

**National Emergency Management Agency  
Mongolia**

**FOLLOW-UP COOPERATION STUDY  
REPORT**

**ON**

**THE PROJECT FOR IMPROVEMENT OF  
FIREFIGHTING EQUIPMENT AND  
MAINTENANCE WORKSHOP**

**IN**

**MONGOLIA**

**November 2017**

**Japan International Cooperation Agency  
HIWA Consultant Inc.**

GL
JR
17-017



## Location map

### Mongolia

Capital: Ulaanbaatar  
Population\* <sup>1</sup>: 3,119,935 (2016)  
Official language: Mongolian  
Religion: Buddhism  
Total area: 1,564,100 km<sup>2</sup>  
GNI per capita\*<sup>2</sup>: 3,550 US\$ (2016)

\*<sup>1</sup> National Statistical Office of Mongolia

\*<sup>2</sup> World Bank



## Photos

Photo 1 : Grant Aid trucks



Ladder truck



4ton Pumper truck



電源車



8ton Watertanker

Photo 2 : Condition of the fire trucks



Black exhaust smoke



Engine of the 10 ton pumper tanker



A worn-out clutch disk



A crack on the flywheel



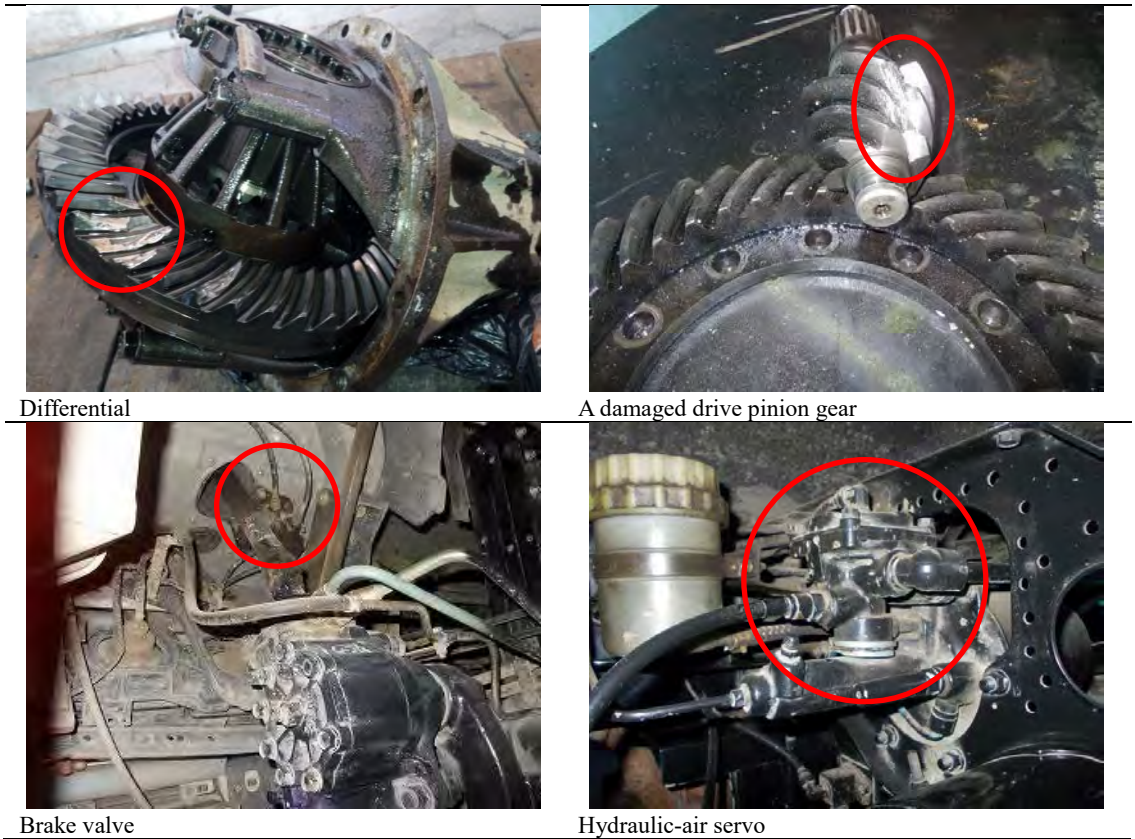


Photo 3 : Condition of the firefighting equipment





Photo 4 : Seminar, Discussion and Signing of MD (January 2016)



Seminar on maintenance of fire engines



Seminar on maintenance of fire engines



Members assisting the expert



Signing of MD

Photo 5 : On-site inspection upon shipment (October 2017)



Equipment and spare parts



Equipment and spare parts



Clutch cover for trucks



Valve for fire fighting equipment

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## **Abbreviations and Acronyms**

C/P :	Counterpart
F/U :	Follow-up
JICA :	Japan International Cooperation Agency
MEMA :	National Emergency Management Agency
MD :	Minutes of Discussions
OJT :	On-the-Job Training
UBFS :	Fire Fighting Section of Ulaanbaatar City

## **Appendices**

1. Minutes of Discussions
2. Seminar on Condition of the 2003 Firefighting trucks
3. Seminar participants list
4. Tentative required parts list
5. Specification of equipment
6. Shipments check record

## **1 Overview of the Follow-up cooperation study**

### **1.1 Background of the Follow-up study**

The population of Mongolia's capital Ulaanbaatar has grown rapidly from 650,000 in 1998 to over 1,300,000 in 2015. Behind this is the liberalization of migration in 1997 and the flow of nomads who, after the serious snow damage in 1999 and 2003, were no longer capable of grazing their cattle. The improvement of fire management and prevention in response to this population increase has been a challenge for the city, but it has so far been unable to provide sufficient services because the vehicles and equipment were either lacking or have become too old.

Japan has been, through grant aids 'project for Improvement of Fire Fighting Equipment and Maintenance Workshop (2001)' and 'project for Improvement of Capacity for Fire Fighting Techniques and Equipment in Ulaanbaatar (2013)', provided a total of 39 fire engines to the Fire Fighting Section of Ulaanbaatar City (UBFS), under the National Emergency Management Agency (NEMA), effectively contributing to the strengthening of the city's ability to protect itself from fires.

The equipment granted by Japan is maintained in good condition. Those granted through 'project for Improvement of Fire Fighting Equipment and Maintenance Workshop (2001)' (8 Pumper tankers, 6 Water tank trucks, 1 Chemical truck, 1 Ladder truck and 1 Floodlight car) are all operating without problems even though 10 years have elapsed since they were introduced to Mongolia. This suggests that the equipment have been provided proper maintenance during these years. In addition, the fire engine maintenance center was established in 2012, strengthening the overall maintenance system. On the other hand, the procurement of genuine spare parts from Japan has been difficult because of import restrictions. The spare parts imported from other countries are used instead, but the frequent replacement of parts for engine, power steering and discharge outlet pump add to the increase in operation and maintenance costs, and may shorten the life of these machinery. This Follow-up cooperation will be meeting the need to provide maintenance to the grant aid equipment as the population of Ulaanbaatar city continues to expand and so does the need for better response to fires.

### **1.2 Overview of the field study**

Following the conclusion of the contract of the Follow-up cooperation study on 28th December 2015 a meeting with the project members on 8th January 2016, 14 days of follow-up cooperation work was implemented from 10th to 23rd January 2016. The overview of the study at the Firefighting Section of Ulaanbaatar City (UBFS) of the National Emergency Management Agency (NEMA) is presented below.

### **1.3 Study team /Work schedule**

#### **1.3.1 Study team member**

Study team member is shown in the following table 1.1.

**Table 1-1 Study team member**

No	Position	Name	Affiliation	Dispatch period
1	Team Leader	Hiromi Sawada	Senior representative of JICA Mongolia office	—
2	Plan Management	Yutaka Wakisaka	JICA Grant Aid Project Management Division	17/1/2016 – 23/1/2016
3	Repair/operation and maintenance plan	Koji Uzawa	HIWA Consultant Inc.	10/1/2016 – 23/1/2016

### 1.3.2 Work schedule

14 days of follow-up cooperation study was completed as shown in the following table 1.2.

**Table 1-2 Study schedule**

	Date	Content	Item
	10 <sup>th</sup> Jan.	Tokyo→Incheon→Ulaanbaatar	
1	11 <sup>th</sup> Jan.	9:00-9:30 JICA Mongolia Office	Outline of study and work schedule
		10:00-11:00 Discussion with Director of NEMA Firefighting department	Inception report, requests from NEMA
		14:00-15:00 Discussion with UBFS Section Chief	Study schedule (selection of assistant members)
		15:00-16:00 Inspection of FS 10	Trouble shooting of one fire engine
		17:00-19:00 Inspection of FS 63 Trouble shooting of ladder truck (1 <sup>st</sup> )	Trouble shooting of two fire engines Condition of the ladder truck
2	12 <sup>th</sup> Jan.	9:00-12:00 Inspection of FS 26	Trouble shooting of four fire engines
		13:00-14:30 Inspection of NEMA repair center	Condition of maintenance facility
		15:00-16:30 Inspection of FS 11	Trouble shooting of two fire engines
3	13 <sup>th</sup> Jan.	8:00-9:00 Inspection of FS 10	Inspection of vehicle check before operation
		9:30-12:00 Inspection of FS 34	Trouble shooting of two fire engines
		13:00-14:30 Inspection of FS 14	Trouble shooting of two fire engines
		15:00-16:00 Inspection of FS 30	Trouble shooting of vehicles introduced in 2013
4	14 <sup>th</sup> Jan.	9:30-11:00 Inspection of FS 28	Trouble shooting of one fire engine
		14:30-16:30 Inspection of FS 64	Trouble shooting of two fire engines
5	15 <sup>th</sup> Jan.	10:30-13:00 Trouble shooting of ladder truck (2 <sup>nd</sup> ) at FS 63	Video shooting Operation training and condition of vehicle
6	16 <sup>th</sup> Jan.	Arranging documents	Conclusion of study results
7	17 <sup>th</sup> Jan.	Arranging documents	Preparation for maintenance seminar
8	18 <sup>th</sup> Jan.	9:00-9:30 JICA Mongolia office interim report	Outline of interim report and cooperation project
		10:00-12:00 Discussion with Director of NEMA Firefighting department	Outline of study results



		14:00-18:00 Vehicle maintenance and management seminar	Required parts for the 17 fire engines Guidance on adjusting the clutch recommendations for future maintenance
9	19 <sup>th</sup> Jan.	10:00-13:00 Discussion with maintenance staff	Prioritizing required spare parts and confirming their number
		15:00-16:00 Trouble shooting of ladder truck (3 <sup>rd</sup> ) at FS 63	Condition of Hydraulic oil pressure control valve
10	20 <sup>th</sup> Jan.	10:00-13:00 Preparing MD Documents	MD, Annex-2
		15:00-16:00 Meeting with Director of NEMA Firefighting department	MD and contents of F/U cooperation
11	21 <sup>st</sup> Jan.	10:00-11:30 Discussion with person in charge of procurement at UBFS	Procurement method and budget
		13:00-14:00 Outline of study results	Preparation of material for the Japanese Embassy and JICA Office
		14:30-15:30 Discussion with Deputy Director of NEMA Firefighting department	CAFS system
12	22 <sup>nd</sup> Jan.	9:00-9:30 Signing of MD	Signing of MD by Director general of NEMA
		10:30-11:30 Trouble shooting of ladder truck (4 <sup>th</sup> ) at FS 63	Outline of study results
		15:00-15:30 Japanese Embassy	Video shooting for Condition of Hydraulic gauge and Operation monitor
		17:30-18:00 JICA Mongolia Office	
	23 <sup>rd</sup> Jan.	Ulaanbaatar→Incheon→Tokyo	

## **2 Results of Field study**

### **2.1 Meeting and discussion on the Inception report and the outline of the study**

The outline of the Follow-up cooperation was explained to the Director of NEMA at 10:00am on 11th January. A meeting on the outline and schedule of the work was held with NEMA's fire department section chief and the person in charge of the fire department head office. It was confirmed that UBFS would continue to use the 17 fire engines (which have been used for 12 years since they were introduced in 2003) for more than another 8 years. This is an important factor to consider when conducting the Follow-up cooperation. It was also agreed that a procurement staff member and 3 mechanics would assist the expert. Members assisting the expert are shown in the following table 2.1.

**Table 2-1 Members assisting the expert**

No	Name	Affiliation	Title
1	Mr. Otgondorj	NEMA Capital emergency station Procurement Division	Procurement Auto engineer
2	Mr. Bayanjargal	NEMA Chingeltei District Emergency Department	Mechanical engineer
3	Mr. Sh.Ganzorig	NEMA Bayanzurkhl and Sukhbaatar District Emergency Department	Mechanical engineer
4	Mr. Gankhuyag	NEMA Khan-Uul District Emergency Department	Mechanical engineer

### **2.2 Inspection of the fire engines**

#### **2.2.1 Inspected fire engines**

The 17 fire engines introduced in 2003 are stationed at 8 fire stations across Ulaanbaatar City. An inspection of these fire engines was conducted as presented in Table 2.2.

**Table 2-2 Inspected fire engines**

Date	No	FS.	Reg. No.	Maker	Chassis No.	Type	Mileage (km)
11 <sup>th</sup> Jan.	1	10	06-53 УБЯ	Mitsubishi	FV 515M-A00037	Pumper tanker 10t	36,717
	2	63	06-81 УБЯ	Mitsubishi	FV515P-A00081	Ladder truck	10,196
	3	63	06-61 УБЯ	Isuzu	JALFTS33F-27000019	Pumper tanker 4t (4WD)	40,600
	4	63	06-67 УБЯ	Mitsubishi	FP517H-A00202	Water tank truck 8t	40,677
12 <sup>th</sup> Jan.	5	26	06-57 УБЯ	Mitsubishi	FV515M-A00039	Chemical truck 9t	17,983
	6	26	06-54 УБЯ	Mitsubishi	FV515M-A00038	Pumper tanker 10t	56,952
	7	26	06-65 УБЯ	Mitsubishi	FP517H-A00201	Water tank truck 8t	40,364
	8	26	06-70 УБЯ	Mitsubishi	FG635C-A0045	Floodlight car	10,917
	9	11	06-58 УБЯ	Isuzu	JALFTS33F-27000017	Pumper tanker 4t (4WD)	57,623
	10	11	06-63 УБЯ	Mitsubishi	FP517H-A00199	Water tank truck 8t	41,800
13 <sup>th</sup> Jan.	11	34	06-68 УБЯ	Mitsubishi	FP517H-A00203	Water tank truck 8t	65,022
	12	34	06-62 УБЯ	Isuzu	JALFTS33F-27000020	Pumper tanker 4t (4WD)	64,670
	13	14	06-55 УБЯ	Mitsubishi	FK617F-B00027	Pumper tanker 4t	32,534
	14	14	06-64 УБЯ	Mitsubishi	FP517H-A00200	Water tank truck 8t	27,145
14 <sup>th</sup> Jan.	15	28	51-86 НАА	Isuzu	JALFTS33F-27000018	Pumper tanker 4t (4WD)	17,027
	16	64	06-56 УБЯ	Mitsubishi	FK617F-B00028	Pumper tanker 4t	18,849
	17	64	06-69 УБЯ	Mitsubishi	FP517H-A00204	Water tank truck 8t	15,868

## 2.3 Result of inspection

The average mileage of the 17 fire engines over the 12 years after their introduction is 34,996.7km and their mileage per year is 2,916.4km. The mileage of fire engines is smaller compared to other vehicles as they are used only for emergencies. There was therefore no need to replace the brake system, which requires spare parts replacements and adjustments as the mileage increases. On the other hand, there were defects such as low engine output and damages on the clutch system and the differential system. This is because the fire engines are required to start at full speed and to run on bad roads. Defects caused by frozen water were also found on brake rubber parts and bulbs of the pumping system. Although there is nothing wrong with its other capabilities, a ladder engine is kept out of use and stored at FS 63 because its ladder will not expand and contract. The rest of the 16 fire engines are kept in good condition through repairs and adjustments, and are used for firefighting operations.

## 2.4 Current malfunctions

### 2.4.1 Engine

Since there have been no engine troubles involving engine oil run-outs, burnouts caused by low quality engine oil, excessive wear or engine breakdown caused by bad driving, engine overhaul has so far not been conducted for any of the vehicles. However, those with mileage exceeding 20,000km have lower engine outputs and are emitting white or black smoke. Oil and water leakage due to the wear of packing and oil seal of the engine are also occurring. Although these parts have been replaced by non-genuine parts, they have not been capable of preventing similar

malfunctions from occurring again.

#### **2.4.2 Clutch**

The clutch of fire engines is frequently used when driving over unpaved roads within the Ger District and during traffic congestions inside the city. In addition, the fire engines are required to answer to emergency calls with their tanks fully loaded with water. All these factors cause heavy damage to the clutch disk's surface (facing made of iron, copper and ceramic). To save repair costs, the facing is renewed each time it wears out. However, because the clutch disk itself is wearing out, it is damaging other parts such as flywheel.

