT 173KA HINO TRUCKS
RECOMMENDED THREE YEAR SUPPLY OF SPARE PARTS

ITEM #	PART #	DESCRIPTION	QTY	UNIT	AMOUNT
348.	37324 - 3720	Flange	6	4,250	25,500
349.	9003 -13160	Washer Thrust	12	750	9,000
350.	36234 - 1030	Shaft	6	8,900	53,400
351.	36231 - 1041	Shaft	6	7,800	46,800
352.	36232 - 1040	Gear	6	8,900	53,400
353.	36311 - 1060	Fork	6	10,100	60,600
354.	9828 -60119	Seal Oil	12	1,600	19,200
355.	9883 -45104	Bearing	6	4,185	25,110
356.	9883 -50106	Bearing	6	7,500	45,000
357.	9883 -50107	Bearing	6	8,000	48,000
358.	9885 -70101	Bearing	6	8,250	49,500
359.	990 -060100	Bearing	6	6,000	36,000
360.	990 -063090	Bearing	6	6,000	36,000
361.	990 -063101	Bearing	6	5,500	33,000
362.	993 -322120	Bearing	6	5,000	30,000
362.	36110 - 1731	Trans Assy	3	110,00	330,000
363.	36232 - 1020	Gear	3	9,200	27,600
364.	36212 - 1100	Gear	3	8,700	26,100
365.	36221 - 1090	Gear	3	7,700	23,100
366.	36231 - 1041	Shaft	3	8,012	24,036
367.	36211 - 1020	Shaft	3	6,575	19,725
368.	36225 - 1011	Shaft	3	7,500	22,500
368 ITEMS			PCS	YENS=	69,596,969

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RECOMMENDED SPAREPARTS FOR
15 EACH - MODEL 113KA - CA 3.5 TON

ITEM	PART #	DESCRIPTION	QTY	YEN UNIT	YEN AMOUNT
1.	15607-1330	Element Set	270	1,206	325,620
2.	15717-1160	Gasket, Oil cooler	36	171	6,156
3.	11400-3430	Block short assy	1	408,000	480,000
4.	23401-1131	Element set Fuel F, Hen	270	193	52,110
5.	11110-2972	Head assy	1	72,250	72,250
6.	11115-1722	Gasket Head	6	2,550	15,300
7.	11213-1550	Gasket CYL Head cover	12	212	2,544
8.	11122-1140	Valve Guide	20	3,060	81,200
9.	11131-1210	Seat valve in	24	1,360	32,640
10.	11135-1320	Seat valve Ex.	24	1,360	32,640
11.	11467-1761	Liner CYL	16	12,240	195,840
12.	12031-1860	MTD sub assy	16	1,900	30,400
3.	13011-1973	Ring set STD	8	9,180	73,440
14.	13216-1460	Piston S/S	16	12,544	195,840
15.	13260-1470	Rod assy	8	11,730	93,840
16.	9001-29119	Collar	8	2,120	16,960
17.	13201-1430	Bearing set	6	23,240	139,740
18.	13203-1470	Bearing set 025	6	23,290	139,740
19.	13711-1443	Valve in	12	3,060	36,720
20.	13715-1251	Valve Ex.	12	3,060	36,720
21.	17173-1552	Gasket Ex.	24	1,020	24,480
22.	15110-1521	Pump assy	3	31,790	95,370
23.	15119-1121	Gasket Oil pump	4	340	1,360
24.	23610-1311	Nozzle	4	19,040	76,160

ANNEX G-2

RECOMMENDED SPAREPARTS FOR
15 EACH - MODEL 113KA - CA 3.5 TON

ITEM#	PART #	DESCRIPTION	QTY	YEN UNIT	YEN AMOUNT
25.	23010-1250	Element	36	1,206	43,416
26.	23650-1271	Nozzle assy	8	11,560	92,480
27.	22570-1240	Pump Feed	3	21,250	63,750
28.	16100-2342	Pump coolant	3	23,290	69,870
29.	16109-1101	Shoft sub assy	3	6,120	18,360
30.	16104-1180	Soul sub assy	3	840	2,520
31.	16131-1340	Vave coolant	3	1,800	5,400
32.	28100-1691	Starter assy	3	65,790	197,370
33.	27050-1061	Alternator assy	3	38,250	119,750
34.	83240-1060	Gage assy	3	3,060	9,180
	83530-1270	Switch assy	3	4,590	13,770
36.	27310-1450	Frame assy ALT.	3	11,560	34,680
37.	27350-1750	Housing assy	3	11,050	33,150
38.	27373-1090	Holden Brush	3	3,230	9,690
39.	28140-1230	Holder assy ST.	3	3,230	9,690
40.	28127-1110	Flab outer	2	3,060	6,120
41.	28011-1420	Clutch sub assy	2	16,150	32,300

		CHASSIS GROUP - FUEL TANK			
42.	77320-1040	Cap assy, Fuel Tank	18	891	16,038
43.	83320-1440	Gage assy, Fuel send	12	1,953	23,436
44.	83361-1020	Gasket	6	71	426
45.	9659-12115	Washer, Soft	18	38	684
46.	23401-1290	Element set, Fuel FI	400	522	208,800

RECOMMENDED SPAREPARTS FOR
15 EACH - MODEL 113KA - CA 3.5 TON

ITEM#	PART #	DESCRIPTION	QTY	YEN UNIT	YEN AMOUNT
RADIATOR					
47.	16090-2330	Radiator assy, W/CAP	10	64,674	646,740
48.	16090-2480	Radiator assy, W/CAP	10	80,352	803,520
49.	16401-1230	Cap sub assy, RAD	36	1,476	53,136
50.	9001-44864	Hose, RAD	60	4,149	149,364
51.	9001-44865	Hose, RAD	60	1,440	51,840
AIR CLEANER					
52.	17801-2410	Element sub assy, AI	300	4,734	1,420,200
53.	81510-1710	Lamp assy, FR turn S	12	4,581	54,972
54.	81511-1260	Lens, RH	12	1,188	14,256
55.	81520-1580	Lamp assy, FR turn S	12	4,581	54,972
56.	81521-1150	Lens, LH	12	1,188	14,256
57.	85220-1090	Blade assy, wiper	12	873	10,476
58.	28300-1040	Relay assy, Start	12	3,627	43,524
59.	81271-1040	Lens	12	198	2,376
60.	81551-1200	Lens, RH	12	1,089	13,068
61.	81561-1050	Lens, LH	12	1,089	13,068
CLUTCH					
62.	31210-2130	Cover assy, Clutch	24	19,602	470,448
63.	31250-3550	Disc assy, Clutch	60	9,693	581,580
64.	9881-17112	Bearing, Ball	36	639	23,004
65.	31420-1501	Cylinder assy, Master	18	7,164	128,952
66.	31230-1020	Bearing assy, throwover	36	4,005	144,180

RECOMMENDED SPAREPARTS FOR
15 EACH - MODEL 113KA - CA 3.5 TON

ITEM#	PART #	DESCRIPTION	QTY	UNIT	AMOUNT
67.	31470-1180	Cylinder assy, Clutch	-18	3,735	67,230
		TRANSMISSION			
68.	33311-3620	Shaft, Input	4	12,987	51,948
69.	33321-2020	Shaft, Output	4	17,640	70,560
70.	33332-2340	Gear, 2nd	2	13,986	27,972
71.	33333-2510	Gear, 3rd	2	10,494	20,088
72.	33334-2000	Gear, 4th	2	7,794	15,588
73.	33335-1831	Gear, 1st	2	15,984	31,986
74.	33338-1441	Gear Rev	2	13,986	27,972
75.	33411-2780	Countershaft	2	27,936	55,872
76.	33451-1230	Shaft, Rev Idler	2	756	1,512
77.	33461-1630	Gear, Rev Idler	2	8,496	16,992
78.	9509-04104	Pin	4	47	188
79.	9659-18110	Washer, Soft	12	47	564
80.	9659-24103	Washer, Soft	12	38	456
81.	9819-01126	Ring, Retainer	6	135	810
82.	9819-32109	Ring, Retainer	6	180	1,080
83.	9819-33105	Ring, Retainer	6	189	1,134
84.	9819-45101	Ring Retainer	6	198	1,158
85.	9819-46101	Ring, Retainer	6	216	1,296
86.	9819-50110	Ring, Retainer	6	261	1,566
87.	9819-86101	Ring, Retainer	6	126	756
88.	9828-47101	Seal, Oil	12	342	4,104

RECOMMENDED SPAREPARTS FOR
15 EACH - MODEL 113KA - CA 3.5 TON

ITEM#	PART #	DESCRIPTION	QTY	UNIT	AMOUNT
89.	9867-48109	Bushing	6	1,233	7,398
90.	9885-22101	BRG	6	765	4,590
91.	9885-25104	Bearing, Needle roll	6	765	4,536
92.	9885-50109	Bearing, Needle roll	6	810	4,860
93.	9885-58103	Bearing, Needle roll	6	909	5,454
94.	33162-1130	Gasket	6	80	480
95.	33481-1710	Gear, Speedo Drive	2	2,943	5,886
96.	33482-1600	Gear, Speedo Driver	2	1,854	3,708
		SERVICE BRAKE			
97.	83390-1160	Switch assy, Vacuu	12	1,080	12,960
	47200-1380	Cylinder assy, Masts	6	7,839	47,034
99.	84340-1010	Switch assy, Stop LA	6	765	4,590
		PARKING BRAKE			
100.	84550-1150	Switch assy, P/B	6	837	5,022
		FRONT SUSPENTION			
101.	48110-9281	Spring Assy, FR	50	23,904	95,620
102.	48101-3011	Leaf sub assy, FR SP	4	5,688	22,752
103.	48112-3641	Leaf, FR SPG, No 2	5	4,482	22,410
104.	48104-2671	Leaf, sub assy, FR SP	5	2,952	14,760
105.	48500-1630	Shockabsorber assy,	24	3,186	76,464
		REAR SUSPENTION			
106.	48210-8140	Spring assy, RR	5	180,000	900,000
!	48230-4150	Spring assy, RR MAIN	4	90,000	360,000

RECOMMENDED SPAREPARTS FOR
15 EACH - MODEL 113KA - CA 3.5 TON

ITEM#	PART #	DESCRIPTION	QTY	UNIT	AMOUNT
108.	48201-2140	Leaf sub assy, RR SP	5	7,893	39,465
109.	48212-3690	Leaf, RR SPG, No2	5	6,624	33,120
110.	48213-3740	Leaf, RR SPG, No3	5	18,000	90,000
111.	48204-1670	Leaf sub assy, RR SP	3	90,000	270,000
112.	48215-3010	Leaf, RR SPG, No5	5	2,394	11,970
113.	48260-2770	Spring assy, RR Help	2	45,000	90,000
114.	48530-1600	Shockabsorber assy,	24	3,924	94,176
		METER AND COWL			
115.	78015-3352	Cable sub assy, Acce	2	2,502	5,004
116.	83710-7512	Cable assy, Speedo D	2	2,268	4,536
		FRONT AXLE & WHEEL BRAKE			
117.	9004-21120	Nut, Hub, Rh	10	207	2,070
118.	9004-22112	Nut, Hub, Lh	10	207	2,070
119.	9004-25177	Bolt, Hub, Rh	10	351	3,510
120.	9004-26150	Bolt, Hub, Lh	10	351	3,510
121.	47441-4960	Lining, Brake shoe	144	819	117,936
122.	47661-1220	Lining, Brake shoe, F	216	819	176,904
123.	9470-06101	Rivet	2200	38	83,600
124.	9279-27109	Washer, Lock	12	117	1,404
125.	9280-10250	Lock Washer	12	11	132
126.	9828-35117	Seal Oil	12	126	1,512
127.	9828-85106	Seal Oil	12	324	3,888
128.	9867-35122	Bushing	12	423	5,076

RECOMMENDED SPAREPARTS FOR
15 EACH - MODEL 113KA - CA 3.5 TON

ITEM#	PART #	DESCRIPTION	QTY	UNIT	AMOUNT
129.	9867-35123	Bushing	4	468	1,872
130.	9882-35103	Bearing, Thrust	4	1,602	6,408
131.	9884-35105	Bearing, Tapered rol	6	1,260	7,560
132.	9884-50110	Bearing, Tapered rol	6	1,962	11,772

		REAR AXLE & WHEEL BRAKE			
133.	9004-23102	Nut, Hub, Inner RH	20	405	8,100
134.	9004-24102	Nut, Hub, Inner LH	20	405	8,100
135.	42311-2932	Shaft, Axle	4	19,116	76,464
136.	9004-25173	Bolt, Hub, RH	20	315	6,300
137.	9004-26146	Bolt, Hub, LH	20	315	6,300
..	9004-36187	Plate, Lock	6	306	1,848
139.	9209-18119	Nut	12	108	1,296
140.	9280-10250	Lock Washer	20	11	220
141.	9659-18110	Washer, Soft	18	47	846
142.	9659-30102	Washer, Soft	18	66	1,188
143.	9828-01206	Seal, Oil	8	981	7,848
144.	9828-48112	Seal, Oil	8	549	4,392
145.	9884-55106	Bearing, Tapered Rol	6	4,050	24,030
146.	9884-63103	Bearing, Tapered Rol	6	4,140	24,840
147.	9818-58109	Seal, Oil	12	765	9,180
148.	47441-4960	Lining, Brake shoe R	216	819	176,904
149.	47661-1220	Lining, Brake shoe, R	216	819	176,904
150.	9479-06101	Rivet	2200	38	83,600