#### **2.4.3 Differential**

The fire engines run on unpaved roads at full speed while being fully loaded with water. This has caused malfunctions of the differential system in one of the fire engines (no. 06-61 at FS 63). As the engineer of NEMA's repair center could not procure the necessary genuine spare parts within Mongolia, a Korean spare part was used instead. Although the fire engine can be operated, genuine spare parts are urgently required in order to prevent another malfunction.

#### **2.4.4 Brake**

There have been no major damages on the brake lining, wheel cylinder or the brake drum as the fire engines have not run long distances. However, the freezing of water vapor inside compressed air during winter and the stiffening of rubber parts are causing air leak from the valves. The mechanic engineers have provided maintenance by using similar but non-genuine parts, but considering the importance of the brake system, these parts must urgently be replaced by genuine parts.

#### **2.4.5 Valve / Water pipes**

Spray water valves and drainage valves are showing signs of wear due to age. The packing, gasket and seal that connect the water piping have hardened and cracked over the cold winter months, resulting in water leakage. The leaking water has rusted the water tank, causing more leakage. 220V heaters using the AC power source of the garage are attached to the water pipes in order to prevent the water from freezing, but almost 7 of them have broken down. The warm-air heating using the vehicles' batteries, which are required to prevent the water piping from freezing while the vehicle is in operation, do not work due to breakdown. The exhaust pipes are therefore adjusted so that the exhaust gas comes into contact with and warms the water pipes, but this is burning out the plastic parts piping and control valves.

#### **2.4.6 Malfunctions of the ladder truck**

When a fire broke out at a government building in Ulaanbaatar city in June 2015, the UBFS sent a ladder truck for fire extinguishing operations. After the operation, the ladder that usually stores itself automatically stopped halfway, so it was stored manually instead. Later, when the ladder was operated for inspection, an error sign appeared on the control board just as the jack cylinder of the outrigger equipment, which prevents the vehicle from overturning, started to extend. Since then, the ladder has become inoperable. The condition of the ladder was recorded on video and sent to the engineer of MORITA HOLDINGS CORPORATION, a ladder truck manufacturer, together with detailed descriptions via email. They confirmed that the ladder's malfunctions were due to problems in the hydraulic system and its electric control system. The selection of the spare parts required for the repair is scheduled.



## **2.5 Maintenance and management system**

### **2.5.1 Number of fire engines**

As of December 2014, NEMA possessed a total of 178 fire engines, 39 of which were introduced by the Japanese grant aid. The number increased to 228 when 15 Chinese fire engines and 26 Korean fire engines were introduced by grant aid, and 9 more were purchased by the municipal budget. 17 more will be introduced in 2016 by loans from Australia, so the number of fire engines will increase to 245.

### **2.5.2 Budget**

The spare parts required for the parts of the fire engine that have broken down during the year and for periodic maintenance of the following year is requested to and approved by NEMA's accounting and procurement department. The purchase request is filed by each fire station every December of the previous year. As the requested spare parts are procured through general competitive bids of the following year, it takes time for the fire engines to be repaired. Aside from this annual request, 50,000 tugrik/month (about 3,000 yen/month-Jan.2016) is allocated to each fire station to allow the maintenance and management staff to procure spare parts as necessary. However, the spare parts that can be purchased with this budget are very limited, making it difficult to properly conduct the maintenance and management of the fire engines.

### **2.5.3 Maintenance and repair system**

Drivers or firefighters take charge of capital services (periodic inspection of fire engines held twice a year in spring and autumn) and minor repairs under the guidance of mechanical engineers allocated at each station. On the other hand, major repairs and maintenance involving the engine, clutch and differential systems are conducted at the repair center of NEMA's accounting and procurement department procurement office. There are 6 mechanics, 1 automobile electrician and 1 body painting worker at the repair center. The eight staff members are in charge of the major repairs of all the fire engines used at NEMA. Although most maintenance equipment is available at the repair center, there are few tools for repairing large sized vehicles. Moreover, some of the tools were damaged because they are not of good quality.

### **2.5.4 Procurement of spare parts under Mongolia's Procurement Act**

Article 11. (Technical Definition) of Mongolia's Procurement Act stipulates "To not set specific requirements and conditions as to trademark, brand, type, place of origin, methods of production, producer or supplier".

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Article 11. Technical Definition

11.1. Customer shall satisfy the following requirements when preparing technical definitions:

11.1.3. To not set specific requirements and conditions as to trademark, brand, type, place of origin, methods of production, producer or supplier;

11.1.4. In the case of required inclusion of conditions specified in 11.1.3 of this Law, to add the clause "... or equivalent to these ...".

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Mongolia's Procurement Act does not allow for the specification of trademarks, but allows the procurement of comparable spare parts if sufficient information is provided, and thus allows specific requirements equivalent of genuine spare parts to be specified. Although the NEMA is trying to exclude cheap counterfeit parts by respecting this stipulation of the Procurement Act, it is unable to prevent such parts made in China from being procured, making it difficult to procure genuine parts.

## **2.6 Seminar on maintenance of fire engines**

During the seminar on maintenance of fire engines held on 18th January 2016 (14:00-18:00), the expert reported on the results of the inspection and made recommendations on how to provide maintenance. Staff members involved in the maintenance and management of the fire engines (spare parts procurement staff, mechanical engineers, repair center engineers) and 41 drivers (who conduct daily maintenance) participated in the seminar. All participants took part in confirming the condition of each vehicle and the spare parts required, and also in selecting additional parts. The participants were able to understand the current situation as well as the importance of the parts procured through the F/U cooperation. The drivers were also able to understand the importance of daily maintenance.

(Appendices 2: Seminar on Condition of the 2003 Firefighting trucks)

(Appendices 3: Seminar participants list)

(Appendices 4: Tentative required parts list)

## **2.7 Report on the study results**

### **2.7.1 Report to NEMA**

The draft of the MD was presented to Mr. Zaluukhuu (Director of NEMA) from 15:00 on 20th January. The current condition of the 17 fire engines and the necessary spare parts (their order of priority and number), as shown in Annex-2, was also explained and agreed upon.

### **2.7.2 Report to the Embassy of Japan**

The expert explained the overview of the Follow-up cooperation to Mr. Fukazawa at the Embassy of Japan from 15:00 on 22nd January.

### **2.7.3 Report to the JICA office**

The expert explained the overview of the Follow-up cooperation to the Director, deputy director and the staff member in charge of the project from 17:30 on 22nd January.

## **2.8 Signing of MD**

Mr. Badral (Director general of NEMA) and Mr. Sawada (Senior representative of JICA Mongolia office) signed the MD of the Follow-up cooperation project at 9:00 on 22nd January. (Appendices 1: Minutes of Discussions)

### **3 Drawing up the Follow-up cooperation study plan**

The necessary parts were selected during the maintenance seminar held on 18th January 2016. Based on this, the necessary spare parts were prioritized and their numbers were decided during the discussion on the 19th with the 4 members assisting the expert to decide the component (draft) required for the follow-up project.

#### **3.1 Criteria for selecting spare parts**

All the defects were confirmed and the necessary spare parts were selected. The criteria for selecting spare parts was set as follows:

##### **3.1.1 Spare parts that are consumable or procurable in Mongolia**

Filters (engine oil, air, fuel), batteries and tires need to be replaced regularly in order to keep the vehicles in good condition. As these parts do not necessarily have to be genuine, they will continue to be procured in Mongolia using NEMA's budget.

##### **3.1.2 Parts that might cause malfunctions if they are not genuine**

When spare parts that are not genuine are used for engine, fuel injection, clutch and differential systems, they may quicken the wear of other parts and shorten the lives of the whole system. Genuine parts must therefore be procured through the F/U cooperation.

##### **3.1.3 Important safety related parts**

Since malfunctions of brake and steering systems during the operation of vehicles may result in serious accidents, genuine spare parts must be procured through the F/U cooperation.

#### **3.2 Prioritizing the necessary parts**

The spare parts were categorized on a scale of 4 based on their current conditions and replacement timing. Those categorized as 'AA' are currently broken or damaged, and need immediate replacement in order to regain their functions. Those under category 'A' show some wear and will require replacement within 1~2 years. Those under category 'B' are expected to show some malfunctions after 3~5 years and those under 'C' will be needing replacement after 5 more years of use. Criteria and priority of spare parts are shown in the following table 3.1.

**Table 3-1 Priority of spare parts**

Category	Condition	Replacement timing
AA	Broken or Damaged	Immediate replacement
A	Worn out	In 1~2 years
B	Deteriorated	In 3~5 years
C	Weakened	In 5~8 years

#### **3.3 Number of spare parts**

The number of fire engine spare parts that will be required after 8 more years of operation was calculated, on the assumption that the vehicles have a 20-year lifespan. Draft of F/U component is shown in the following table 3.2.

**Table 3-2 Draft of F/U component**

1. Mitsubishi Pumper 10,000L (FV515M)					2. Mitsubishi Ladder Truck (FV515P)				
3 trucks					1 truck				
Category	No.	Item	Priority Rank	Qty	Category	No.	Item	Priority Rank	Qty
Engine	1-1	Engine overhaul kit	AA	3	Brake	2-1	Brake valve	A	1
	1-2	Fuel feed pump	AA	2		2-2	Hydraulic air servo brake	A	1
	1-3	Radiator assembly	AA	2		2-3	Brake lining	B	1
	1-4	Water pump	AA	2	Clutch	2-4	Clutch cover	A	1
	1-5	Power steering pump	AA	2		2-5	Clutch disk	A	1
	1-6	Starter motor	AA	2		2-6	Clutch release bearing	A	1
	1-7	Air compressor	A	1		2-7	Clutch pilot bearing	A	1
	1-8	Piston, Piston ring	B	3	Body	2-8	Ladder repair parts	AA	1
	1-9	Cylinder liner	B	3		2-9	PTO cross joint	C	1
	1-10	B/G (Crank shaft, Connecting rod, Thrust)	B	3	3. Mitsubishi Water tank 8,000L (FP517H)				
	1-11	Injection nozzle assembly	B	3	6 trucks				
	1-12	Injection nozzle chip	B	3	Category	No.	Item	Priority Rank	Qty
	1-13	Injection pump assembly	B	3	Engine	3-1	Air compressor	AA	4
	1-14	Grow heater	C	1		3-2	Starter motor	AA	2
Brake	1-15	Brake valve	AA	3		3-3	Engine overhaul kit	B	4
	1-16	Hydraulic air servo brake	AA	3		3-4	Piston, Piston ring	B	4
	1-17	Brake lining	AA	3		3-5	Cylinder liner	B	4
	1-18	Brake hose	AA	2		3-6	B/G (Crank shaft, Connecting rod, Thrust)	B	4
Clutch	1-19	Clutch release cylinder	AA	2		3-7	Injection nozzle assembly	B	4
	1-20	Clutch cover	A	3		3-8	Injection nozzle chip	B	4
	1-21	Clutch disk	A	3		3-9	Injection pump assembly	B	4
	1-22	Clutch release bearing	A	3		3-10	Grow heater	C	1
	1-23	Clutch pilot bearing	A	3	Brake	3-11	Brake valve	AA	3
	1-24	Clutch sleeve, guide	A	2		3-12	Hydraulic air servo brake	AA	4
	1-25	Fly wheel	A	2		3-13	Air tank drain cock	A	2
	1-26	Main drive shaft	A	1		3-14	Brake lining	B	6
Chassis	1-27	Trunnion suspension, Bush	AA	3		3-15	Parking brake wire cable	B	2
	1-28	Torque rod bush	AA	3	Clutch	3-16	Clutch cover	A	6
	1-29	Steering ball joint	AA	2		3-17	Clutch disk	A	6
	1-30	Cabin motor	AA	2		3-18	Clutch release bearing	A	6
	1-31	Parking brake wire cable	B	2		3-19	Clutch pilot bearing	A	6
	1-32	Wheel hub bearing	B	1		3-20	Clutch sleeve, guide	A	3
	1-33	Wheel hub seal	B	1		3-21	Clutch release cylinder	A	3
	1-34	Lights (Head, Tail, Side, Indicator)	C	1		3-22	Fly wheel	A	3
	1-35	Propeller shaft cross joint	C	1	Chassis	3-23	Main drive shaft	B	1
Body	1-36	Valve assembly	AA	3		3-24	Front grass	AA	1
	1-37	Packing and Seal	AA	3		3-25	Wheel hub bearing	A	1
	1-38	Throttle wire	AA	3		3-26	Wheel hub seal	A	1
	1-39	Water spraying gun	AA	3		3-27	Differential assembly	A	2
	1-40	Central valve	AA	2		3-28	Steering gear box	A	1
	1-41	Electric heater (DC24V)	AA	3		3-29	Leaf spring Front No.1+ No.2	B	6
	1-42	External heater	AA	3		3-30	Lights (Head, Tail, Side, Indicator)	C	1
	1-43	Water pressure auto adjuster	A	2		3-31	Propeller shaft cross joint	C	1
	1-44	PTO cross joint	C	1	Body	3-32	Electric heater (DC24V)	AA	6
Tool	1-45	Compression gage	AA	1		3-33	TOHATSU Pump	A	6
	1-46	Micro meter	AA	1		3-34	PTO cross joint	C	1



**4. Mitsubishi Pumper 4,000L (FK617F)**

**2 trucks**

Category	No.	Item	Priority Rank	Qty
Engine	4-1	Alternator	AA	1
	4-2	Engine overhaul kit	B	2
	4-3	Piston, Piston ring	B	2
	4-4	Cylinder liner	B	2
	4-5	B/G (Crank shaft, Connecting rod, Thrust)	B	2
	4-6	Injection nozzle assembly	B	2
	4-7	Injection nozzle chip	B	2
	4-8	Injection pump assembly	B	2
	4-9	Air compressor	B	1
	4-10	Grow heater	C	1
Brake	4-11	Brake valve	AA	2
	4-12	Hydraulic air servo brake	AA	2
	4-13	Brake lining	AA	2
Clutch	4-14	Clutch cover	A	2
	4-15	Clutch disk	A	2
	4-16	Clutch release bearing	A	2
	4-17	Clutch pilot bearing	A	2
	4-18	Clutch sleeve, guide	A	1
	4-19	Clutch release cylinder	A	1
	4-20	Fly wheel	A	1
Chassis	4-21	Steering dumper	AA	1
	4-22	Parking brake wire cable	A	1
	4-23	Shift wire cable	A	1
	4-24	Shock absorber	A	1
	4-25	Steering ball joint	A	1
	4-26	Leaf spring assembly	B	2
	4-27	Lights (Head, Tail, Side, Indicator)	C	1
	4-28	Propeller shaft cross joint	C	1
Body	4-29	Valve assembly	AA	2
	4-30	Packing and Seal	AA	2
	4-31	Throttle wire	AA	2
	4-32	Water spraying gun	AA	2
	4-33	Water pressure auto adjuster	AA	2
	4-34	Electric heater (DC24V)	AA	2
	4-35	External heater	AA	2
	4-36	PTO cross joint	AA	2

**5. Isuzu Pumper 4WD 4,000L (FTS33F)**

**4 trucks**

Category	No.	Item	Priority Rank	Qty
Engine	5-1	Alternator	AA	2
	5-2	Engine overhaul kit	B	3
	5-3	Piston, Piston ring	B	3
	5-4	Cylinder liner	B	3
	5-5	B/G (Crank shaft, Connecting rod, Thrust)	B	3
	5-6	Injection nozzle assembly	B	3
	5-7	Injection nozzle chip	B	3
	5-8	Injection pump assembly	B	3
	5-9	Air compressor	B	2
	5-10	Grow heater	C	1
Brake	5-11	Brake valve	AA	2
	5-12	Hydraulic air servo brake	AA	2
	5-13	Brake lining	AA	4
	5-14	Parking brake wire cable	AA	4
Clutch	5-15	Clutch cover	A	4
	5-16	Clutch disk	A	4
	5-17	Clutch release bearing	A	4
	5-18	Clutch pilot bearing	A	4
	5-19	Clutch sleeve, guide	A	1
	5-20	Clutch release cylinder	A	1
	5-21	Fly wheel	A	1
	5-22	Front grass	AA	2
Chassis	5-23	Head light	AA	1
	5-24	Cabin motor	AA	2
	5-25	Shift wire cable	AA	2
	5-26	Shock absorber	AA	2
	5-27	Steering dumper	AA	1
	5-28	Steering ball joint	AA	2
	5-29	Steering gear box assembly	AA	2
	5-30	Leaf spring assembly	B	3
	5-31	Differential assembly	B	2
	5-32	Lights (Head, Tail, Side, Indicator)	C	1
Body	5-33	Propeller shaft cross joint	C	1
	5-34	Valve assembly	AA	4
	5-35	Packing and Seal	AA	4
	5-36	Throttle wire	AA	4
	5-37	Water spraying gun	AA	2
	5-38	Electric heater (DC24V)	AA	4
	5-39	External heater	AA	4
	5-40	PTO cross joint	C	1

**6. Mitsubishi Floodlight FG635C)**

**1 truck**

Category	No.	Item	Priority Rank	Qty
Brake	6-1	Vacuum booster	AA	1

### 3.4 Procurement assistance

#### 3.4.1 Specification

Since the equipment will be procured from Japan, preparations for a bid will be made as stipulated in JICA regulation. Bid-related documents (specifications etc.) will be made and documents required for the quotation will be submitted based on the results of the study. The specification will be completed following JICA's guideline, and quotations will be made. The delivery date of the equipment will be verified before the opening of the bid and explained to the Mongolian side.