RECOMMENDED SPAREPARTS FOR
15 EACH - MODEL 113KA - CA 3.5 TON

ITEM#	PART #	DESCRIPTION	QTY	UNIT	AMOUNT
DIFFERENTIAL CARRIER (R)					
151.	41203-2190	Ring Gear & Drive P	3	50,958	452,874
152.	41331-1210	Side Gear	8	4,347	34,776
153.	41341-1150	Pinion	8	2,547	15,282
154.	41351-1160	Washer, Diff Pinion	6	117	702
155.	41361-1360	Washer, Diff Side Ge	4	414	1,656
156.	41371-1090	Spider	3	3,267	9,801
157.	9883-25108	Bearing, Cylindrical	4	2,583	10,332
158.	9884-45106	Bearing, Tapered Rol	6	3,015	18,090
159.	9884-60102	BRG	6	2,142	18,852
	57513-1202	Support, Step	2	666	1,332
161.	57513-1212	Support, Step	2	666	1,332
162.	58312-1260	Step L/H	2	4,203	8,406
163.	76107-1041	Gezel sub assy, Head	2	2,943	5,886
164.	76107-1051	Bezel sub assy, Head	2	2,943	5,886
165.	87902-2180	Mirror Sub Assy, out	6	2,358	14,148
166.	87902-2190	Mirror Sub Assy, Out	6	2,754	16,524
167.	87905-2061	Stay Sub Assy, OutSI	12	3,699	44,388
168.	87906-2840	Stay Sub Assy OutSI	12	5,400	64,800
169.	79411-4780	Glass, W/S	6	43,848	263,088
170.	79413-1290	Weatherstrip W/S	6	4,122	27,932
171.	52424-1250	Bar,Torsion Tilt	3	6,498	19,494
172.	52424-1260	Bar,Torsion Tilt	3	6,493	19,494
ITEMS				YENS=	12,697,168

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RECOMMENDED SPAREPARTS FOR
201 EA-MODEL LUG5R-HRP TOYOTA HI-LUX PICK-UPS

ITEM #	PART #	DESCRIPTION	QTY	YEN UNIT	YEN AMOUNT
1.	04311 - 14020	CYL Kit (04311-30080)	150	1,650	247,500
2.	90341 - 18089	Plug (Heater)	100	222	22,200
3.	04111 - 54051	Gasket Kit	18	10,100.0	181,800
4.	04313 - 22020	Cylinder	30	1,154.0	34,620
5.	04331 - 35101	Gasket Kit	18	1,028.0	18,504
6.	04371 - 35030	Spider Kit	18	4,400.0	72,200
7.	04434 - 60012	Gasket Kit	24	6,220.0	149,280
8.	04443 - 35470	Booster Kit	18	10,380.0	186,480
9.	04475 - 35050	Cup Kit	96	238.0	22,848
10.	04476 - 31010	Cup Kit	96	304.0	29,184
11.	04481 - 35040	Shackle Kit	144	3,340.0	480,960
12.	04482 - 35030	Pin Kit	144	1,258.0	181,152
13.	04483 - 35040	Shackle Kit	144	2,460.0	354,200
14.	04493 - 35170	Piston	60	5,100.0	306,000
15.	04494 - 35060	Shoe Kit	200	4,980.0	996,000
16.	04495 - 35051	Shoe Kit	200	4,980.0	996,000
17.	15600 - 41010	Element, Oil	600	4,218.0	730,800
18.	16401 - 63010	Cap	24	962.0	23,088
19.	16571 - 54130	Hose	144	930.0	133,920
20.	16572 - 54120	Hose	144	1,838.0	264,672
21.	17801 - 31050	Element	144	3,640.0	524,160
22.	19850 - 54031	Plug	48	1,736.0	83,328
23.	23303 - 64010	Element	144	2,960.0	426,240
24.	27700 - 72030	Regulator	12	6,000.0	72,000
25.	31250 - 30351	Disc	24	5,300.0	127,200

RECOMMENDED SPAREPARTS FOR
201 EA-MODEL LN65R-MRP TOYOTA HI-LUX PICK-UPS

ITEM #	PART #	DESCRIPTION ..	QTY	UNIT	AMOUNT
26.	31321 - 14020	Pad	360	142,0	51,120
27.	45046 - 35080	End	24	3,360.0	80,640
28.	45047 - 35050	End	24	5,000.0	120,000
29.	45401 - 35140	Arm	12	4,280.0	51,630
30.	45401 - 35160	Arm	12	4,500.0	54,000
31.	45700 - 39035	Damper	12	7,600.0	91,200
32.	46410 - 35290	Cable	36	1,576.0	56,736
33.	46420 - 35250	Cable	36	4,240.0	152,640
34.	48511 - 39475	Absorber	192	2,380.0	456,960
35.	48531 - 39675	Absorber	192	2,380.0	456,960
..	48541 - 39025	Absorber	192	2,380.0	456,960
..	52011 - 89108	Arm	12	1,384.0	16,608
38.	52012 - 89108	Arm	12	1,384.0	16,608
39.	56111 - 89130	Glass	12	33,600.0	403,200
40.	56121 - 89117	Weatherstrip	12	3,800.0	45,600
41.	81271 - 89110	Lens	12	142.0	1,704
42.	81511 - 12280	Lens	12	476.0	5,712
43.	81521 - 12260	Lens	12	476.0	5,712
44.	81551 - 89131	Lens	12	1,388.0	16,656
45.	81561 - 89131	Lens	12	1,388.0	16,656
46.	81611 - 89165	Lens & Body	12	3,940.0	47,280
47.	81621 - 89165	Lens & Body	12	3,940.0	47,280
48.	83420 - 20020	Gauge	18	1,710.0	30,780
'	83530 - 30060	Switch	18	1,236.0	22,248
..	83710 - 89162	Cable	12	2,820.0	33,840