(Appendices 5: Specification of equipment)

### **3.4.2 Technical assistance for the bid**

Assistance will be provided to make a list of model answers to technical questions concerning the bid after its official announcement.

### **3.4.3 Delivery of equipment and on-site inspection upon shipment**

On 6<sup>th</sup> October 2017, the equipment was checked upon shipment, together with the supplier and the person in charge of the manufacturer, to make sure that they comply with the specifications. A summary of the report on the inspection will be made. The procured parts were as ordered and in good shape.

(Appendices 6: Shipments check record)

## **3.5 Dispatch of technical engineers**

### **3.5.1 The need to dispatch technical engineers**

As it will be technically difficult for UBFS maintenance and management staff to repair the fire engines, technical engineers will be dispatched for the task. The repairs will be conducted in the form of OJT, by letting the UBFS maintenance and management staff to participate. The technical staff will be in charge of the opening and checking of the new spare parts, repair, adjustment, trial operation, operation verification and guidance on operation.

### **3.5.2 Number of technical engineers and period of dispatch**

1 manager and 2 technical engineers (one on maintenance and another on operation of fire engines) will be dispatched 7 days each.

### **3.5.3 Dispatch schedule**

The dispatch schedule is as presented in the table 3.3 below.

**Table 3-3 Technical engineers dispatch schedule**

Days	Week	Schedule		Place
		AM	PM	
1	Sun.	Tokyo→Transit→Ulaanbaatar		
2	Mon.	Discussion: JICA Mongolia Office NEMA	Parts inspection / Troubleshooting	Ulaanbaatar
3	Tue.	Repairing and adjustment Ladder truck	Repairing and adjustment Ladder truck	Ulaanbaatar
4	Wen.	Repairing and adjustment Ladder truck	Repairing and adjustment Ladder truck	Ulaanbaatar
5	Thu.	Operation training for Ladder truck Operation training for Pumper truck	Operation training for Ladder truck Operation training for Pumper truck	Ulaanbaatar
6	Fri.	Operation training for Ladder truck Operation training for Pumper truck	Report: JICA Mongolia office NEMA	Ulaanbaatar
7	Sat.	Ulaanbaatar→Transit→Tokyo		

## 4 Recommendations on the maintenance and management of fire engines

### 4.1 Repair and maintenance after the procurement of spare parts

#### 4.1.1 Engine overhaul

The current fire engines have never had engine overhauls. This is because engine overhaul is usually conducted only when engines have broken down completely. In the future, the spare parts that have worn out inside engines with lowering outputs will have to be replaced as part of preventative maintenance. The replacement has to be based on the measurements on the pressure gauge and not on the experience of the maintenance staff. A plan of repair works that appropriately reflects the conditions of the engine will be required. As inappropriate engine overhaul can result in negative consequences, it has to be conducted based on the repair manual published by the manufacturer.

#### 4.1.2 Replacement timing of spare parts

It is advised to conduct preventative maintenance (early replacements of damaged or worn out parts) rather than to repair only when parts have worn out. Preventative maintenance will make it possible to prevent damages to other parts of the vehicle and also shorten repair time by good planning. Rubber packing and seals require early replacements because they deteriorate when kept in store for too long. They must also be stored inside the office with heating because they cannot be kept in good condition at temperatures below minus 30 degrees Celsius. It is also advised to keep the replaced parts can be used again in case of emergencies.

Repairs and spare parts replacements have to be planned in advance for the smooth operation of the fire engines.

### 4.2 Maintenance and management system

The drivers and firefighters are currently engaged in conducting daily inspections and minor repairs at each fire station. More serious repairs are conducted by the mechanics at the repair center. There is currently no maintenance staff to be in charge of preventative maintenance that involves periodic inspections and adjustments as well as trouble shooting in between these two types of repairs. The organization of a maintenance team to conduct monthly inspections of all fire engines is therefore proposed. Recommendation for maintenance management system is shown in the following table 4.1.

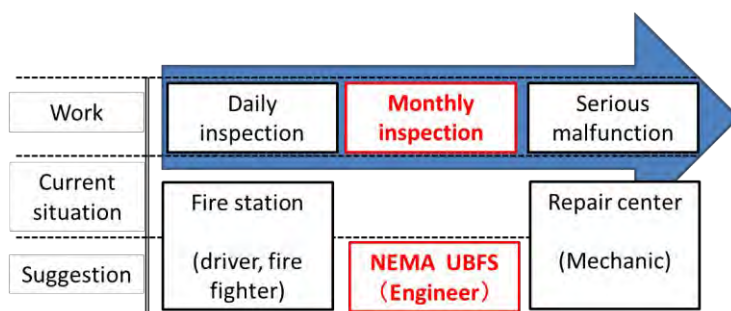


Figure 4-1 Recommendation for maintenance management system

### **4.3 Budget**

The parts required to operate the vehicles introduced in 2003 will be procured through the F/U cooperation. So the fire stations are expected to request less annual budget for the maintenance of their fire engines. The saved amount should be used to increase the maintenance management budget (currently 50,000 tugrik/month or about 3,000 yen/month for each district) as breakdowns and malfunctions are expected to increase due to age. It is also advised to allocate the maintenance management budget by vehicle and not by district, as districts with more fire engines require more maintenance budget.

### **4.4 Technical assistance**

Training on how to manage firefighting vehicles and the use of fire extinguishing devices was organized by the manufacturer when the vehicles were introduced, but training on the structure, operation and troubleshooting of these devices have not yet been conducted. Such technical guidance is important in order to maintain them in good condition. Technical guidance including a plan of repair works to appropriately utilize the spare parts prepared through F/U cooperation and guidance on how to replace and organize the spare parts and make specifications for their future procurement are also necessary.

## **Appendices**

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1. Minutes of Discussions
2. Seminar on Condition of the 2003 Firefighting trucks
3. Seminar participants list
4. Tentative required parts list
5. Specification of equipment
6. Shipments check record

**MINUTES OF DISCUSSIONS**  
**ON**  
**THE FOLLOW-UP STUDY**  
**ON**  
**THE PROJECT FOR IMPROVEMENT OF FIRE FIGHTING EQUIPMENT AND**  
**MAINTENANCE WORKSHOP**

In response to the request from the National Emergency Management Agency (hereinafter referred to as "NEMA"), the Japan International Cooperation Agency (hereinafter referred to as "JICA") decided to conduct a Follow-up Study (hereinafter referred to as "the Study") on The Project for Improvement of Fire Fighting Equipment and Maintenance Workshop (hereinafter referred to as "the Original Project").

JICA sent to Mongolia the Follow-up Study Team (hereinafter referred to as "the Team"), which is headed by Ms. Hiromi SAWADA, Senior Representative of JICA Mongolia Office and is scheduled to stay in the country from January 10th to January 23rd, 2016.

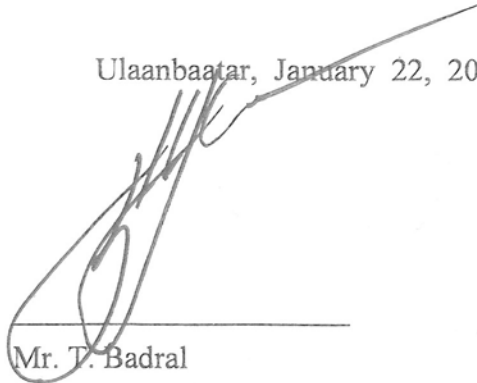
The Team held discussions with the officials concerned of the government of Mongolia and conducted a field survey at the study area.

In the course of the discussions and field survey, both parties confirmed the main items described on the attached sheets. The Team will proceed to further works and prepare the Follow-Up Study Report.

Ulaanbaatar, January 22, 2016

沢田 博美

Ms. Hiromi SAWADA  
Team Leader  
Follow-up Study Team  
Japan International Cooperation  
Agency

  
Mr. T. Badral  
Chief, Brigadier General  
National Emergency Management  
Agency

## ATTACHMENT

### 1. Objective of the Follow-up Cooperation Scheme

- 1-1. Objective of the Follow-up Cooperation Project (hereinafter referred to as "the Project") is to maintain and restore the function of equipment and facilities provided through the Original Project to the originally expected levels.
- 1-2. Viability of the implementation of the Project will be determined by JICA after the Study.
- 1-3. The Study aims at, through field survey and discussions with concerned officials, examining the current situation of equipment and facilities, clarifying the request from the Mongolian side, and collecting necessary information for considering the Project implementation.

### 2. Responsible and Implementing Agencies

The responsible and implementing agency is NEMA. The organization chart of NEMA is shown in Annex-1.

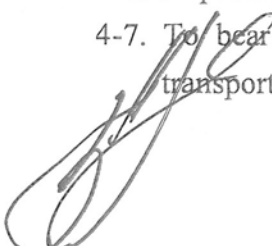
### 3. Components of the Follow-up Cooperation Project

- 3-1. Based on the results of the study and discussions, both sides identified the major items and the priority under consideration for the Project are described in Annex-2.
- 3-2. The final decision of the rationalization of the implementation of the Project will be determined after further studies in Japan. Such decision may also be subject to budgetary allocation by the Japanese side.

### 4. Undertakings by the Mongolian side

When the Project is decided to be implemented, the Mongolian side shall take necessary measures for the smooth implementation of the Project as listed below.

- 4-1. To ensure sufficient space necessary when the Project is executed.
- 4-2. To assist the procedure of tax exemption and customs clearance of the equipment at the port of disembarkation.
- 4-3. To assist prompt customs clearance of the products and to assist internal transportation of the products in Mongolia.
- 4-4. To accord Japanese nationals whose services may be required in connection with the supply of products as may be necessary for their entry into Mongolia and stay therein for the performance of their work, if the services above are judged necessary after further examination.
- 4-5. To ensure that the products be maintained and use properly and effectively to make best use of the equipment in future, including purchase of all necessary consumables for continuous use of the equipment.
- 4-6. To provide JICA with necessary information upon the request of JICA.
- 4-7. To bear all the expense, other than those to be borne by the Project, necessary for the transportation and installation of the products, when necessary.





## 5. Others

5-1. Both sides agreed that the items to be procured by the Project shall be installed by the Mongolian side except for ladder repair parts which shall be installed by the manufacturer's engineer.

5-2. Both sides agreed that the Japanese side shall provide the technical seminar during the Project, the Mongolian side shall provide necessary arrangement to it.

5-3. Both sides agreed that the Mongolian side shall submit the plan of repair works utilizing all the items to be procured by the Project to JICA Mongolia Office within three months after the handover.

5-4. Both sides agreed that the Mongolian side shall submit the progress report of the plan mentioned in 5-3 to JICA Mongolia Office semi-annually in June and December.

5-5. Both sides agreed that NEMA shall manage the stock of all the items to be procured by the Project.

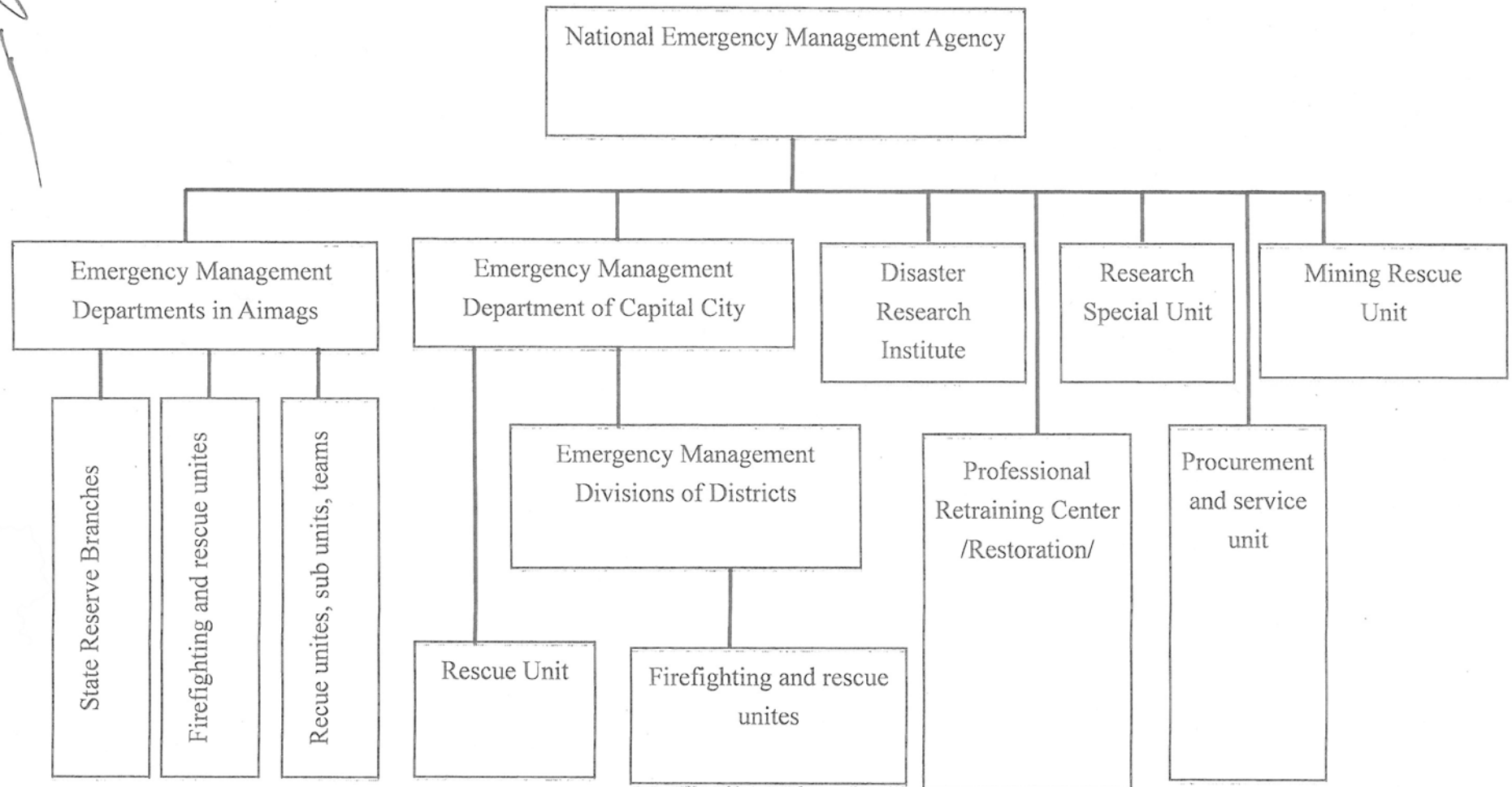
Annex-1 Organization chart of NEMA

Annex-2 Tentative Evaluation results of the Items

Annex-3 Major Undertakings to be taken by the Government of Mongolia and JICA

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Annex-1 Organization chart of NEMA



## Annex-2 Tentative Evaluation result of the Items

Priority criteria

AA: Broken or Damaged Parts A: Worn Out Parts B: Deteriorated Parts C: Weakened Parts