RECOMMENDED SPAREPARTS FOR
201 EA-MODEL LN65R-MRP TOYOTA HI-LUX PICK-UPS

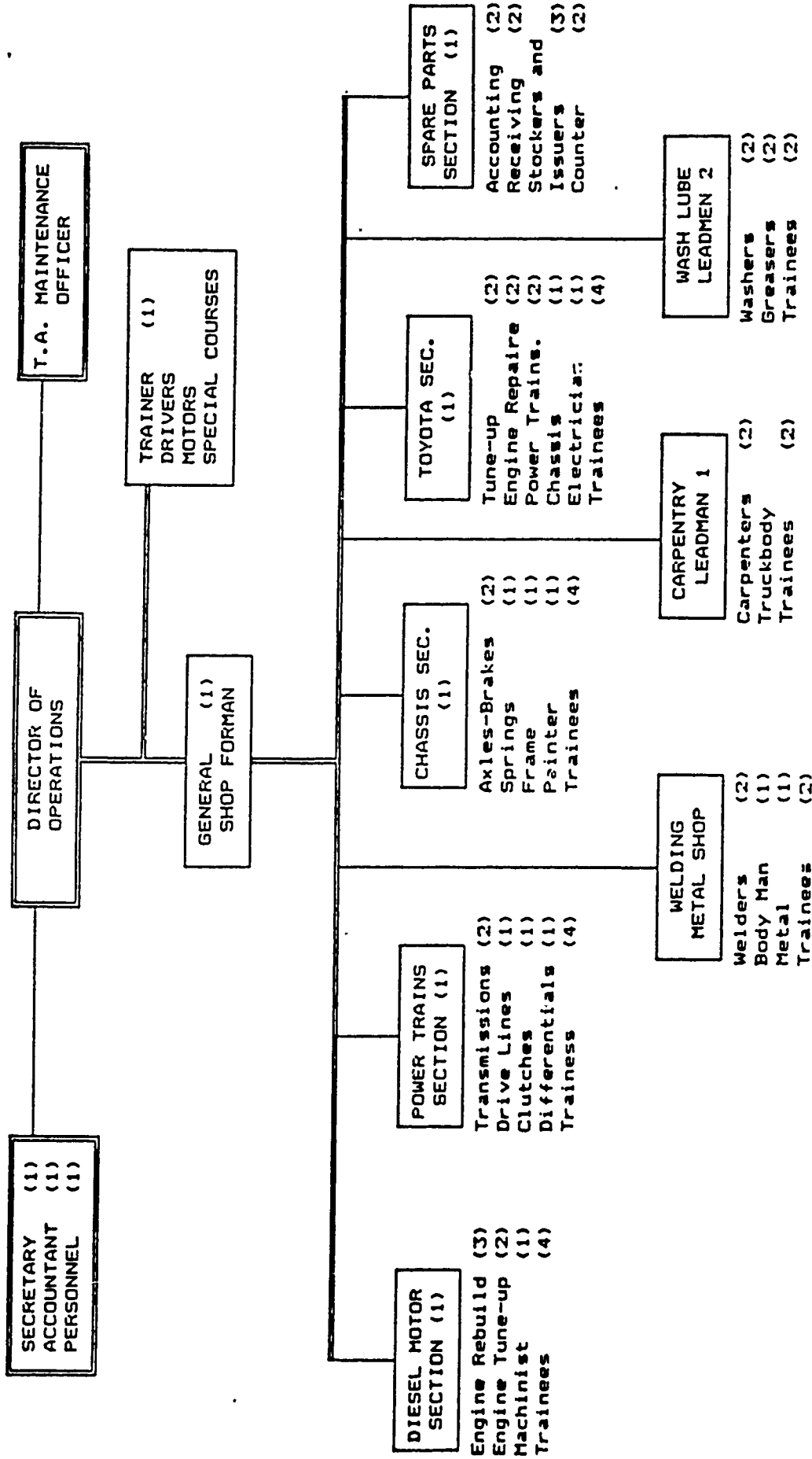
TM. #	PART #	DESCRIPTION	QTY	UNIT	AMOUNT
51.	84210 - 60021	Switch	18	1,986.0	35,748
52.	84310 - 28070	Switch	18	12,680.0	228,240
53.	84340 - 30030	Switch	18	1,346.0	24,228
54.	85035 - 89110	Nozzle	36	736.0	26,496
55.	85190 - 89130	Arm	18	2,480.0	44,640
56.	85210 - 89101	Arm	18	2,480.0	44,640
57.	85220 - 22470	Blade	48	1,490.0	71,520
58.	85221 - 89103	Rubber	36	482.0	17,352
59.	90310 - 32024	Seal's Oil	36	296.0	10,656
60.	90310 - 50001	Seal	48	394.0	18,912
61.	90311 - 30115	Seal	24	344.0	8,256
62.	90311 - 38134	Seal	48	756.0	36,288
.	90311 - 62001	Seal	36	1,168.0	42,048
64.	90313 - 48001	Seal	48	532.0	25,536
65.	90363 - 12002	Bearing, Bal 12,32	18	492.0	8,856
66.	90363 - 40020	Bearing, Bal 40,90	96	3,660.0	351,360
67.	90363 - 40020	Bearing, Bal 40,67	24	2,800.0	67,200
68.	90368 - 45087	Bearing, RTP,45,73	36	2,160.0	77,760
69.	90368 - 49084	Bearing, RTP,50,82	36	2,260.0	94,320
70.	90385 - 18007	Bush	48	250.0	12,000
71.	90385 - 18046	Bush	248	154.0	38,192
72.	85221 - 39103	Rubber	96	482.0	46,272
*73.	90201 - 20005	Washer	48	176.0	8,448
74.	90310 - 32024	Seal,S Oil	24	296.0	7,104
75.	90310 - 50001	Seal	96	394.0	37,824

RECOMMENDED SPAREPARTS FOR
201 EA-MODEL LN65R-MRP TOYOTA HI-LUX PICK-UPS

ITEM #	PART #	DESCRIPTION	QTY	UNIT	AMOUNT
76.	90311 - 30115	Seal	36	344.0	12,384
77.	90311 - 38134	Seal	60	756.0	45,360
78.	90311 - 62001	Seal	36	1,168.0	42,048
79.	90313 - 48001	Seal	96	532.0	51,072
80.	90363 - 12002	Bearing, Bal	24	492.0	11,808
81.	90363 - 40020	Bearing, Bal	96	3,660.0	351,360
82.	90363 - 40020	Bearing, Bal	36	2,800.0	100,800
83.	90368 - 45087	Bearing, RTP	36	2,160.0	77,760
84.	90368 - 49084	Bearing, RTP	36	2,620.0	94,320
85.	90385 - 18007	Bush	96	250.0	24,000
.	90385 - 18046	Bush	229	154.0	34,496
87.	90430 - 18008	Gasket	60	52.0	3,120
88.	90430 - 18013	Gasket	96	34.0	3,264
89.	90916 - 03062	Thermostat	18	1,160.0	20,880
90.	90917 - 06004	Gasket, Pipe	36	206.0	7,416
91.	90947 - 02383	Hose	60	2,400.0	144,000
92.	90981 - 04001	Sealed	144	3,300.0	475,200
93.	96814 - 50260	Hose	72	1,014.0	73,008
94.	96940 - 34305	Hose	72	1,650.0	118,800
95.	99332 - 00850	Belt	96	1,032.0	99,072
95 ITEMS					9,225,730 Y

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PROPOSED LOCAL HIRE STAFFING



MAINTENANCE PERSONNEL = 57
TRAINEES/APPRENTICES = 22

RECOMMENDED STAFFING REQUIREMENTS FOR A VEHICLE MAINTENANCE FACILITY.
IT IS PRESUMED THAT A MAJORITY OF THE EMPLOYEES WILL BE AFGHANS AND IN EACH SECTION A NUMBER OF TRAINEES/APPRENTICES WILL BE USED AND TRAINED AS FUTURE VEHICLE MAINTENANCE PERSONNEL.....

ANNEX "H"

PROPOSED LOCAL HIRE STAFFING

<u>TITLE</u>	<u>QUALIFICATIONS</u>	<u>*RECOMMEND GRADES</u>
(1) DIRECTOR MAINTENANCE	Must have 15 years experience in maintenance shop operations and management. Graduate of a technical high school or equivalent. Must be fluent in English-Farsi and Urdu. Have past experiences in managing and handling 60 or more employees.	FSN-10
(1) GENERAL SHOP SUPERVISOR	Must have 10-12 years experience in directing a vehicle repair shop in complete diesel engine, chassis and power train work. Candidate must be able to direct shop foremen in all phases of vehicle maintenance. High school graduate or equivalent, fluent in English-Farsi and Urdu.	FSN-8
(3) MAINTENANCE FOREMEN	Must have 5-8 years experience in all areas of vehicular maintenance, i.e. in complete light and heavy duty gas and diesel engines, transmissions, clutches, chassis, brakes, complete engine tune-up, welding and other duties on a master mechanics. Candidates must speak and read English, speak Farsi and Urdu. Preferable technical school graduates.	FSN-5
1. Motor Section 1. Power-Train Section 1. Chassis Section 1. Toyota Section 1. Welding & Metal		
(2) LEADMEN	Must be experienced in their respective area of (1) carpentry and (2) vehicle washing and lubrication - both positions require candidates with 3-5 years experience in the respective trade areas.	FSN-4
1. Carpentry 1. Wash & Lube Lube		
(5) MASTER MECHANICS DIESEL	Candidates to have 3-5 years experience in complete diesel overhauling and component rebuilding. Must have knowledge of entire vehicle maintenance needs and capabilities, must have experience in nozzle and diesel fuel pump overhaul and testing. Technical school graduate or equivalent. Be capable of reading English parts books.	FSN-4

ANNEX H

- (1) AUTOMOTIVE MACHINIST
Must be experienced in the use of metal lathes, valve regrinders and seat refacers, engine block reboring, sleeving and other vehicle shop rebuild equipment, 3-5 years minimum experience, be able to speak English.
- (15) MASTER MECHANICS
5. Power Train
5. Chassis Section
5. Toyota-Light Vehicles
Must have 3-5 years experience in transmission, clutch, differential, drive-wire wheel alignment, wheel geometry, spring, axle, chassis and related work. Preferable technical school attendance. FSN-4
- (3) TUNE-UP SPECIALISTS
Light vehicles 3-5 years previous experience. Must be able to use electronic tune-up equipment, voltmeters, battery chargers. Must have skills to remedy minor engine faults, such as changing carburetors, rebuilding carburetors and distributors, etc. Must be capable of reading English tune-up and repair manuals. FSN-4
- (1) AUTOMOTIVE ELECTRICIAN
Must have 3-5 years experience in automotive electronics, capable of rebuilding starters, generators, alternators, voltage regulators and set tuning-up battery charging systems. Technical school experience preferred, must be able to read English. FSN-4
- (4) WELDING & METAL MECHANICS
2. Welders
2. Metal Mechanics
Must have 3-5 years experience using arc-welding and gas welding equipment. Experience in all types of metal fabrication knowledge of both electric and engine driven welders. Must be able to weld chassis, frames and other ferrous metals. Preferable technical school attenders. FSN-4
- (1) AUTOMOTIVE PAINTER
Candidate must have 3-5 years experience in light and heavy vehicle painting. Must be able to set up, mix paints and maintain and care for portable pressure painting equipment. Capable of mixing, use of puffing and sanding equipment. FSN-3
- (2) CARPENTERS
Must have at least 5 years experience in general carpentry work. Preferable candidates with truck bed experience. Must have experience with carpentry hand tools as well as electric powered table saws, skill saws and etc. Must be able to maintain carpentry tools. FSN-3

- 4) VEHICLE LUBRICATION MECHANICS Candidates with 2-3 years experience in vehicle chassis lubrication to be considered. Must have knowledge of use high pressure greasing and washing equipment. Be able to advise shop foreman of mechanical problems encountered during washing. Must have knowledge of preventative maintenance scheduling, types of greases to use for different vehicles and components. Experience in care and maintaining of pressurized greasing and washing equipment. FSN-3
2. Greasemen
1. Washer Vehicles
1. Wash & Lube
- (2) TOOL ROOM KEEPERS Candidates with previous tool room experience should be considered. Must be able to organize tools on boards and bins by use, demand and weight. Must be responsible for all tools entrusted to the individual. Must be able to explain tools use if needed, to maintain tools, i.e. hammer handles tight, chisels sharp, screw driver bits square and etc. FSN-3
- (1) SPARE PARTS SPECIALIST Candidates must have 5-8 years experience in spare parts warehousing. Knowledge of forms of receiving, stocking, binning, storing, issuing, reordering, cross references, ability to direct warehouse staff, such as accountants stockers, binners, countertermen. Must be fully familiar and able to train parts personnel in kardex record and issuing control, monitoring of spare parts and usage and etc. Candidate must be able to read and write English-Farsi and Urdu. Preferably a high school graduate or higher with typing skills. FSN-6
- (7) WAREHOUSEMEN Must have worked in a spare parts previously-minimum of 2 years. Candidates must be able to speak and read English packing lists, parts book and have a knowledge of warehouse layout as to counter work, storing, receiving and issuing spare parts. Must have attended high school. FSN-2-3
2. Countertermen
2. Parts Receiving
3. Stockers & Issuers
- (3) ACCOUNTANTS Must possess general accounting skill at book keepers level, able to put into practice good fiscal and inventory management. Duties will include maintaining petty cash, inventory, issuing records. Computing salaries and wages, purchase records and recording of suppliers. Must be fluent in English, Pushto and Farsi. Have 35 w.p.m. typing skills and calculator experience. High school graduate with 3 years book keeping experience minimum acceptable qualification. FSN-7
2. Spare Parts
1. Office

1) SECRETARY

Candidate must have had 5 years previous FSN-6
experience in general office work. Must be
able to type 50 w.p.m in English, able to receive
and relay phone calls, capable of preparing
documents, maintain files, conduct personnel action
to files. Candidate must have completed high school
or equivalent clerical training.

(1) TRAINER

Must have 10-12 years in personnel and training FSN-7
activities. Be able to organize training courses
for drivers, mechanics and apprenticeship endeavors.
Must be responsible to train trainees, design
lesson plans and training course content.
Acquainted with organizing, making and using visual
aid. Necessary to read and write, English, Farsi
Pushto-Urdu.

(22) TRAINEES/
APPRENTICES

Candidates must be mechanically inclined, 16 years
of age or older. Trainees will receive class room
and theory training as well as shop practice.

TRAINING PROGRAMS

During this feasibility study it became evident that the poor condition of the Alliance trucks was not only due to lack of spares. A major contributing factor is the scarcity of good drivers and skilled mechanics. A program offering training in these areas would greatly enhance the life of the Alliance fleet of trucks. Therefore, it is recommended that a full time training program be established as soon as the recommended maintenance center becomes a reality.

This training should be in the areas of:

1. **Driver Training & Operation -**

This should be a 30 day course covering the requirements stated in Annex I-1.

2. **Preventative Maintenance -**

A 30 day course in theory and practical operator care and maintenance. (Annex I-2)

3. **Shop, On-The-Sub Training -**

A training course for maintenance shop apprentices. The course is to include theory and practical hands training on diesel engines, chassis and power trains. (Annex I-3)

4. **Spare Parts Personnel -**

Training to be continued to meet requirements of course outlined in Annex I-4.

DRIVER TRAINING (ANNEX I-1)

Operators and driver....these individuals must be responsible for their assigned vehicle, through careful operation, as well as daily and some weekly inspections before, during and after operation.

1. Before training an individual must be mentally & physically qualified:
 - a. Good or correctable vision
 - b. Physically able to stand long tedious hours of setting without drowsiness.
 - c. Physically able to shift gears, reach brake and clutch pedals without difficulty.
2. Practical:
 - a. Seat adjustment and vision
 - b. Clutch, brake and gear lever movements
 - c. Engaging clutch - movement - clearance
 - d. Vehicle movement - gears to use
 - c. Braking -- emergencies
 - f. Turning radius steering
 - g. Road manners

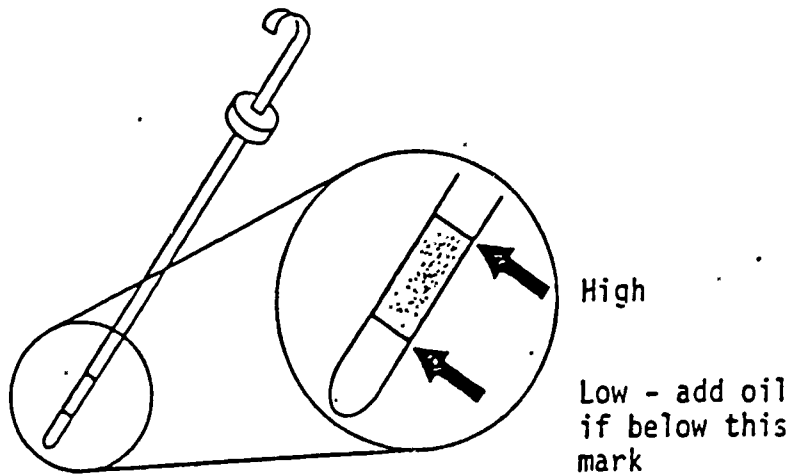
Further to the above each driver trainee is to complete the exercises shown in attached diagrams 2-2 to 2-4.