### 1. Mitsubishi Pumper 10,000L (FV515M)

3 trucks

### 2. Mitsubishi Ladder Truck (FV515P)

1 truck

Category	No	Item	Current Condition	Priority Rank	Category	No	Item	Current Condition	Priority Rank
Engine	1-1	Engine overhaul kit	Damaged	AA	Brake	2-1	Brake valve	Worn out	A
	1-2	Fuel feed pump	Damaged	AA		2-2	Hydraulic air servo brake	Worn out	A
	1-3	Radiator assembly	Damaged	AA		2-3	Brake lining	Deteriorated	B
	1-4	Water pump	Damaged	AA	Clutch	2-4	Clutch cover	Worn out	A
	1-5	Power steering pump	Damaged	AA		2-5	Clutch disk	Worn out	A
	1-6	Starter motor	Damaged	AA		2-6	Clutch release bearing	Worn out	A
	1-7	Air compressor	Worn out	A		2-7	Clutch pilot bearing	Worn out	A
	1-8	Piston, Piston ring	Deteriorated	B	Body	2-8	Ladder repair parts	Broken	AA
	1-9	Cylinder liner	Deteriorated	B		2-9	PTO cross joint	Weakened	C
	1-10	Crank shaft B/G, Connecting rod B/G, Thrust B/G	Deteriorated	B	3. Mitsubishi Water tank 8,000L (FP517H)				
	1-11	Injection nozzle assembly	Deteriorated	B	6 trucks				
	1-12	Injection nozzle chip	Deteriorated	B	Engine	3-1	Air compressor	Damaged	AA
	1-13	Injection pump assembly	Deteriorated	B		3-2	Starter motor	Damaged	AA
	1-14	Grow heater	Weakened	C		3-3	Engine overhaul kit	Deteriorated	B
Brake	1-15	Brake valve	Damaged	AA		3-4	Piston, Piston ring	Deteriorated	B
	1-16	Hydraulic air servo brake	Damaged	AA		3-5	Cylinder liner	Deteriorated	B
	1-17	Brake lining	Damaged	AA		3-6	Crank shaft B/G, Connecting rod B/G, Thrust B/G	Deteriorated	B
	1-18	Brake hose	Damaged	AA		3-7	Injection nozzle assembly	Deteriorated	B
Clutch	1-19	Clutch release cylinder	Damaged	AA		3-8	Injection nozzle chip	Deteriorated	B
	1-20	Clutch cover	Worn out	A		3-9	Injection pump assembly	Deteriorated	B
	1-21	Clutch disk	Worn out	A		3-10	Grow heater	Weakened	C
	1-22	Clutch release bearing	Worn out	A	Brake	3-11	Brake valve	Damaged	AA
	1-23	Clutch pilot bearing	Worn out	A		3-12	Hydraulic air servo brake	Damaged	AA
	1-24	Clutch sleeve, guide	Worn out	A		3-13	Air tank drain cock	Worn out	A
	1-25	Fly wheel	Worn out	A		3-14	Brake lining	Deteriorated	B
	1-26	Main drive shaft	Worn out	A		3-15	Parking brake wire cable	Deteriorated	B
Chassis	1-27	Trunnion suspension, Bush	Damaged	AA	Clutch	3-16	Clutch cover	Worn out	A
	1-28	Torque rod bush	Damaged	AA		3-17	Clutch disk	Worn out	A
	1-29	Steering ball joint	Damaged	AA		3-18	Clutch release bearing	Worn out	A
	1-30	Cabin motor	Broken	AA		3-19	Clutch pilot bearing	Worn out	A
	1-31	Parking brake wire cable	Deteriorated	B		3-20	Clutch sleeve, guide	Worn out	A
	1-32	Wheel hub bearing	Deteriorated	B		3-21	Clutch release cylinder	Worn out	A
	1-33	Wheel hub seal	Deteriorated	B		3-22	Fly wheel	Worn out	A
	1-34	Lights (Head, Tail, Side, Indicator)	Weakened	C		3-23	Main drive shaft	Deteriorated	B
	1-35	Propeller shaft cross joint	Weakened	C	Chassis	3-24	Front grass	Damaged	AA
Body	1-36	Valve assembly	Damaged	AA		3-25	Wheel hub bearing	Worn out	A
	1-37	Packing and Seal	Damaged	AA		3-26	Wheel hub seal	Worn out	A
	1-38	Throttle wire	Damaged	AA		3-27	Differential assembly	Worn out	A
	1-39	Water spraying gun	Damaged	AA		3-28	Steering gear box	Worn out	A
	1-40	Central valve	Damaged	AA		3-29	Leaf spring Front No.1+ No.2	Deteriorated	B
	1-41	Electric heater (DC24V)	Broken	AA		3-30	Lights (Head, Tail, Side, Indicator)	Weakened	C
	1-42	External heater	Damaged	AA		3-31	Propeller shaft cross joint	Weakened	C
	1-43	Water pressure auto adjuster	Worn out	A	Body	3-32	Electric heater (DC24V)	Broken	AA
	1-44	PTO cross joint	Weakened	C		3-33	TOHATSU Pump	Damaged	A
Tool	1-45	Compression gage	Damaged	AA		3-34	PTO cross joint	Weakened	C
	1-46	Micro meter	Damaged	AA					

## 4. Mitsubishi Pumper 4,000L (FK617F)

2 trucks

Category	No.	Item	Current Condition	Priority Rank
Engine	4-1	Alternator	Damaged	AA
	4-2	Engine overhaul kit	Deteriorated	B
	4-3	Piston, Piston ring	Deteriorated	B
	4-4	Cylinder liner	Deteriorated	B
	4-5	Crank shaft B/G, Connecting rod B/G, Thrust B/G	Deteriorated	B
	4-6	Injection nozzle assembly	Deteriorated	B
	4-7	Injection nozzle chip	Deteriorated	B
	4-8	Injection pump assembly	Deteriorated	B
	4-9	Air compressor	Deteriorated	B
	4-10	Glow heater	Weakened	C
Brake	4-11	Brake valve	Damaged	AA
	4-12	Hydraulic air servo brake	Damaged	AA
	4-13	Brake lining	Damaged	AA
Clutch	4-14	Clutch cover	Worn out	A
	4-15	Clutch disk	Worn out	A
	4-16	Clutch release bearing	Worn out	A
	4-17	Clutch pilot bearing	Worn out	A
	4-18	Clutch sleeve, guide	Worn out	A
	4-19	Clutch release cylinder	Worn out	A
	4-20	Fly wheel	Worn out	A
Chassis	4-21	Steering dumper	Damaged	AA
	4-22	Parking brake wire cable	Worn out	A
	4-23	Shift wire cable	Worn out	A
	4-24	Shock absorber	Worn out	A
	4-25	Steering ball joint	Worn out	A
	4-26	Leaf spring assembly	Deteriorated	B
	4-27	Lights (Head, Tail, Side, Indicator)	Weakened	C
	4-28	Propeller shaft cross joint	Weak	C
Body	4-29	Valve assembly	Damaged	AA
	4-30	Packing and Seal	Damaged	AA
	4-31	Throttle wire	Damaged	AA
	4-32	Water spraying gun	Damaged	AA
	4-33	Water pressure auto adjuster	Broken	AA
	4-34	Electric heater (DC24V)	Broken	AA
	4-35	External heater	Damaged	AA
	4-36	PTO cross joint	Damaged	AA

## 5. Isuzu Pumper 4WD 4,000L (FTS33F)

4 trucks

Category	No.	Item	Current Condition	Priority Rank
Engine	5-1	Alternator	Damaged	AA
	5-2	Engine overhaul kit	Deteriorated	B
	5-3	Piston, Piston ring	Deteriorated	B
	5-4	Cylinder liner	Deteriorated	B
	5-5	Crank shaft B/G, Connecting rod B/G, Thrust B/G	Deteriorated	B
	5-6	Injection nozzle assembly	Deteriorated	B
	5-7	Injection nozzle chip	Deteriorated	B
	5-8	Injection pump assembly	Deteriorated	B
	5-9	Air compressor	Deteriorated	B
	5-10	Glow heater	Weakened	C
Brake	5-11	Brake valve	Damaged	AA
	5-12	Hydraulic air servo brake	Damaged	AA
	5-13	Brake lining	Damaged	AA
	5-14	Parking brake wire cable	Broken	AA
Clutch	5-15	Clutch cover	Worn out	A
	5-16	Clutch disk	Worn out	A
	5-17	Clutch release bearing	Worn out	A
	5-18	Clutch pilot bearing	Worn out	A
	5-19	Clutch sleeve, guide	Worn out	A
	5-20	Clutch release cylinder	Worn out	A
	5-21	Fly wheel	Worn out	A
Chassis	5-22	Front grass	Damaged	AA
	5-23	Head light	Damaged	AA
	5-24	Cabin motor	Damaged	AA
	5-25	Shift wire cable	Damaged	AA
	5-26	Shock absorber	Damaged	AA
	5-27	Steering dumper	Damaged	AA
	5-28	Steering ball joint	Damaged	AA
	5-29	Steering gear box assembly	Damaged	AA
	5-30	Leaf spring assembly	Deteriorated	B
	5-31	Differential assembly	Deteriorated	B
	5-32	Lights (Head, Tail, Side, Indicator)	Weakened	C
	5-33	Propeller shaft cross joint	Weakened	C
Body	5-34	Valve assembly	Damaged	AA
	5-35	Packing and Seal	Damaged	AA
	5-36	Throttle wire	Damaged	AA
	5-37	Water spraying gun	Damaged	AA
	5-38	Electric heater (DC24V)	Broken	AA
	5-39	External heater	Damaged	AA
	5-40	PTO cross joint	Weakened	C

## 6. Mitsubishi Floodlight FG635C)

1 truck

Category	No.	Item	Current Condition	Priority Rank
Brake	6-1	Vacuum booster	Damaged	AA

Annex-3 Major Undertakings to be taken by the Government of Mongolia and JICA

NO	Items	To be covered by JICA	To be covered by Mongolian side
1	To ensure prompt unloading and customs clearance at the port of disembarkation in recipient country		•
1)	Marine(Air) transportation of the products from Japan to the recipient country	•	
2)	Tax exemption and customs clearance of the products at the port of disembarkation		•
3)	Internal transportation from the port of disembarkation to the project site	•	
2	To accord Japanese nationals whose services may be required in connection with the supply of the products and the services under the verified contract such facilities as may be necessary for their entry into the recipient country and stay therein for the performance of their work		•
3	To exempt Japanese nationals from customs duties, internal taxes and other fiscal levies which may be imposed in the recipient country with respect to the supply of the products and services under the verified contract		•
4	To maintain and use properly and effectively the facilities rehabilitated and equipment provided under the Follow-up Cooperation		•
5	To bear all the expenses, other than those to be borne by the Project, necessary for the local transportation and installation of the equipment, when necessary		•




## Seminar on Condition of the 2003 Fire Fighting trucks

Follow-up study for the project for Improvement of Fire Fighting Equipment and Maintenance Workshop

Koji UZAWA

Repair/operation and maintenance plan

1

### The project for Improvement of Fire Fighting Truck

#### 1. Target: **17 FF trucks (2003)**

1. 10,000L Pumper truck (Mitsubishi FV515) -2-
2. 4,000L Pumper truck (Mitsubishi FK617) -2-
3. 4,000L Pumper truck 4WD(ISUZU FTS33) -4-
4. 8,000L Water tank truck (Mitsubishi FP517) -6-
5. Ladder truck (Mitsubishi FV515) -1-
6. Chemical truck (Mitsubishi FV515) -1-
7. Floodlight truck (Mitsubishi FG635) -1-

2

### The project for Improvement of Fire Fighting Truck

#### 2. Period:

2003 + 20years = 2023

**8 years from January 2016**

**2023~ 17 FF trucks → Depreciation**

Introduction NEW FF Trucks

3

### The project for Improvement of Fire Fighting Truck

#### 3. Characteristic:

Fire Fighting Trucks ≠ Waste collection Trucks

— Millage → Low → Brake lining Clutch disk

**No Adjusting**

— Engine → High → Engine oil change

**Not by Millage**

**Emergency Services**

No Brake down on the duty

4

### The project for Improvement of Fire Fighting Truck

#### 4: Parts Categorize:

1. **Genuine parts** = Main component System  
= Major Safety Parts

Engine, Injection pump, Brake, Power steering, Differential, Transmission

2. **Compatible parts** = Consumption parts  
= Mongolian improvement

Battery, Tire, \*Elements (Air, Fuel, Oil)

\*Depend on quality

5

### The project for Improvement of Fire Fighting Truck

Day	No.	F.F. Units	Registration Number	Truck manufacture	Types of Vehicles	Capacity of Water Tank	15/1/2016	per year	per day	per day
11/Jan.	1	10	05-53 YSR	Mitsubishi	FV 515M-A00037	10,000	36,717	3059.8	8.4	8.4
	2	83	05-51 YSR	Mitsubishi	FV515P-A00081	Ladder truck	10,196	849.7	2.3	0.0
	3	83	05-51 YSR	Isuzu	JALFTS33F-27000019	4,000 (4WD)	40,800	3383.3	9.3	9.3
	4	83	05-57 YSR	Mitsubishi	FP517HA00202	8,000	40,877	3389.8	9.3	9.3
12/Jan.	5	26	05-57 YSR	Mitsubishi	FV515M-A00039	Chemical	17,983	1496.6	4.1	0.0
	6	26	05-54 YSR	Mitsubishi	FV515M-A00038	10,000	56,952	4746.0	13.0	13.0
	7	26	05-55 YSR	Mitsubishi	FP517HA00201	8,000	40,384	3383.7	9.2	9.2
	8	26	05-70 YSR	Mitsubishi	FG635C-A00045	Flood Light	10,917	909.8	2.5	0.0
13/Jan.	9	11	05-56 YSR	Isuzu	JALFTS33F-27000017	4,000 (4WD)	57,623	4801.9	13.2	13.2
	10	11	05-53 YSR	Mitsubishi	FP517HA00199	8,000	41,800	3483.3	9.5	9.5
	11	34	05-58 YSR	Mitsubishi	FP517HA00203	8,000	66,022	5418.5	14.8	14.8
	12	34	05-52 YSR	Isuzu	JALFTS33F-27000020	4,000 (4WD)	64,670	5389.2	14.8	14.8
14/Jan.	13	14	05-55 YSR	Mitsubishi	FK617F800027	4,000	32,534	2711.2	7.4	7.4
	14	14	05-54 YSR	Mitsubishi	FP517HA00200	8,000	27,145	2282.1	6.2	6.2
	15	28	51-58 HAA	Isuzu	JALFTS33F-27000018	4,000 (4WD)	17,027	1418.9	3.9	3.9
	16	84	05-56 YSR	Mitsubishi	FK617F800028	4,000	18,849	1570.8	4.3	4.3
	17	84	05-59 YSR	Mitsubishi	FP517HA00204	8,000	15,898	1322.3	3.6	3.6
Average							34,996.7	2,916.4	8.0	7.5

Mitsubishi 15m3(FV515) 13,428 km / year. 45km / day  
ISUZU 6m3(FSR33) 21,700 km / year. 72km / day

6

### The project for Improvement of Fire Fighting Truck

#### 5: Brake adjustment:

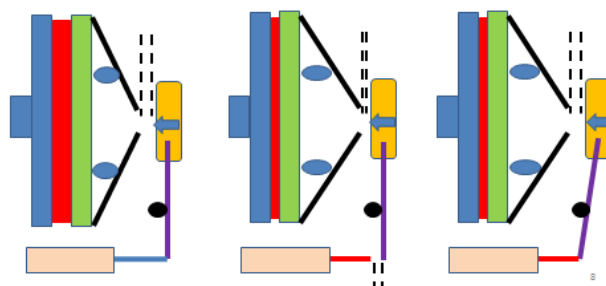


7

### The project for Improvement of Fire Fighting Truck

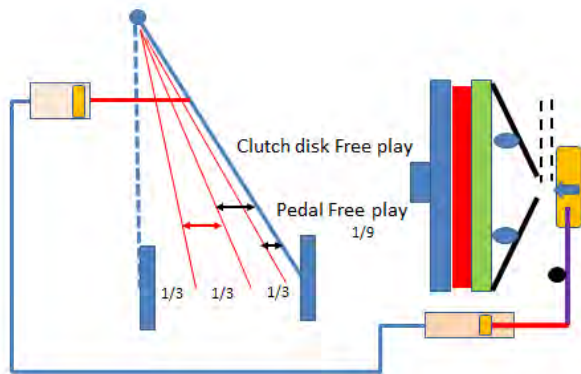
#### 6: Clutch adjustment: 1/3 Full Clutch pedal stroke

Clutch facing wear out → Free play reduction



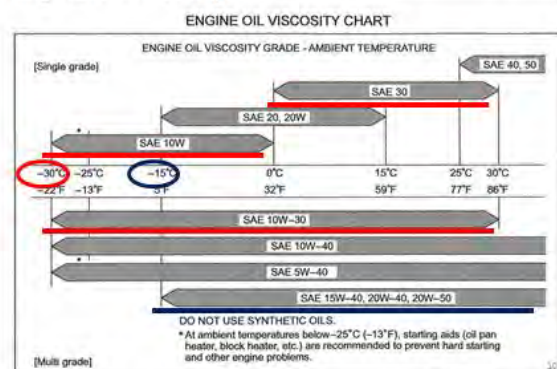
8





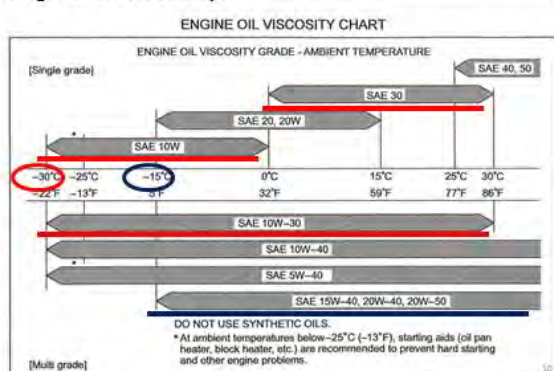
## The project for Improvement of Fire Fighting Truck

### 7. Engine oil viscosity:



## The project for Improvement of Fire Fighting Truck

### 7. Engine oil viscosity:



## The project for Improvement of Fire Fighting Truck

### 9. Freezing Countermeasure:



Water Pump and Fire Fighters

## The project for Improvement of Fire Fighting Truck

### 10. Engine Oil change:

2 times / year = April and October



## The project for Improvement of Fire Fighting Truck

### 11. Capital service:

1. Engine oil(Filter)change
2. Grease up
3. Brake adjustment
4. Clutch adjustment
5. Air Filter Cleaning or Change
6. Fuel Filter Checking or Change
7. Battery Checking