DRIVER/OPERATOR PM INSPECTION ACTIVITIES

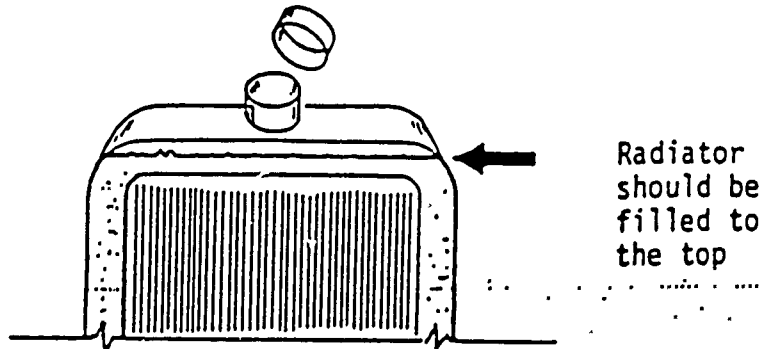
DIESEL ENGINE TRUCKS

UNDER-THE-HOOD

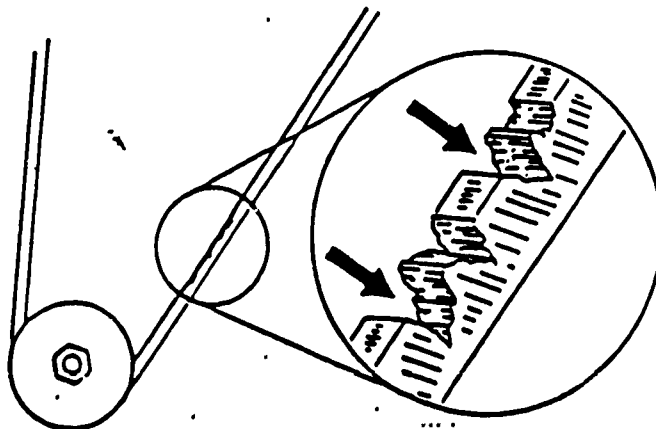
1. Engine oil -
check level on dipstick



2. Radiator -
check water/coolant level

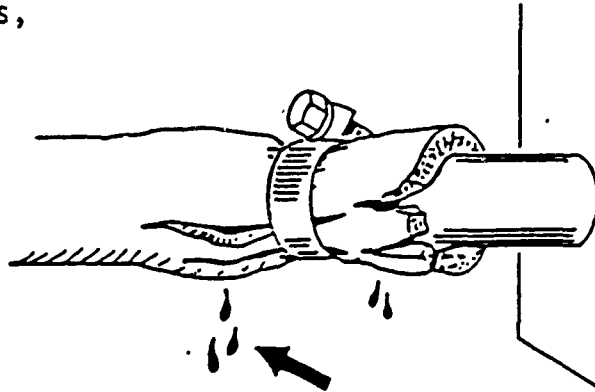


3. Belts -
check all belts for
wear, cracks and
looseness

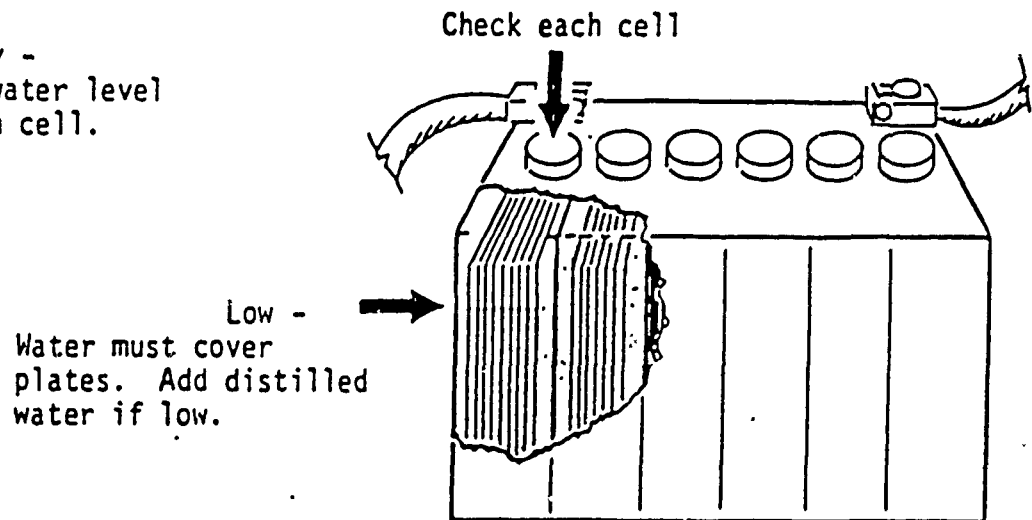


UNDER-THE-HOOD (Continued)

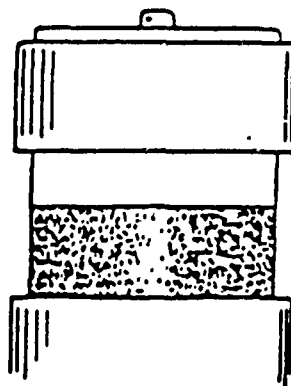
4. Hoses -
check hoses for leaks,
splits, cracks and
wear.



5. Battery -
check water level
in each cell.



6. Air Filter -
check air breather
indicator in sight
glass. Clean when
indicator reaches
service line.



Clean air filter
when indicator
reaches service
line.

PREVENTATIVE MAINTENANCE (ANNEX I-2)

The following outline is a three course in Preventative Maintenance (PM). The trainer will have to develop the training around this outline and the actual conditions existing, i.e. type of vehicle usage level of trainees, etc.

DEVELOPMENT OF THE PM PROGRAM:

An effective PM program must clearly define the responsibility and accountability for performing specific PM activities. All persons involved with the maintenance or operation of district's equipment fleet must know which activities they are responsible for performing. The PM program's procedures must define what must be performed, when it shall be performed, how it shall be performed, who shall perform it, and who is responsible for seeing that it is performed properly and on time.

GENERAL PROCEDURE:

The manufacturer's recommendations should be the starting point for developing procedure for performing preventative maintenance inspections and services. The manufacturer's recommendations are generally contained in a operator's manual. The operator's manual for each model of equipment describes the PM tasks that must be performed and provides frequencies for average operating conditions. Due to differences in engine type, mounted equipment (such as a trash compactor), or other major components, separate procedures are required for each class of equipment.

The next step is modify the manufacturer's recommendations to fit the actual operating conditions. While the activities to be performed will generally be the same as those recommended by the manufacturer, the timing or length of service interval must be shortened if actual operating conditions are harder on the equipment than the average condition. Factors that influence PM program requirements include:

- **Climatic Conditions** - including temperature, precipitation, dust, humidity and wind. Prevailing conditions such as high amounts of dust, high summer temperatures, wind, and low humidity indicate a need for more frequent PM servicing than would be necessary for typical climatic conditions.

- **Roadway Characteristics** - such as terrain (level, hilly or mountainous) road conditions, traffic congestion and roadway geometry. Narrow congested streets and hard on equipment, additionally rough road conditions will result in increased wear and tear on tires and suspension systems.
- **Equipment Type** - maintenance requirements can be affected by engine size, type, configuration and fuel system as well as transmission gearing, mounted equipment and extended service options such as automatic lubrication systems.
- **Equipment Use** - amount of idling time, length of trips, number of stops and starts, travel speeds, and type or weight of loads carried will influence maintenance requirements.
- **Personnel and Other Resources** - the skill levels of drivers and operators, skill levels of repair technicians, adequacy of shop facilities and adequacy of shop tooling will influence the PM program.
- **Other Considerations** - lubricant quality and fuel quality are examples of other considerations that influence PM requirements. Diesel engines using fuel with a sulfur content greater than 0.5 percent require more frequent oil changes than engines using fuel with a low sulfur content.

When changes in the manufacturer's recommendations are necessary due to one or more of the above factors, the modifications should be based on previous experience with similar equipment operating under similar conditions. Accurate and complete maintenance records are the best source for obtaining this information. Many manufacturers will make "customized" recommendation, when requested, based on the actual operating conditions. The previous experience of other local public and private sector fleets can also be helpful in modifying the manufacturer's recommendations.

LEVEL

PM Check List

VEHICLE NO. _____

MILEAGE _____

DATE _____

SIGNATURE _____

DIESEL ENGINE TRUCK

6000 km. or 240 hrs.

PM INSPECTOR IS TO INSPECT, ADJUST, TIGHTEN, LUBRICATE OR ADD FLUID AS REQUIRED FOR EACH OF THE ACTIVITIES LISTED.

PLACE A '✓' IN THE BOX UNDER 'GOOD' IF THE ITEM IS SATISFACTORY.

PLACE AN 'X' IN THE BOX UNDER 'BAD' IF REPAIRS ARE REQUIRED.

UNDER-THE-HOOD

GOOD BAD

- ☐ ☐ 1. Exhaust system - inspect for leaks.
- ☐ ☐ 2. Oil and fuel lines - inspect for leaks, chafing and kinks.
- ☐ ☐ 3. Radiator core, water pump, cylinder heads, block, hoses, and connections - inspect for leaks.
- ☐ ☐ 4. Belts - check for wear and proper adjustment.
- ☐ ☐ 5. Steering - inspect gear housing lubricant level, lubricate gear relay lever, steering column, U-joints and flexible coupling. (Perform lubrication when under the vehicle if easier:)
- ☐ ☐ 6. Brakes - check master cylinder fluid level.
- ☐ ☐ 7. *Battery - check water level in all cells, clean posts if corrosion present.

GOOD BAD

- ☐ ☐ 8. Windshield washer - check water level.
- ☐ ☐ 9. Air cleaner (engine) - clean housing with rag, clean element with low pressure air, check element for split. Check air intake system for leaks.
- ☐ ☐ 10. Engine oil - check level. Do not add since oil is to be changed.
- ☐ ☐ 11. Radiator - flush cooling system, change coolant and water filter. Check mounting bolts.
- ☐ ☐ 12. Radiator shutters - clean, inspect and lubricate shutterstat. Check shutter operation.
- ☐ ☐ 13. Fuel filters - replace filter.
- ☐ ☐ 14. Hood tilt linkage - lubricate.

*If battery is on side of truck perform during walk-around.

WALK-AROUND

GOOD BAD

- ☐☐ 1. Front fenders, sheet metal, fiber glass, paint and bumpers - inspect for appearance and accident damage.
- ☐☐ 2. Front lights and directional signals - check operation.
- ☐☐ 3. Left front wheel and tire - inspect for cuts or uneven wear, torque wheel nuts, check tire inflation.
- ☐☐ 4. Left side of cab sheet metal and glass - inspect for appearance and damage.
- ☐☐ 5. Left side door, hinges, latches and striker - check and lubricate.
- ☐☐ 6. Battery - check water level in all cells, test specific gravity in cells, clean posts if corrosion present, inspect cover clamps.
- ☐☐ 7. Fuel tank - check mountings, tighten if loose, check cap.
- ☐☐ 8. Left side body and frame - inspect for appearance and damage.
- ☐☐ 9. Left rear tires and wheels - inspect for cuts and wear, torque wheel nuts and axle flange nuts, check tire inflation.
- ☐☐ 10. Mounted equipment, dump body - check oil level in hydraulic system, lubricate body and hoist fittings.

GOOD BAD

- ☐☐ 11. Rear of vehicle, tail lights and direction signals - inspect.
- ☐☐ 12. Right rear tires and wheels - inspect for cuts and unusual wear, torque wheel and axle flange nuts, check tire inflation.
- ☐☐ 13. Right side body and frame - inspect for appearance and damage.
- ☐☐ 14. Right side cab sheet metal and glass - inspect for appearance and damage.
- ☐☐ 15. Right side door, hinges, latches and striker - check and lubricate.
- ☐☐ 16. Right front tire and wheel - check for cuts and unusual wear, torque wheel nuts, check inflation.
- ☐☐ 17. Front brake linings, anchors, locks, wheel cylinders and drums - inspect, clean drums and shoes with air, lubricate shoe anchors and cams.
- ☐☐ 18. Front wheel bearings - if grease packed, clean, repack and adjust. If oil lubricated, change lubricant.
- ☐☐ 19. Rear brake linings, anchors, locks, wheel cylinders and drums - inspect. Clean drums and shoes with compressed air. Lubricate shoe anchors and cams.
- ☐☐ 20. Rear wheel bearings - if grease packed, clean, repack and adjust. If oil lubricated, change lubricant.

UNDER-VEHICLE

GOOD BAD

☐ ☐ 1. Front tires and wheels - examine tires for cuts and wear, wheel cylinders for leakage. Check fluid level if wheel bearings are oil lubricated.

☐ ☐ 2. Front springs - check for breakage or misalignment, lubricate spring pins.

☐ ☐ 3. Front axle - check to insure U-bolt nuts and mounting bolts and nuts are tight. Check axle for damaged binding or worn parts and adequate lubrication.

☐ ☐ 4. Steering - check pitman arms, steering arms, drag link and tie rods for looseness - lubricate drag links, steering knuckles and tie rods.

☐ ☐ 5. Engine - change oil and filter, inspect pan gasket and crankshaft seals for leaks, inspect engine mounts for looseness or deterioration.

☐ ☐ 6. Clutch - lubricate linkage and check for tightness; lubricate relay and release forkshaft; release sleeve, bearing and fork; and slave cylinder yoke pin. check clutch adjustment.