## The project for Improvement of Fire Fighting Truck

### 12. Recommendation:

1. Mechanic
  - Monthly Round maintenance service
  - By Qualified Experienced mechanic
2. Budget
  - \$150 per Capital service = \$300 X 17 = \$5,100
  - 1 Engine Over haul = \$2,000 ~ \$3,000
  - + 2 weeks out of service
3. Maintenance equipment
  - Tools and Tester

## The project for Improvement of Fire Fighting Truck

### 13. Future Planning:

1. Good study for UBFS Engineers
2. Understanding All FF truck Condition
3. Relation ship with information sharing

Таны хамтын ажиллагаанд маш их баярлалаа

## Attachment 3: Seminar participants list

## Seminar on Condition of the 2003 Fire Fighting trucks

## List of Participants

2016.01.18

№		Section	Military rank	Name	position
1	1	NEMA	LTC	Nyambayar	Senior Specialist of direction
2	2	Capital emergency stations Procurement Division	Colonel	Ts.Otgondorj	Auto engineer
1. Khan-Uul District Emergency Department					
3	1	District Emergency Department	Captain	J.Gankhuyag	Automobile mechanic of department
4	2	Fire fighting and rescue 14 th section	Deputy Leader	G.Khatanbaatar	Driver
5	3		Senior Leader	Ch.Naranbaatar	Driver
6	4		Senior Leader	A.Amartuvshin	Driver
7	5	Fire fighting and rescue 30 th section	Senior Leader	G.Zolzaya	Driver
8	6		Senior Leader	Altangerel	Driver
9	7		Senior Leader	Ts,Tsogjavkhlan	Driver
10	8	Fire fighting and rescue 30 th section	Senior Leader	B.Otgonbayar	Driver
11	9		Senior Leader	Ts.Nyamdavaa	Driver
12	10		Senior Leader	B. Lkhamsuren	Driver
2. Bayanzurkhl District Emergency Department					
13	1	District Emergency Department	Captain	Sh.Ganzorig	Automobile mechanic of department
14	2	Fire fighting and rescue 63 th section	Senior Leader	M.Boldbaatar	ladder Technician
15	3		Senior Leader	M.Ariunbold	Driver
16	4		Leader	B.Nyamdalai	Driver
17	5	Fire fighting and rescue 35 th section	Senior Leader	B.Unurbayar	Driver
18	6		Leader	J.Baatar	Driver
19	7		Senior Leader	O.Enkhtsog	Driver
3. Sukhbaatar District Emergency Department					
20	1	Fire fighting and rescue 34 th section	Senior Leader	N.Tuvshinbayar	Driver
21	2		Senior Leader	S.Otgonbaatar	Driver
22	3		Senior Leader	G.Enkhtuvshin	Driver
4. Songino Khaikhan District Emergency Department					
23	1	District Emergency Department		J.Ankhat	Automobile mechanic of department
24	2	Fire fighting and rescue 26 th section	Senior Leader	G.Gankhuyag	Driver
25	3	Fire fighting and rescue 11 th section	Senior Leader	M.Tumurkhuyag	Driver
26	4		Senior Leader	D.Lkhagvasuren	Driver
27	5	Fire fighting and rescue 29 th section	Leader	N.Sedendamba	Driver
28	6		Leader	Ts.Nemekhbayar	Driver
29	7		Deputy Leader	N.Baasanjav	Driver



5. Bayangol District Emergency Department					
30	1	Fire fighting and rescue 26 th section	Senior Leader	D.Batjargal	Driver
31	2		Senior Leader	N.Boldbaatar	Driver
6. Bagakhangai District Emergency Department					
32	1	Fire fighting and rescue 80 th section	Senior Leader	H.Batjagal	Senior driver
7. Baganuur District Emergency Department					
33	1	Fire fighting and rescue 64 th section	Senior Leader	Altangerel	Senior driver
34	2		Senior Leader	S.Byambasuren	Driver
35	3		Senior Leader	A.Gan-Od	Driver
8. Nalaikh District Emergency Department					
36	1	District Emergency Department	Lieutenant	T.Purevdorj	Automobile mechanic of department
37	2	Fire fighting and rescue 28 th section	Senior Leader	O.Byambaa	Driver
9. Chingeltei District Emergency Department					
38	1	District Emergency Department	Captain	R.Bayanjargal	Automobile mechanic of department
39	2	Fire fighting and rescue 10 th section	Senior Leader	N.Batbayar	Driver
40	3		Senior Leader	D.Bayarsaikhan	Driver
41	4		Leader	D.Enkhmanlai	Driver

## Mitsubishi Pumper 10,000L + Chemical 9,000 l + Ladder Truck

	FS	10	26	26	63
	Registration Number	06-53 УБЯ	06-54 УБЯ	06-57 УБЯ	06-81 УБЯ
	Truck manufacture	Mitsubishi	Mitsubishi	Mitsubishi	Mitsubishi
	Chassis No.	FV 515M-A00037	FV515M-A00038	FV515M-A00039	FV515P-A00081
	Capacity of Water Tank	10,000	10,000	9,000 (Chemical)	Ladder truck
	15/1/2016	36,717	56,952	17,983	10,196
Engine	1 Engine Overhaul kit	○	○	△	—
	2 Piston, Piston ring	○	○	○	—
	3 Cylinder liner	○	○	○	—
	4 Crank shaft B/G, Connecting rod B/G, Thrust B/G	○	○	○	—
	5 Injection Nozzle Assy	○	○	○	—
	6 Injection Nozzle chip	○	○	○	—
	7 Injection Pump Assy	○	○	○	—
	8 Fuel feed pump	—	○	○	—
	9 Radiator Assy	○	△	—	—
	10 Water pump	○	△	—	—
	11 Power steering pump	○	△	—	—
	12 Starter motor	○	△	—	—
	13 Air Compressor	—	△	—	—
	14 Grow heater	—	△	—	—
Brake	15 Brake valve	○	○	○	○
	16 Hydraulic air servo brake	○	○	○	○
	17 Brake Lining	○	○	○	○
	18 Brake hose	○	△	—	—
	19 Parking Brake wire cable	△	△	—	—
Clutch	20 Clutch cover	○	○	○	○
	21 Clutch disk	○	○	○	○
	22 Clutch Release Bearing	○	○	○	○
	23 Clutch Pilot Bearing	○	○	○	○
	24 Clutch sleeve, guide	○	△	—	—
	25 Clutch Release cylinder	—	△	○	—
	26 Fly wheel	○	△	—	—
	27 Main drive shaft	○	△	—	—
Chassis	28 Trunnion suspension, Bush	○	○	○	—
	29 Torque rod Bush	○	○	○	—
	30 Wheel Hub Bearing	—	△	—	—
	31 Wheel Hub Seal	—	△	—	—
	32 Steering Ball joint	○	△	—	—
	33 Lights (Head, Tail, Side, indicator)	—	△	—	—
	34 Truck Cross joint	—	△	—	—
MORITA	35 Valve assembly	○	○	○	Repair
	36 Packing and Seal	○	○	○	—
	37 Throttle wire	○	○	○	—
	38 Water spraying gun	○	○	○	—
	39 Water pressure auto adjuster	△	○	—	—
	40 Central Valve	○	△	—	—
	41 Electric heater (DC24V)	○	○	○	—
	42 External fan heater	○	○	○	—
	43 Cabin motor	○	△	—	—
	44 PTO Cross joint	—	△	—	—
Tools	45 Compression gage	○	—	—	—
	46 Micro meter	○	—	—	—

## Mitsubishi Water tank 8,000L

		FS	63	26	11	34	14	64
		Registration Number	06-67 УБЯ	06-65 УБЯ	06-63 УБЯ	06-68 УБЯ	06-64 УБЯ	06-69 УБЯ
		Truck manufacture	Mitsubishi	Mitsubishi	Mitsubishi	Mitsubishi	Mitsubishi	Mitsubishi
		Chassis No.	FP517H-A00202	FP517H-A00201	FP517H-A00199	FP517H-A00203	FP517H-A00200	FP517H-A00204
		Capacity of Water Tank	8,000	8,000	8,000	8,000	8,000	8,000
		15/1/2016	40,677	40,364	41,800	65,022	27,145	15,868
Engine	1	Engine Overhaul kit	○	○	○	○	—	—
	2	Piston, Piston ring	○	○	○	○	—	—
	3	Cylinder liner	○	○	○	○	—	—
	4	Crank shaft B/G, Connecting rod B/G, Thrust B/G	○	○	○	○	—	—
	5	Injection Nozzle Assy	○	○	○	○	—	—
	6	Injection Nozzle chip	○	○	○	○	—	—
	7	Injection Pump Assy	○	○	○	○	—	—
	8	Air Compressor	—	○	○	—	○	○
	9	Grow heater	—	—	—	△	—	—
Brake	10	Brake valve	—	○	—	○	○	—
	11	Hydraulic air servo brake	—	○	—	○	○	○
	12	Brake Lining	○	○	○	○	○	○
	13	Air tank Drain cock	—	—	○	△	—	—
	14	Parking Brake wire cable	—	—	△	△	—	—
Clutch	15	Clutch cover	○	○	○	○	△	○
	16	Clutch disk	○	○	○	○	△	○
	17	Clutch Release Bearing	○	○	○	○	△	○
	18	Clutch Pilot Bearing	○	○	○	○	△	○
	19	Clutch sleeve, guide	△	—	△	△	—	—
	20	Clutch Release cylinder	△	—	△	△	—	—
	21	Fly wheel	△	—	△	△	—	—
	22	Main drive shaft	—	—	—	△	—	—
Chassis	23	Wheel Hub Bearing	—	—	○	—	—	—
	24	Wheel Hub Seal	—	—	○	—	—	—
	25	Differential	△	—	○	—	—	—
	26	Steering gear box	—	—	—	—	○	—
	27	Leaf spring Front No.1+ No.2	—	—	—	○	—	—
	28	Front grass	○	—	—	—	—	—
	29	Lights (Head, Tail, Side, indicator)	—	—	—	△	—	—
	30	Truck Cross joint	—	—	—	△	—	—
	31	Electric heater (DC24V)	○	○	○	○	○	○
Morita	32	Starter motor	—	—	—	△	—	○
	33	TOHATSU Pump	○	○	○	○	○	△
	34	PTO Cross joint	—	—	—	△	—	—

## Mitsubishi Pumper 4,000L + Isuzu Pumper 4WD 4,000L + Mitsubishi Floodlight

	FS	14	64	63	11	34	28	26
	Registration Number	06-55 УБЯ	06-56 УБЯ	06-61 УБЯ	06-58 УБЯ	06-62 УБЯ	51-86 HAA	06-70 УБЯ
	Truck manufacture	Mitsubishi	Mitsubishi	Isuzu	Isuzu	Isuzu	Isuzu	Mitsubishi
	Chassis No.	FK617F-B00027	FK617F-B00028	JALFTS33F-27000019	JALFTS33F-27000017	JALFTS33F-27000020	JALFTS33F-27000018	FG635C-A0045
	Capacity of Water Tank	4,000	4,000	4,000 (4WD)	4,000 (4WD)	4,000 (4WD)	4,000 (4WD)	Flood Light
	15/1/2016	32,534	18,849	40,600	57,623	64,670	17,027	10,917
Engine	1 Engine Overhaul kit	○	○	○	○	—	○	—
	2 Piston, Piston ring	○	○	○	○	—	○	—
	3 Cylinder liner	○	○	○	○	—	○	—
	4 Crank shaft B/G, Connecting rod B/G, Thrust B/G	○	○	○	○	—	○	—
	5 Injection Nozzle Assy	○	○	○	○	—	○	—
	6 Injection Nozzle chip	○	○	○	○	—	○	—
	7 Injection Pump Assy	○	○	○	○	—	○	—
	8 Air Compressor	△	—	—	△	△	—	—
	9 Grow heater	△	—	—	—	△	—	—
	10 Alternator	○	—	—	△	○	—	—
Brake	11 Brake valve	○	△	○	○	—	—	—
	12 Hydraulic air servo brake	○	△	○	○	—	—	—
	Vacuum booster	—	—	—	—	—	—	○
	13 Brake Lining	○	○	○	○	○	○	—
	Brake hose	—	—	—	—	—	—	—
Clutch	14 Parking Brake wire cable	—	△	○	○	○	○	—
	15 Clutch cover	○	○	○	○	○	○	—
	16 Clutch disk	○	○	○	○	○	○	—
	17 Clutch Release Bearing	○	○	○	○	○	○	—
	18 Clutch Pilot Bearing	○	○	○	○	○	○	—
	19 Clutch sleeve, guide	—	△	—	—	○	—	—
	20 Clutch Release cylinder	—	△	—	—	○	—	—
	21 Fly wheel	—	△	—	—	○	—	—
	Chassis 22 Leaf spring assy	△	△	—	△	○	—	—
	Front Grass	—	—	○	○	—	—	—
	23 Head light	—	△	—	○	—	—	—
	Differential	—	—	△	○	—	—	—
	24 Lights (Head, Tail, Side, indicator)	△	—	—	—	△	—	—
	25 Truck Cross joint	△	—	—	—	△	—	—
	Cabin Motor	—	—	—	○	○	—	—
	26 Shift wire cable	—	△	—	△	○	—	—
	27 Shock absorber	—	△	—	△	○	—	—
	28 Steering dumper	○	—	—	—	○	—	—
	29 Steering Ball joint	—	—	○	—	△	—	—
	Steering Gear box	—	—	—	—	△	○	—
MORITA	30 PTO Cross joint	△	—	—	—	△	—	—
	31 Valve assembly	○	○	○	○	○	○	—
	32 Packing and Seal	○	○	○	○	○	○	—
	33 Throttle wire	○	○	△	○	○	○	—
	34 Water spraying gun	○	○	○	—	—	○	—
	35 Water pressure auto adjuster	○	○	—	—	—	—	—
	36 Electric heater (DC24V)	○	○	○	○	○	○	—
	37 External fan heater	○	○	○	○	○	○	—

# 機材仕様明細書

番 号	機 材 名	仕 様	参考銘柄 (メーカー名等)	数量
	総則	1. 部品について		
		中古品は認めない。		
		同様に交換部品、修理に使用する部品等についても中古品の使用は認めない。		
		2. 銘柄指定		
		機材番号1～6(各枝番も含む)は全て銘柄指定とする。		
		3. 技師業務		
		技師派遣条件書を参照のこと。		
1	ポンプ車(10,000L) 維持管理部品	車両型式:FV515M 架装型式:MWD10	株式会社モリタ	
1-1-1	吐水コック65XI/口金AC露ネジ男 Delivery cock 65mm I	吐水コック65XI/口金AC露ネジ男		3
1-1-2	吐水コック65XM/口金AC露ネジ男 Delivery cock 65mm M	吐水コック65XM/口金AC露ネジ男		3
1-1-3	吐水口口金 ΓM-70 Delivery valve cock GOST70	吐水口口金 ΓM-70		3
1-1-4	ピク吸排コック75XO Ball valve 75 O	P4-VALVE/BALL-75XO-002		3
1-1-5	送水ボールコック50MMFC-R右 Ball cock 50	P4-VALVE/BALL-50XFCR-002		3
1-1-6	両Fボールコック65MMXA-FC Ball cock 65mm A Flange	P4-VALVE/BALL-65XA-028		3
1-1-7	スリスバルブ 40A BC-MF付 Gate valve 40A	P4-VALVE/GATE-40A-004		2
1-2-1	70露GOSTXBSP2.5"用パッキン Packing for 70GOST	70露GOSTXBSP2.5"用パッキン		3
1-2-2	100露GOSTXBSP4"用パッキン Packing for 100GOST	100露GOSTXBSP4"用パッキン		3
1-2-3	50露GOSTXBSP2"用パッキン Packing for 50GOST	50露GOSTXBSP2"用パッキン		3
1-3-1	スロットルケーブルBKT Throttle cable	PA-THROTTLE-CABLEBKT-006 (日野FD-3)		3
1-3-2	スロットルケーブル止金具14六角 Throttle cable bracket	PA-THROTTLE-CABLEPIN-002		3
1-3-3	板_スロットルアーム100° Throttle arm	P9-PPYK0000233-00X		3
1-3-4	スロットル90°アーム取付BKT Throttle arm bracket	P9-THROTTLE-ARMBKT-001		3

1-3-5	ケーブル止ピンH000059650 Pin for cable	P9-THROTTLE-CABLEPIN-003		3
1-3-6	ケーブル止ピン H000006813 Pin for cable	P9-THROTTLE-CABLEPIN-002		3
1-3-7	スロットルケーブル止金具 Fixing ping for cable	P9-THROTTLE-CABLEPIN-001		3
1-3-8	スロットル変速ギヤ-ケース Gear case for throttle	P4-THROTTLE/GEAR_CASE-OS-002		3
1-3-9	スロットルワイヤ-1900MM-2500MM Throttle wire 1900-2500mm	P4-CABLE/THROTTLE-SUS-2500-001		3
1-3-10	スロットルハンドルプリミックス Throttle handle premix	P4-HANDLE-THROTTLE-001		3
1-3-11	スロットルウォームケ-スBKT付 Throttle warm cace	P4-THROTTLE/GEAR_CASE-OS-001		3
1-3-12	ユニバサルジョイントB-8改 Universal joint	P4-JOINT/UNIVERSAL-008A-001 (三好)		3
1-3-13	コネクトロッドSS6φX270 Connection lod SS 6x270	PA-APMONITOR-ROD-001		3
1-3-14	コネクトロッド6φXM6X31X665 Connection lod 6x31x665	P9-THROTTLE-ROD-001		3
1-3-15	BKT_スロットルワイヤー止金具 Throttle cable bracket	P9-PLQT0003160-01X		3
1-3-16	スロットル円盤プレート付LR組 Throttle disk	P4-THROTTLE/DISK-STD-002		3
1-4-1	グラステープGT-6666FT巻 Glass tape GT-6666	P4-TAPE/GLASS-GT66-001		3
1-4-2	ソフトロンテープ5M巻 Softron tape 5m	P4-TAPE/HEATPROOF-SOFTRON-001		3
1-4-3	ヒートワイヤー 12/4 1.2M Heating wire	P4-WIRE/HEATING-1,2M-001 (アトム)		3
1-4-4	耐熱リード線2sq 600V LKGB Lead wire	P4-WIRE/LEAD-2SG-001		3
1-4-5	テープヒータ 8BTV2-CR 200V Tape heater	P4-WIRE/HEATING-8BTV2-001		3
1-4-6	ヒーター式MY30/10000L水槽 Heater MY30/10000L	P4-HEATER-MY30-001		3
1-4-7	ヒータ追加一式MY30/10000L水槽 Additional hearter MY30/10000L	P4-HEATER-MY30-008		3
2	はしご車 修理及び維持管理部品	車両型式:FV515P 架装型式:MLF5-35R	株式会社モリタ	
2-1-1	制御器_ジャイコン_GYMC-97E-2 Gyro-Control computer unit_GYMC-97E-2	P4-QPGE0001228-00X		1
2-1-2	梯子コントローラ HAC-30-99英文 Ladder Control computer unit_HAC-30-99	P4-CONTROLLER/LADDER-HAC30-99-002		1
2-1-3	スイッチ_近接_PE-T4D Approximate sensor PE-T4D	P4-QPYE0000356-00X (富士電機)		2
2-1-4	スイッチ_近接_PE-T4DB Approximate sensor PE-T4DB	P4-QPYE0000357-00X (富士電機)		2
2-1-5	3連電磁比例弁 3DP04T1Y447-1 3 units of Solenoid valve 3DP04T1Y447-1	P4-VALVE/SOLENOID-3DP04T1Y447-001		1
2-1-6	小型電磁切換弁16-2903 Small Solenoid switcher valve 16-2903	P4-VALVE/SOLENOID-16_2903-001		1

2-1-7	インラインチェックSDICT-02-0.3 Inline check valve SDICT-02-0.3	P4-VALVE/CHECK-SDICT-001		3
2-1-8	リターンフィルタエレメントPX252A Oil return filter element PX252A	P4-FILTER/OIL-PX252A-001		1
2-2-1	梯子監視装置 Ladder Monitoring Device / Controller	P4-MONITOR/LADDER-LOBC93-001		1
2-2-2	オンロードカットアダプタ Hydraulic onload cut adapter	P4-ADAPTER/HYDRAULIC-LDCUT96-001		1
2-2-3	背面荷重検出器 Load ditector sensor	P4-DETECTOR/LOAD-HMMT97-001		1
2-2-4	X-Y傾斜角度センサー X-Y sensor	P4-SENSOR/ANGLE-PMP10TZL-001		1
2-2-5	1方向操作レバー Joystick controller (2-way)	P4-OPERATION_DEVICE-SUXEBS-001		1
2-2-6	2方向操作レバー Joystick controller (4-way)	P4-OPERATION_DEVICE-SUXEBS-003		2
2-2-7	1方向操作レバー Joystick controller (2-way)	P4-OPERATION_DEVICE-SUXEBS-002		1
2-2-8	ポテンシオメーター Potential sensor	P4-DETECTOR/POTENTIAL-HP16-001		2
2-2-9	ポテンシオメーター Potential sensor	P4-DETECTOR/POTENTIAL-CP2FB-001		3
2-2-10	ストロークセンサ(直結型) Stroke sensor	P4-SENSOR/STROKE-HS165-001		4
2-2-11	近接スイッチ Approximate Sensor	P4-SWITCH-E2EX5E1-001		3
2-2-12	近接スイッチ Approximate Sensor	P4-SWITCH-E2EX10ME1-001		7
2-2-13	近接スイッチ Approximate Sensor	P4-SWITCH-E2EX18ME1-001		2
2-2-14	近接スイッチ Approximate Sensor	P4-SWITCH-E2EX1R5E1-001		2
2-2-15	近接スイッチ Approximate Sensor	P4-SWITCH-E2E2X5C1-001		2
2-2-16	近接スイッチ Approximate Sensor	P4-SWITCH-TLT5ME1-001		12
2-2-17	近接スイッチ Approximate Sensor	P4-SWITCH-TLN20ME1-001		2
2-2-18	近接スイッチ Approximate Sensor	P4-SWITCH-TLW5MC1-001		1
2-2-19	リミットスイッチ Limit switch	P4-SWITCH-AZ5106-001		2
2-2-20	風速発信器 Anemometer	P4-ANEMOMETER-26OPC-001		1
2-2-21	足踏みスイッチ Deadman foot pedal	P4-SWITCH-OFLR-001		3
2-2-22	防水トグルスイッチ(1極単投オルタネート)Toggle switch	P4-SWITCH-ATA22W-001		3
2-2-23	防水トグルスイッチ(1極単投オルタネート)Toggle switch	P4-SWITCH-ATF22W-001		2
2-2-24	防水トグルスイッチ(1極単投オルタネート)Toggle switch	P4-SWITCH-ATG22W-001		6

2-2-25	防水トグルスイッチ (4極双投オルタネート) Toggle switch	P4-SWITCH-A4TN22-001		1
2-2-26	トグルスイッチ防水キャップ Toggle switch cap	P4-COVER/SWITCH-BOUSUI-001		7
2-2-27	照光スイッチ(丸、オルタネート透明1NC1NO、カバー)Self-lighting switch	P4-SWITCH-704,0607,9005,6003-002		1
2-2-28	照光スイッチ(丸、オルタネート透明1NC2NO、カバー)Self-lighting switch	P4-SWITCH-704,0607,9005,6003-004		1
2-2-29	照光スイッチ(丸、オルタネート透明1NC3NO、カバー)Self-lighting switch	P4-SWITCH-704,607,9005,6003-001		1
2-2-30	照光スイッチ(丸、オルタネート透明1NC6NO、カバー)Self-lighting switch	P4-SWITCH-704,0607,9005,6003-006		1
2-2-31	照光スイッチ(丸、オルタネート透明1NC7NO、カバー)Self-lighting switch	P4-SWITCH-704,0607,9005,6003-005		1
2-2-32	照光スイッチ(丸、オルタネート透明1NC8NO、カバー)Self-lighting switch	P4-SWITCH-704,0607,9005,6003-009		1
2-2-33	照光スイッチ(丸、オルタネート赤1NC1NO、カバー)Self-lighting switch	P4-SWITCH-704,0602,9005-001		1
2-2-34	照光スイッチ(丸、モーメンタリ透明1NC1NO、カバー)Self-lighting switch	P4-SWITCH-704,0307,9005,6003-002		1
2-2-35	照光スイッチ(丸、モーメンタリ透明1NC1NO、カバー)Self-lighting switch	P4-SWITCH-704,0307,9005,6003-005		1
2-2-36	パイロットランプ Pilot lamp	P4-LAMP/PILOT-RED-24V-001		1
2-2-37	マーカーランプ Marker lamp green	P4-LAMP/MARKER-GREEN-001		1
2-2-38	マーカーランプ Marker lamp red	P4-LAMP/MARKER-RED-001		1
2-2-39	バイパワーリレー Relay	P4-RELAY/ELECTRIC-LY2D-001		10
2-2-40	ソリッドステートタイマー Timer relay	P4-RELAY/ELECTRIC-H3Y2-001		1
2-2-41	ソリッドステートタイマー Timer relay	P4-RELAY/ELECTRIC-H3CR-001		1
2-2-42	パワーリレー Power relay	P4-RELAY/ELECTRIC-G7L2A-001		2
2-2-43	リレーソケット Relay socket	P4-HOLDER/SWITCH-PTF08A-001		10
2-2-44	リレーソケット Relay socket	P4-HOLDER/SWITCH-PYF08A-001		1
2-2-45	リレーソケット Relay socket	P4-RELAY/ELECTRIC-P2CF11-001		1
2-2-46	リレーソケット Relay socket	P4-HOLDER/SWITCH-P7LF-001		2
2-2-47	保持金具 Bracket	P4-HOLDER/SWITCH-PYCA1-001		10
2-2-48	保持金具 Bracket	P4-HOLDER/SWITCH-Y92H3-001		1
2-2-49	フロントカバー Front cover	P4-COVER/SWITCH-Y92A-48B-001		1
2-2-50	バッテリーリレー Battery relay	P4-RERAY/BATTERY-BR257-001		1



2-2-51	電子ブザー Buzzer	P4-BUZZER-EB1114-24V-001		2
2-2-52	電子ブザー Buzzer	P4-BUZZER-EB1124-24V-001		2
2-2-53	オス・インサート Electric wire coupler	P4-COUPLER/CABLE-CDM40-001		1
2-2-54	メス・インサート Electric wire coupler	P4-COUPLER/CABLE-CDF40-001		2
2-2-55	プラグ・シエル Plug connector	P4-CONNECTOR/METAL-CAO16L29-001		1
2-2-56	レセプタクル・シエル Receptacle connector	P4-CONNECTOR/METAL-CHI16LS-001		2
2-2-57	オス・コンタクト Connector pin (Male)	P5-PIN/WIRING-CDMA1,5-001		40
2-2-58	メス・コンタクト Connector pin (Female)	P5-PIN/WIRING-CDFA1,5-001		40
2-2-59	オス・ガイドピン Guide pin (Male)	P5-SCREW/GUIDE-CRM-001		6
2-2-60	メス・ガイドピン Guide pin (Female)	P5-SCREW/GUIDE-CRF-001		6
2-2-61	ソレノイド Solenoid	P4-VALVE/SOLENOID-MD2115I-002		1
2-2-62	集電リング (25段, PT, センサ付) Electric Brush 25 sections	P4-BRUSH/ELECTRIC-TKF-P-001		1
2-2-63	低雑音型インターホン標準 (スピーカ無) Interphone	P4-INTERPHONE-PM210A-002		1
2-2-64	上部スピーカ (大・アンプ内蔵) Speaker mic. For interphone (basket)	P4-INTERPHONE-CA150AMP-001		1
2-2-65	先端灯 Top lamp (basket)	P4-LAMP/END-YELLOW-001		2
2-2-66	先端灯 Top lamp (basket)	P4-LAMP/TURN_SIGNAL-ORANGE-24V-001		4
2-2-67	先端灯 Top lamp (basket)	P4-LAMP/SIDE-FH60-NISSAN-001		2
2-2-68	カマボコ型ゲージランプ Gauge ramp (basket)	P4-LAMP/ROOM-STD-001		1
2-2-69	リターンフィルタエレメントPX252A Oil return filter element PX252A	P4-FILTER/OIL-PX252A-001		3
2-3-1	吐水コック 65XI/口金AC露ネジ男 Delivery cock 65mm I	吐水コック 65XI/口金AC露ネジ男		1
2-3-2	吐水コック 65XM/口金AC露ネジ男 Delivery cock 65mm M	吐水コック 65XM/口金AC露ネジ男		1
2-3-3	露ネジ吸排コック 65MMXM Ball cock 65mm M GOST	露ネジ吸排コック 65MMXM		1
3	タンク車 維持管理部品	車両型式:FP517H 架装型式:MWT08	株式会社モリタ	
3-1-1	グラステープGT-6666FT巻 Glass tape GT-6666	P4-TAPE/GLASS-GT66-001		6
3-1-2	ソフトロンテープ5M巻 Softron tape 5m	P4-TAPE/HEATPROOF-SOFTRON-001		6
3-1-3	ヒートワイヤー 12/4 1.2M Heating wire	P4-WIRE/HEATING-1,2M-001 (アトム)		6

3-1-4	耐熱リド線2sq 600V LKGB Lead wire	P4-WIRE/LEAD-2SG-001		6
3-1-5	テープヒータ 8BTV2-CR 200V Tape heater	P4-WIRE/HEATING-8BTV2-001		6
4	ポンプ車(4,000L 2WD) 維持管理部品	車両型式:FK617F 架装型式:MT-Y04 (4x2)	株式会社モリタ	
4-1-1	吐水コック65XI/口金AC露ネジ男 Delivery cock 65mm I	吐水コック65XI/口金AC露ネジ男		2
4-1-2	吐水コック65XM/口金AC露ネジ男 Delivery cock 65mm M	吐水コック65XM/口金AC露ネジ男		2
4-1-3	吐水口口金 7M-70 Delivery valve cock GOST70	吐水口口金 7M-70		2
4-1-4	ビク吸排コック75XO Ball valve 75 O	P4-VALVE/BALL-75XO-002		2
4-1-5	送水ボールコック50MMFC-R右 Ball cock 50	P4-VALVE/BALL-50XFCR-002		2
4-1-6	両Fボールコック65MMXA-FC Ball cock 65mm A Flange	P4-VALVE/BALL-65XA-028		2
4-2-1	70露GOSTXBSP2.5"用パッキン Packing for 70GOST	70露GOSTXBSP2.5"用パッキン		2
4-2-2	100露GOSTXBSP4"用パッキン Packing for 100GOST	100露GOSTXBSP4"用パッキン		2
4-2-3	50露GOSTXBSP2"用パッキン Packing for 50GOST	50露GOSTXBSP2"用パッキン		2
4-3-1	スロットルケーブルBKT Throttle cable	PA-THROTTLE-CABLEBKT-006 (日野FD-3)		2
4-3-2	スロットルケーブル止金具14六角 Throttle cable bracket	PA-THROTTLE-CABLEPIN-002		2
4-3-3	板_スロットルアーム100° Throttle arm	P9-PPYK0000233-00X		2
4-3-4	スロットル90°アーム取付BKT Throttle arm bracket	P9-THROTTLE-ARMBKT-001		2
4-3-5	ケーブル止ピンH000059650 Pin for cable	P9-THROTTLE-CABLEPIN-003		2
4-3-6	ケーブル止ピン H000006813 Pin for cable	P9-THROTTLE-CABLEPIN-002		2
4-3-7	スロットルケーブル止金具 Fixing pin for cable	P9-THROTTLE-CABLEPIN-001		2
4-3-8	スロットル変速ギヤ-ケース Gear case for throttle	P4-THROTTLE/GEAR_CASE-OS-002		2
4-3-9	スロットルワイヤ-1900MM-2500MM Throttle wire 1900-2500mm	P4-CABLE/THROTTLE-SUS-2500-001		2
4-3-10	スロットルハンドルブリックス Throttle handle premix	P4-HANDLE-THROTTLE-001		2
4-3-11	スロットルウォームケースBKT付 Throttle warm case	P4-THROTTLE/GEAR_CASE-OS-001		2
4-3-12	ユニバサルジョイントB-8改 Universal joint	P4-JOINT/UNIVERSAL-008A-001 (三好)		2
4-3-13	コネクトロッドSS6φX270 Connection lod SS 6x270	PA-APMONITOR-ROD-001		2
4-3-14	コネクトロッド6φXM6X31X665 Connection lod 6x31x665	P9-THROTTLE-ROD-001		2