☐ ☐ 7. Parking brake - lubricate linkage and relay lever.

☐ ☐ 8. Transmission - check fluid level, lubricate air cylinder and check for leakage.

☐ ☐ 9. Power-take-off - lubricate P.T.O. U-joints and control linkage, inspect gaskets for leakage.

☐ ☐ 10. Propeller shaft - lubricate shaft center bearing, slip

GOOD BAD

☐ ☐ 11. Frame and cross members - inspect for damage.

☐ ☐ 12. Exhaust System - inspect muffler, tail pipe and hanger bracket.

☐ ☐ 13. Body mounts - check for tightness.

☐ ☐ 14. Brakes - check hoses, lines, valves, cables, and cylinders. Lubricate pedal to valve linkage.

☐ ☐ 15. Electrical - check wires for breaks or worn insulation

☐ ☐ 16. Rear tires and wheels - check tires for cuts and wear, check wheel cylinders for leakage. Check fluid level if wheel bearings are oil lubricated.

☐ ☐ 17. Rear springs - check for breakage or misalignment, lubricate spring pins.

☐ ☐ 18. Rear axle - check to assure that axle mounting bolts and nuts are tight. Check for binding, warp or damaged parts.

☐ ☐ 19. Differential - check lubricant level.

☐ ☐ 20. Shift motor - (two speed axle only) - check lubricant level.

☐ ☐ 21. Power divider lock - (dual rear axles only) - lubricate yoke pin.

☐ ☐ 22. Air brake reservoirs - drain water.

PM Checklist

Page 4

CAB/DRIVER ITEMS

GOOD BAD

- ☐ ☐ 1. Cab interior - inspect for appearance and condition.
- ☐ ☐ 2. Seats - inspect and operate seat adjustment.
- ☐ ☐ 3. Windows and vents - operate.
- ☐ ☐ 4. Mirrors - inspect and check for tightness.
- ☐ ☐ 5. Instruments - check.
- ☐ ☐ 6. Directional signals - operate.
- ☐ ☐ 7. Steering wheel - check play.

GOOD BAD

- ☐ ☐ 8. Brake pedal - check for action and reserve.
- ☐ ☐ 9. Parking brake - check for action and reserve.
- ☐ ☐ 10. Clutch - check for action and free play.
- ☐ ☐ 11. Transmission - shift through all gears.
- ☐ ☐ 12. Accelerator and choke - check for binding.

NOTES

Fluid Added: _____

Repairs Needed: _____

Repair Needs Reported To: _____ By: _____

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SHOP-ON-THE JOB TRAINING (ANNEX I-3)

It is envisioned that the repair facility would have 40-50 apprentices in the repair and spare parts facilities on a continuing basis. The type of training should be at a minimum of one year in length.

1. Each trainee must attend a theory class one hour per day for three months consisting of:
 - a. Safety
 - b. A.B.C. of hand tools
 - c. Lubricant & fuels
 - d. Internal combustion engines
 - e. Gear train components
 - f. Chassis - springs - axles - steering
2. Each trainee is to receive hands on instruction from the master mechanics that are in charge of each section of the repair shop:
 - a. Washing & cleaning of parts
 - b. Repacking bearings - replacing seals
 - c. Adjusting V. Belts & light trouble shooting
 - d. Changing V. Joints & drive lines
 - e. Relining & replacing brakes
 - f. Adjusting valves & tune up
3. During the last three month period the trainee will be given limited responsibilities in:
 - a. Transmission and differential removal disassemble and assemble - adjustment.
 - b. Changing components of the chassis, i.e. axles, steering, gears and etc.
 - c. Disassemble and assembly of diesel engines:
 1. Grinding valves
 2. Re-ringing an engine
 3. Cylinder boring and sleeving
 4. Diesel fuel pumps and nozzles

4. Receiving Section:

- Customs, inspection and claims systems
- Recording received spare parts in Book 118
- Release spare parts to central workshop's warehouse. Documents and formats used.
- Entry on KARDEX

5. KARDEX System:

- Stock record & inventory cards
- Bin cards
- Usage of different colors for cards
- Application stock to cards
- System - divide files by make, model, etc.
- Putting present system on the KARDEX
- Exercises

6. Warehousing:

- Binning - location - letter and numbers
 - Common items - location
 - Slow moving items - location
 - Fast moving items - location
 - Stock levels min/max
 - Requisition objectives
 - Reordering procedure - warehouse responsibility
 - Issuing - to who, how order and old parts
 - Returns - credit and putting back into stock
 - Exercise
- 95

7. Control of end-use parts:

- Monitoring of spare parts usage
- Monitoring contractors usage
- disposal of old parts

8. Make up new parts lists:

- Separate local purchase from off-shore
- Daily requests to shop director
- Consult KARDEX files for levels

9. Exercise on make up of new parts list

10. Course review

ESTIMATED COST OF RECOMMENDED FACILITY

<u>FIXED COSTS:</u>	<u>FIRST YEAR</u> (US \$)	<u>SECOND YEAR</u> (US \$)
Lease	12,000*	12,000*
Building Construction/Rehabilitation	75,000*	10,000*
Shop Equipment - Tools	92,000	10,000
Maintenance Trucks/Other Support Vehicles	74,000	20,000
Office/Warehouse/Class Room Furniture and Equipment	20,000 -----	5,000 -----
	273,000	57,000
 <u>OPERATING COSTS:</u>		
Spare Parts	500,000	200,000
Salaries & Benefits 60% 2nd Year	110,000	180,000
Utilities	6,000	8,000
Subsistence - Trainees 40-50	40,000	60,000
Office & Warehouse Supplies	5,000	6,000
Other Operating Costs		
Fuel, Oil, Lubricants	5,000 -----	5,000 -----
	666,000	463,000
 TOTAL	= \$ <u>939,000</u>	\$ <u>520,000</u>

*Assuming raw land where AMEG builds all buildings.

CONTACTS DURING SURVEY

1. G.O.P.

Mr. Omar (Peshawar)
Mr. Kundi (Peshawar)

2. COMMERCIAL:

Mr. Salim Kadir - Owner Peshawar Motors
Mr. Mohammad Akram - Owner Peshawar Motors
Mr. Inayatullah Awan, Manger United Motors
Two Sons of Above - United Motors
Mr. Parveen - Director - Farib Motors
Mr. Noor Mohammad - Afgan Garage Capelpura
Mr. Najami - Shuba Bearing House
Mr. Mauqabad - Owner Mauqabad Garage
Mr. Syed Ahmad Ali Shah - Land Owner
Mr. Jalil - Land Owner
Mr. Sadek - Maintenance Chief - City Bus Co.
Mr. Haji Salim - NLC Maintenance

3. OTHER:

Mr. Kochie - Chief, Maintenance National Islamaic Front

Three Maintenance People From Other Alliance Parties -
Met at Capelpura:

Mr. Mohammad Latif
Mr. Gul Aftab
Mr. Gani Mohammad Khalil

4. USAID:

Mr. Ken Davis - Peshawar - Motor Pool
Mr. Jani - Peshawar - Motor Pool
Mr. H. Cushing
Mr. L. Crandall
Mr. V. Mahan

5. AMEG:

Mr. Manz
Mr. Lawrence
Dr. Ottenberg