4-3-15	BKT_スロットルワイヤー止金具 Throttle cable bracket	P9-PLQT0003160-01X		2
4-3-16	スロットル円盤プレート付LR組 Throttle disk	P4-THROTTLE/DISK-STD-002		2
4-4-1	グラステープGT-6666FT巻 Glass tape GT-6666	P4-TAPE/GLASS-GT66-001		2
4-4-2	ソフトロンテープ5M巻 Softron tape 5m	P4-TAPE/HEATPROOF-SOFTRON-001		2
4-4-3	ヒートワイヤー 12/4 1.2M Heating wire	P4-WIRE/HEATING-1,2M-001 (アトム)		2
4-4-4	耐熱リード線2sq 600V LKGB Lead wire	P4-WIRE/LEAD-2SG-001		2
4-4-5	テープヒータ 8BTV2-CR 200V Tape heater	P4-WIRE/HEATING-8BTV2-001		2
4-4-6	ヒーター式MY30/4000L水槽 Heater	P4-HEATER-MY30-001		2
4-4-7	ヒータ追加一式MY30/4000L水槽 Additional heater MY30/4000L	P4-HEATER-MY30-008		2
4-5-1	Dシャフト427-01000-11450MM D shaft	P4-SHAFT/DRIVING-427,01000,11-001		1
5	ポンプ車(4,000L 4WD) 維持管理部品	車両型式:FTS33F 架装型式:MT-Y04 (4x4)	株式会社モリタ	
5-1-1	吐水コック65XI/口金AC露ネジ男 Delivery cock 65mm I	吐水コック65XI/口金AC露ネジ男		4
5-1-2	吐水コック65XM/口金AC露ネジ男 Delivery cock 65mm M	吐水コック65XM/口金AC露ネジ男		4
5-1-3	吐水口口金 ΓM-70 Delivery valve cock GOST70	吐水口口金 ΓM-70		4
5-1-4	ビク吸排コック75XO Ball valve 75 O	P4-VALVE/BALL-75XO-002		4
5-1-5	送水ボールコック50MMFC-R右 Ball cock 50	P4-VALVE/BALL-50XFCR-002		4
5-1-6	両Fボールコック65MMXA-FC Ball cock 65mm A Flange	P4-VALVE/BALL-65XA-028		2
5-2-1	70露GOSTXBSP2.5"用パッキン Packing for 70GOST	70露GOSTXBSP2.5"用パッキン		4
5-2-2	100露GOSTXBSP4"用パッキン Packing for 100GOST	100露GOSTXBSP4"用パッキン		4
5-2-3	50露GOSTXBSP2"用パッキン Packing for 50GOST	50露GOSTXBSP2"用パッキン		4
5-3-1	スロットルケーブルBKT Throttle cable	PA-THROTTLE-CABLEBKT-006 (日野FD-3)		4
5-3-2	スロットルケーブル止金具14六角 Throttle cable bracket	PA-THROTTLE-CABLEPIN-002		4
5-3-3	板_スロットルアーム100° Throttle arm	P9-PPYK0000233-00X		4
5-3-4	スロットル90°アーム取付BKTメッ Throttle arm bracket	P9-THROTTLE-ARMBKT-001		4
5-3-5	ケーブル止ピンH000059650 Pin for cable	P9-THROTTLE-CABLEPIN-003		4
5-3-6	ケーブル止ピン H000006813 Pin for cable	P9-THROTTLE-CABLEPIN-002		4

5-3-7	スロットルケーブル止金具 Fixing pin for cable	P9-THROTTLE-CABLEPIN-001		4
5-3-8	スロットル変速ギヤ-ケース Gear case for throttle	P4-THROTTLE/GEAR_CASE-OS-002		4
5-3-9	スロットルワイヤ-1900MM-2500MM Throttle wire 1900-2500mm	P4-CABLE/THROTTLE-SUS-2500-001		4
5-3-10	スロットルハンドルプリミックス Throttle handle premix	P4-HANDLE-THROTTLE-001		4
5-3-11	スロットルウォ-ムケースBKT付 Throttle warm case	P4-THROTTLE/GEAR_CASE-OS-001		4
5-3-12	ユニバサルジョイントB-8改 Universal joint	P4-JOINT/UNIVERSAL-008A-001 (三好)		4
5-3-13	コネクトロッドSS6φX270 Connection lod SS 6x270	PA-APMONITOR-ROD-001		4
5-3-14	コネクトロッド6φXM6X31X665 Connection lod 6x31x665	P9-THROTTLE-ROD-001		4
5-3-15	BKT_スロットルワイヤー止金具 Throttle cable bracket	P9-PLQT0003160-01X		4
5-3-16	スロットル円盤プレート付LR組 Throttle disk	P4-THROTTLE/DISK-STD-002		4
5-4-1	グラステ-プGT-6666FT巻 Glass tape GT-6666	P4-TAPE/GLASS-GT66-001		4
5-4-2	ソフトロンテープ5M巻 Softron tape 5m	P4-TAPE/HEATPROOF-SOFTRON-001		4
5-4-3	ヒートワイヤー 12/4 1.2M Heating wire	P4-WIRE/HEATING-1,2M-001 (アトム)		4
5-4-4	耐熱リード線2sq 600V LKGB Lead wire	P4-WIRE/LEAD-2SG-001		4
5-4-5	テープヒータ 8BTV2-CR 200V Tape heater	P4-WIRE/HEATING-8BTV2-001		4
5-4-6	ヒーター式MY30/4000L水槽 Heater	P4-HEATER-MY30-001		4
5-4-7	ヒータ追加一式MY30/4000L水槽 Additional heater MY30/4000L	P4-HEATER-MY30-008		4
5-5-1	Dシャフト427-01000-11450MM D shaft	P4-SHAFT/DRIVING-427,01000,11-001		1
6	ポンプ車(4,000L 4WD) 車両維持管理部品	型式: FTS33F	いすゞ自動車(株)	
6-1-1	オルターネーター Alternator	1812004165		2
6-2-1	ブレーキバルブ Brake valve	1481008720		2
6-2-2	油圧エア-サーボブレーキ Hydraulic air servo brake	1478006631		2
6-2-3	油圧エア-サーボブレーキ Hydraulic air servo brake	1478006642		2
6-2-4	パーキングブレーキワイヤー Parking brake wire cable	1799964674		4
6-3-1	クラッチカバー Clutch cover	1312204470		4
6-3-2	クラッチディスク Clutch disk	1312409011		4

6-3-3	クラッチリリースベアリング Clutch release bearing	1098201140		4
6-3-4	クラッチパイロットベアリング Clutch pilot bearing	8943922880		4
6-4-1	フロントガラス Front glass	1761180451		2
6-4-2	ヘッドライト(左) Head light (Left)	8976094280		1
6-4-3	ヘッドライト(右) Head light (Right)	8976094270		1
6-4-4	変速ワイヤーケーブル Shift wire cable	1336712590		2
7	エンジン分解組立用測定器 コンプレッションゲージ式			
	Compression gauge	(仕様) 用途: ディーゼルエンジン用		
		目盛: ゲージ目盛0-7MPa 最少目盛0.2MPa		
		標準装備の他、以下のエンジンのアダプターを装備すること		
		・三菱エンジン: 6D16、6D24、8DC9		
		・いすゞエンジン: 6HH1		
		参考銘柄① コンプレッションゲージ: DG-8L	株式会社バンザイ	1
		8DC, 6HH1用アダプターセット: GI-6		1
		参考銘柄② コンプレッションゲージセット: AB-1204	マルマテクニカ株式会社	1
		8DC用アダプター: GF-3		1
		6HH1用アダプター: GI-6		1

(国内用)

## 立会検査記録

業務名：モンゴル国消防機材及び維持修繕作業施設改善計画フォローアップ協力向け機材

検査年月日：2017年10月6日（金）13：00

検査実施場所：株式会社モリタ パーツセンター

受注者名：株式会社テックインターナショナル

番号	品目	銘柄・規格	数量	備考
	別添の通り			全てのアイテムの品番、数量 について問題なし。

立会検査員：会社名・所属 株式会社日和コンサルタント

氏名 鵜澤 幸二 印（又は自署）

受注者側責任者：会社名・所属 株式会社テックインターナショナル

氏名 堀江 ひとみ 印（又は自署）

（記載上の注意）

- ・ 納品書やリストがある場合には納品書やリストを基に確認した項目に「レ」点を入れ、検査年月日、検査場所、受注者名を記載し、立会検査員と受注者側責任者が署名する方式でも構いません。
- ・ 備考欄には、納品された物品に問題がある場合に、その詳細を記載してください。また、日章旗・JICAステッカー貼付有や必要に応じ、製造番号を記載してください。
- ・ 1枚で足りない場合は、2枚以上使用し、右上にページの連番をふってください。



# 内訳明細書

モンゴル国消防機材及び維持修繕作業施設改善計画フォローアップ協力向け機材

番 号	機 材 名	仕 様	メーカー	数量	単価(円)	金額(円)
	総則	1. 部品について				
		中古品は認めない。				
		同様に交換部品、修理に使用する部品等についても中古品の使用は認めない。				
		2. 銘柄指定				
		機材番号1～6(各枝番も含む)は全て銘柄指定とする。				
		3. 技師業務				
		技師派遣条件書を参照のこと。				
1	ポンプ車(10,000L) 維持管理部品	車両型式:FV515M 架装型式:MWD10	株式会社モリタ			
1-1-1	吐水コック65XI/口金AC露ネジ男 Delivery cock 65mm I	吐水コック65XI/口金AC露ネジ男		2x	13 (6) 179,600	538,800
1-1-2	吐水コック65XM/口金AC露ネジ男 Delivery cock 65mm M	吐水コック65XM/口金AC露ネジ男		2x	13 (6) 179,600	538,800
1-1-3	吐水口口金 FM-70 Delivery valve cock GOST70	吐水口口金 FM-70		4x	13 (12) 57,100	171,300
1-1-4	ビク吸排コック75XO Ball valve 75 O	P4-VALVE/BALL-75XO-002			13 (3) 71,500	214,500
1-1-5	送水ボールコック50MMFC-R右 Ball cock 50	P4-VALVE/BALL-50XFCR-002			13 (3) 50,200	150,600
1-1-6	両Fボールコック65MMXA-FC Ball cock 65mm A Flange	P4-VALVE/BALL-65XA-028			13 (3) 38,900	116,700
1-1-7	スリースバルブ 40A BC-MF付 Gate valve 40A	P4-VALVE/GATE-40A-004			12 27,600	55,200
1-2-1	70露GOSTXBSP2.5"用パッキン Packing for 70GOST	70露GOSTXBSP2.5"用パッキン (A)		4x	13 (12) 2,400	7,200
1-2-2	100露GOSTXBSP4"用パッキン Packing for 100GOST	100露GOSTXBSP4"用パッキン (B)		2x	13 (6) 1,500	4,500
1-2-3	50露GOSTXBSP2"用パッキン Packing for 50GOST	50露GOSTXBSP2"用パッキン (C)		4x	13 (12) 2,400	7,200
1-3-1	スロットルケーブルBKT Throttle cable	PA-THROTTLE-CABLEBKT-006 (日野FD-3)			13 400	1,200
1-3-2	スロットルケーブル止金具14六角 Throttle cable bracket	PA-THROTTLE-CABLEPIN-002		2x	13 (6) 12,600	37,800
1-3-3	板_スロットルアーム100° Throttle arm	P9-PPYK0000233-00X			13 8,900	26,700
1-3-4	スロットル90°アーム取付BKT Throttle arm bracket	P9-THROTTLE-ARMBKT-001			13 700	2,100
1-3-5	ケーブル止ピンH000059650 Pin for cable	P9-THROTTLE-CABLEPIN-003		3x	13 (9) 5,200	15,600
1-3-6	ケーブル止ピン H000006813 Pin for cable	P9-THROTTLE-CABLEPIN-002		2x	13 (6) 2,100	6,300
1-3-7	スロットルケーブル止金具 Fixing pin for cable	P9-THROTTLE-CABLEPIN-001			13 700	2,100
1-3-8	スロットル変速ギヤ-ケース Gear case for throttle	P4-THROTTLE/GEAR_CASE-OS-002		2x	13 (6) 24,000	72,000
1-3-9	スロットルワイヤ-1900MM-2500MM Throttle wire 1900-2500mm	P4-CABLE/THROTTLE-SUS-2500-001			13 6,700	20,100
1-3-10	スロットルハンドルブリミックス Throttle handle premix	P4-HANDLE-THROTTLE-001		2x	13 (6) 7,100	21,300
1-3-11	スロットルウォームケースBKT付 Throttle warm case	P4-THROTTLE/GEAR_CASE-OS-001			13 18,700	56,100
1-3-12	ユニバサルジョイントB-8改 Universal joint	P4-JOINT/UNIVERSAL-008A-001 (三好)		2x	13 (6) 5,200	15,600
1-3-13	コネクトロッドSS6φX270 Connection rod SS 6x270	PA-APMONITOR-ROD-001			13 6,500	19,500



1-3-14	コネクトロッド6φXM6X31X665 Connection rod 6x31x665	P9-THROTTLE-ROD-001	2x	1.3	(6)	1,800	5,400
1-3-15	BKT_スロットルワイヤー止金具 Throttle cable bracket	P9-PLQT0003160-01X	2x	1.3	(6)	4,900	14,700
1-3-16	スロットル円盤プレート付LR組 Throttle disk	P4-THROTTLE/DISK-STD-002		1.3		4,500	13,500
1-4-1	ガラステープGT-6666FT巻 Glass tape GT-6666	P4-TAPE/GLASS-GT66-001	4x	1.3	(12)	13,800	41,400
1-4-2	ソフトロンテープ5M巻 Softron tape 5m	P4-TAPE/HEATPROOF-SOFTRON-001	10x	1.3	(30)	22,300	66,900
1-4-3	ヒートワイヤー 12/4 1.2M Heating wire	P4-WIRE/HEATING-1.2M-001 (アトム)	2x	1.3	(6)	20,300	60,900
1-4-4	耐熱リド線2sq 600V LKGB Lead wire	P4-WIRE/LEAD-2SG-001	5x	1.3	(15)	4,500	13,500
1-4-5	テープヒータ8BTV2-CR 200V Tape heater	P4-WIRE/HEATING-8BTV2-001	10x	1.3	(30)	327,200	981,600
1-4-6	ヒーター式MY30/10000L水槽 Heater MY30/10000L	P4-HEATER-MY30-001		1.3		802,800	2,408,400
1-4-7	ヒータ追加式MY30/10000L水槽 Additional heater MY30/10000L	P4-HEATER-MY30-008		1.3		45,900	137,700
2	はしご車 修理及び維持管理部品	車両型式:FV515P 装置型式:MLF5-35R	株式会社モリタ				
2-1-1	制御器 ジャイコン_GYMC-97E-2 Gyro-Control computer unit_GYMC-97E-2	P4-QPGE0001228-00X		1		1,055,800	1,055,800
2-1-2	梯子コントローラ HAC-30-99英文 Ladder control computer unit_HAC-30-99	P4-CONTROLLER/LADDER-HAC30-99-002		1		2,174,400	2,174,400
2-1-3	スイッチ_近接_PE-T4D Approximate sensor PE-T4D	P4-QPYE0000356-00X (富士電機)		2		13,100	26,200
2-1-4	スイッチ_近接_PE-T4DB Approximate sensor PE-T4DB	P4-QPYE0000357-00X (富士電機)		2		13,100	26,200
2-1-5	3連電磁比例弁 3DP04T1Y447-1 3 units of Solenoid valve 3DP04T1Y447-1	P4-VALVE/SOLENOID-3DP04T1Y447-001		1		904,100	904,100
2-1-6	小型電磁切換弁16-2903 Small Solenoid switcher valve 16-2903	P4-VALVE/SOLENOID-16_2903-001		1		37,800	37,800
2-1-7	インラインチェックSDICT-02-0.3 Inline check valve SDICT-02-0.3	P4-VALVE/CHECK-SDICT-001		1.3		11,000	33,000
2-1-8	リタンフィルタエレメントPX252A Oil return filter element PX252A	P4-FILTER/OIL-PX252A-001		1		16,000	16,000
2-2-1	梯子監視装置 Ladder Monitoring Device / Controller	P4-MONITOR/LADDER-LOBC93-001	2x	1	(2)	389,800	389,800
2-2-2	オンロードカットアダプタ Hydraulic onload cut adapter	P4-ADAPTER/HYDRAULIC-LDCUT96-001	2x	1	(2)	30,300	30,300
2-2-3	背面荷重検出器 Load detector sensor	P4-DETECTOR/LOAD-HMMT97-001		1		125,500	125,500
2-2-4	X-Y傾斜角度センサー X-Y sensor	P4-SENSOR/ANGLE-PMP10TZL-001		1		190,000	190,000
2-2-5	1方向操作レバー Joystick controller (2-way)	P4-OPERATION_DEVICE-SUXEBS-001		1		134,500	134,500
2-2-6	2方向操作レバー Joystick controller (4-way)	P4-OPERATION_DEVICE-SUXEBS-003		2		237,400	474,800
2-2-7	1方向操作レバー Joystick controller (2-way)	P4-OPERATION_DEVICE-SUXEBS-002		1		237,400	237,400
2-2-8	ポテンショメーター Potential sensor	P4-DETECTOR/POTENTIAL-HP16-001		2		7,900	15,800
2-2-9	ポテンショメーター Potential sensor	P4-DETECTOR/POTENTIAL-CP2FB-001		3		14,100	42,300
2-2-10	ストロークセンサ(直結型) Stroke sensor	P4-SENSOR/STROKE-HS165-001		4		80,600	322,400
2-2-11	近接スイッチ Approximate Sensor	P4-SWITCH-E2EX5E1-001		3		8,000	24,000
2-2-12	近接スイッチ Approximate Sensor	P4-SWITCH-E2EX10ME1-001		7		10,400	72,800
2-2-13	近接スイッチ Approximate Sensor	P4-SWITCH-E2EX18ME1-001		2		16,000	32,000
2-2-14	近接スイッチ Approximate Sensor	P4-SWITCH-E2EX1R5E1-001		2		7,700	15,400
2-2-15	近接スイッチ Approximate Sensor	P4-SWITCH-E2EX5C1-001		2		9,300	18,600



2-2-16	近接スイッチ Approximate Sensor	P4-SWITCH-TLT5ME1-001	12	6,400	76,800
2-2-17	近接スイッチ Approximate Sensor	P4-SWITCH-TLN20ME1-001	2	8,000	16,000
2-2-18	近接スイッチ Approximate Sensor	P4-SWITCH-TLW5MC1-001	1	6,500	6,500
2-2-19	リミットスイッチ Limit switch	P4-SWITCH-AZ5106-001	2	9,200	18,400
2-2-20	風速発信器 Anemometer	P4-ANEMOMETER-26OPC-001	1	186,700	186,700
2-2-21	足踏みスイッチ Deadman foot pedal	P4-SWITCH-OFLR-001	3	16,800	50,400
2-2-22	防水トグルスイッチ(1極単投オルタネート)Toggle switch	P4-SWITCH-ATA22W-001	3	2,700	8,100
2-2-23	防水トグルスイッチ(1極単投オルタネート)Toggle switch	P4-SWITCH-ATF22W-001	2	3,600	7,200
2-2-24	防水トグルスイッチ(1極単投オルタネート)Toggle switch	P4-SWITCH-ATG22W-001	6	3,400	20,400
2-2-25	防水トグルスイッチ (4極双投オルタネート)Toggle switch	P4-SWITCH-A4TN22-001	1	4,900	4,900
2-2-26	トグルスイッチ防水キャップ Toggle switch cap	P4-COVER/SWITCH-BOUSUI-001	1	700	4,900
2-2-27	照光スイッチ(丸、オルタネート透明1NC1NO、カバー)Self-lighting switch	P4-SWITCH-704,0607,9005,6003-002	1	7,000	7,000
2-2-28	照光スイッチ(丸、オルタネート透明1NC2NO、カバー)Self-lighting switch	P4-SWITCH-704,0607,9005,6003-004	1	7,100	7,100
2-2-29	照光スイッチ(丸、オルタネート透明1NC3NO、カバー)Self-lighting switch	P4-SWITCH-704,607,9005,6003-001	1	7,300	7,300
2-2-30	照光スイッチ(丸、オルタネート透明1NC6NO、カバー)Self-lighting switch	P4-SWITCH-704,0607,9005,6003-006	1	8,000	8,000
2-2-31	照光スイッチ(丸、オルタネート透明1NC7NO、カバー)Self-lighting switch	P4-SWITCH-704,0607,9005,6003-005	1	8,000	8,000
2-2-32	照光スイッチ(丸、オルタネート透明1NC8NO、カバー)Self-lighting switch	P4-SWITCH-704,0607,9005,6003-009	1	8,000	8,000
2-2-33	照光スイッチ(丸、オルタネート赤1NC1NO、カバー)Self-lighting switch	P4-SWITCH-704,0602,9005-001	1	7,000	7,000
2-2-34	照光スイッチ(丸、モーメンタリ透明1NC1NO、カバー)Self-lighting switch	P4-SWITCH-704,0307,9005,6003-002	1	6,800	6,800
2-2-35	照光スイッチ(丸、モーメンタリ透明1NC1NO、カバー)Self-lighting switch	P4-SWITCH-704,0307,9005,6003-005	1	7,700	7,700
2-2-36	パイロットランプ Pilot lamp	P4-LAMP/PILOT-RED-24V-001	1	2,100	2,100
2-2-37	マーカールンプ Marker lamp green	P4-LAMP/MARKER-GREEN-001	1	1,300	1,300
2-2-38	マーカールンプ Marker lamp red	P4-LAMP/MARKER-RED-001	1	1,300	1,300
2-2-39	バイパワーリレー Relay	P4-RELAY/ELECTRIC-LY2D-001	10	2,100	21,000
2-2-40	ソリッドステートタイマー Timer relay	P4-RELAY/ELECTRIC-H3Y2-001	1	6,400	6,400
2-2-41	ソリッドステートタイマー Timer relay	P4-RELAY/ELECTRIC-H3CR-001	1	9,800	9,800
2-2-42	パワーリレー Power relay	P4-RELAY/ELECTRIC-G7L2A-001	2	2,500	5,000
2-2-43	リレーソケット Relay socket	P4-HOLDER/SWITCH-PTF08A-001	10	1,000	10,000
2-2-44	リレーソケット Relay socket	P4-HOLDER/SWITCH-PYF08A-001	1	1,000	1,000
2-2-45	リレーソケット Relay socket	P4-RELAY/ELECTRIC-P2CF11-001	1	1,300	1,300
2-2-46	リレーソケット Relay socket	P4-HOLDER/SWITCH-P7LF-001	2	2,100	4,200
2-2-47	保持金具 Bracket	P4-HOLDER/SWITCH-PYCA1-001	10	100	1,000
2-2-48	保持金具 Bracket	P4-HOLDER/SWITCH-Y92H3-001	1	100	100
2-2-49	フロントカバー Front cover	P4-COVER/SWITCH-Y92A-48B-001	1	1,200	1,200



2-2-50	バッテリーリレー Battery relay	P4-RERAY/BATTERY-BR257-001		1	11,900	11,900
2-2-51	電子ブザー Buzzer	P4-BUZZER-EB1114-24V-001		2	2,700	5,400
2-2-52	電子ブザー Buzzer	P4-BUZZER-EB1124-24V-001		2	2,500	5,000
2-2-53	オス・インサート Electric wire coupler	P4-COUPLER/CABLE-CDM40-001		1	2,800	2,800
2-2-54	メス・インサート Electric wire coupler	P4-COUPLER/CABLE-CDF40-001		2	3,000	6,000
2-2-55	プラグ・シエル Plug connector	P4-CONNECTOR/METAL-CAO16L29-001		1	4,900	4,900
2-2-56	レセプタクル・シエル Receptacle connector	P4-CONNECTOR/METAL-CHI16LS-001		2	7,700	15,400
2-2-57	オス・コンタクト Connector pin (Male)	P5-PIN/WIRING-CDMA1,5-001		40	100	4,000
2-2-58	メス・コンタクト Connector pin (Female)	P5-PIN/WIRING-CDFA1,5-001		40	100	4,000
2-2-59	オス・ガイドピン Guide pin (Male)	P5-SCREW/GUIDE-CRM-001	予備ナニ	6 (2)	400	2,400
2-2-60	メス・ガイドピン Guide pin (Female)	P5-SCREW/GUIDE-CRF-001	予備ナニ	6 (2)	400	2,400
2-2-61	ソレノイド Solenoid	P4-VALVE/SOLENOID-MD2115I-002		1	14,500	14,500
2-2-62	集電リング (25段, PT, センサ付) Electric Brush 25 sections	P4-BRUSH/ELECTRIC-TKF-P-001		1	356,200	356,200
2-2-63	低雑音型インターホン標準 (スピーカ無) Interphone	P4-INTERPHONE-PM210A-002		1	218,300	218,300
2-2-64	上部スピーカ (大・アンプ内蔵) Speaker mic. For interphone (basket)	P4-INTERPHONE-CA150AMP-001		1	39,900	39,900
2-2-65	先端灯 Top lamp (basket)	P4-LAMP/END-YELLOW-001		2	3,400	6,800
2-2-66	先端灯 Top lamp (basket)	P4-LAMP/TURN_SIGNAL-ORANGE-24V-001		4	2,200	8,800
2-2-67	先端灯 Top lamp (basket)	P4-LAMP/SIDE-FH60-NISSAN-001		2	6,800	13,600
2-2-68	カマボコ型ゲージランプ Gauge ramp (basket)	P4-LAMP/ROOM-STD-001		1	2,500	2,500
2-2-69	リタンフィルタエレメントPX252A Oil return filter element PX252A	P4-FILTER/OIL-PX252A-001		3	16,000	48,000
2-3-1	吐水コック 65XI/口金AC露ネジ男 Delivery cock 65mm I	吐水コック 65XI/口金AC露ネジ男	2x	1 (2)	179,600	179,600
2-3-2	吐水コック 65XM/口金AC露ネジ男 Delivery cock 65mm M	吐水コック 65XM/口金AC露ネジ男	2x	1 (2)	179,600	179,600
2-3-3	露ネジ吸排コック 65MMXM Ball cock 65mm M GOST	露ネジ吸排コック 65MMXM		1	71,500	71,500
3	タンク車 維持管理部品	車両型式:FP517H 架装型式:MWOT08	株式会社モリタ			
3-1-1	ガラステープGT-6666FT巻 Glass tape GT-6666	P4-TAPE/GLASS-GT66-001	4x	16 (64)	13,800	82,800
3-1-2	ソフトロンテープ5M巻 Softron tape 5m	P4-TAPE/HEATPROOF-SOFTRON-001	10x	16 (60)	22,300	133,800
3-1-3	ヒートワイヤー 12/4 1.2M Heating wire	P4-WIRE/HEATING-1,2M-001 (アトム)	2x	16 (12)	20,300	121,800
3-1-4	耐熱リード線2sq 600V LKGB Lead wire	P4-WIRE/LEAD-2SG-001	5x	16 (30)	4,500	27,000
3-1-5	テープヒータ 8BTV2-CR 200V Tape heater	P4-WIRE/HEATING-8BTV2-001	30x	16 (180)	327,200	1,963,200
4	ポンプ車 (4,000L 2WD) 維持管理部品	車両型式:FK617F 架装型式:MT-Y04 (4x2)	株式会社モリタ			
4-1-1	吐水コック65XI/口金AC露ネジ男 Delivery cock 65mm I	吐水コック65XI/口金AC露ネジ男	2x	2 (4)	179,600	359,200
4-1-2	吐水コック65XM/口金AC露ネジ男 Delivery cock 65mm M	吐水コック65XM/口金AC露ネジ男	2x	2 (4)	179,600	359,200
4-1-3	吐水口口金 ΓM-70 Delivery valve cock GOST70	吐水口口金 ΓM-70	4x	2 (8)	57,100	114,200
4-1-4	ビク吸排コック75XO Ball valve 75 O	P4-VALVE/BALL-75XO-002		2	71,500	143,000



4-1-5	送水ボールコック50MMFC-R右 Ball cock 50	P4-VALVE/BALL-50XFCR-002		12	50,200	100,400
4-1-6	両Fボールコック65MMXA-FC Ball cock 65mm A Flange	P4-VALVE/BALL-65XA-028		12	38,900	77,800
4-2-1	70露GOSTXBSP2.5"用パッキン Packing for 70GOST	70露GOSTXBSP2.5"用パッキン (A)	4x	12 (8)	2,400	4,800
4-2-2	100露GOSTXBSP4"用パッキン Packing for 100GOST	100露GOSTXBSP4"用パッキン (B)	2x	12 (4)	1,500	3,000
4-2-3	50露GOSTXBSP2"用パッキン Packing for 50GOST	50露GOSTXBSP2"用パッキン (C)	4x	12 (8)	2,400	4,800
4-3-1	スロットルケーブルBKT Throttle cable	PA-THROTTLE-CABLEBKT-006 (日野FD-3)		12	400	800
4-3-2	スロットルケーブル止金具14六角 Throttle cable bracket	PA-THROTTLE-CABLEPIN-002		12	12,600	25,200
4-3-3	板_スロットルアーム100° Throttle arm	P9-PPYK0000233-00X		12	8,900	17,800
4-3-4	スロットル90°アーム取付BKT Throttle arm bracket	P9-THROTTLE-ARMBKT-001		2	700	1,400
4-3-5	ケーブル止ピンH000059650 Pin for cable	P9-THROTTLE-CABLEPIN-003	3x	2 (6)	5,200	10,400
4-3-6	ケーブル止ピン H000006813 Pin for cable	P9-THROTTLE-CABLEPIN-002	2x	12 (4)	2,100	4,200
4-3-7	スロットルケーブル止金具 Fixing pin for cable	P9-THROTTLE-CABLEPIN-001		12	700	1,400
4-3-8	スロットル変速ギヤ-ケース Gear case for throttle	P4-THROTTLE/GEAR_CASE-OS-002	2x	12 (4)	24,000	48,000
4-3-9	スロットルワイヤ-1900MM-2500MM Throttle wire 1900-2500mm	P4-CABLE/THROTTLE-SUS-2500-001		12	6,700	13,400
4-3-10	スロットルハンドルブリミックス Throttle handle premix	P4-HANDLE-THROTTLE-001	2x	12 (4)	7,100	14,200
4-3-11	スロットルウォームケースBKT付 Throttle warm case	P4-THROTTLE/GEAR_CASE-OS-001		12	18,700	37,400
4-3-12	ユニバサルジョイントB-8改 Universal joint	P4-JOINT/UNIVERSAL-008A-001 (三好)	2x	12 (4)	5,200	10,400
4-3-13	コネクトロッドSS6φX270 Connection lod SS 6x270	PA-APMONITOR-ROD-001		2	6,500	13,000
4-3-14	コネクトロッド6φXM6X31X665 Connection lod 6x31x665	P9-THROTTLE-ROD-001	2x	12 (4)	1,800	3,600
4-3-15	BKT_スロットルワイヤー止金具 Throttle cable bracket	P9-PLQT0003160-01X	2x	12 (4)	4,900	9,800
4-3-16	スロットル円盤プレート付LR組 Throttle disk	P4-THROTTLE/DISK-STD-002		12	4,500	9,000
4-4-1	ガラステープGT-6666FT巻 Glass tape GT-6666	P4-TAPE/GLASS-GT66-001	4x	12 (8)	13,800	27,600
4-4-2	ソフトロンテープ5M巻 Softron tape 5m	P4-TAPE/HEATPROOF-SOFTRON-001	10x	12 (20)	22,300	44,600
4-4-3	ヒートワイヤー 12/4 1.2M Heating wire	P4-WIRE/HEATING-1.2M-001 (アトム)	2x	12 (4)	20,300	40,600
4-4-4	耐熱リード線2sq 600V LKGB Lead wire	P4-WIRE/LEAD-2SG-001	5x	12 (10)	4,500	9,000
4-4-5	テープヒータ 8BTV2-CR 200V Tape heater	P4-WIRE/HEATING-8BTV2-001	30x	12 (60)	327,200	654,400
4-4-6	ヒーター式MY30/4000L水槽 Heater	P4-HEATER-MY30-001		12	802,800	1,605,600
4-4-7	ヒータ追加式MY30/4000L水槽 Additional heater MY30/4000L	P4-HEATER-MY30-008		12	45,900	91,800
4-5-1	Dシャフト427-01000-11450MM D shaft	P4-SHAFT/DRIVING-427,01000,11-001		1	50,800	50,800
5	ポンプ車(4,000L 4WD) 維持管理部品	車両型式:FTS33F 架装型式:MT-Y04 (4x4)	株式会社モリタ			
5-1-1	吐水コック65XI/口金AC露ネジ男 Delivery cock 65mm I	吐水コック65XI/口金AC露ネジ男	2x	12 (8)	179,600	718,400
5-1-2	吐水コック65XM/口金AC露ネジ男 Delivery cock 65mm M	吐水コック65XM/口金AC露ネジ男	2x	12 (8)	179,600	718,400
5-1-3	吐水口口金 FM-70 Delivery valve cock GOST70	吐水口口金 FM-70	4x	12 (16)	57,100	228,400
5-1-4	ビク吸排コック75XO Ball valve 75 O	P4-VALVE/BALL-75XO-002		12	71,500	286,000

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5-1-5	送水ボールコック50MMFC-R右 Ball cock 50	P4-VALVE/BALL-50XFCR-002		2	50,200	200,800
5-1-6	両Fボールコック65MMXA-FC Ball cock 65mm A Flange	P4-VALVE/BALL-65XA-028		2	2,400	4,800
5-2-1	70露GOSTXBSP2.5"用パッキン Packing for 70GOST	70露GOSTXBSP2.5"用パッキン (A)	2X	4 (8)	1,500	6,000
5-2-2	100露GOSTXBSP4"用パッキン Packing for 100GOST	100露GOSTXBSP4"用パッキン (B)	4X	4 (16)	2,400	9,600
5-2-3	50露GOSTXBSP2"用パッキン Packing for 50GOST	50露GOSTXBSP2"用パッキン (C)		4	400	1,600
5-3-1	スロットルケーブルBKT Throttle cable	PA-THROTTLE-CABLEBKT-006 (日野FD-3)	2X	4 (8)	12,600	50,400
5-3-2	スロットルケーブル止金具14六角 Throttle cable bracket	PA-THROTTLE-CABLEPIN-002		4	8,900	35,600
5-3-3	板_スロットルアーム100° Throttle arm	P9-PPYK0000233-00X		4	700	2,800
5-3-4	スロットル90°アーム取付BKT Throttle arm bracket	P9-THROTTLE-ARMBKT-001	3X	4 (12)	5,200	20,800
5-3-5	ケーブル止ピンH000059650 Pin for cable	P9-THROTTLE-CABLEPIN-003	2X	4 (8)	2,100	8,400
5-3-6	ケーブル止ピン H000006813 Pin for cable	P9-THROTTLE-CABLEPIN-002		4	700	2,800
5-3-7	スロットルケーブル止金具 Fixing pin for cable	P9-THROTTLE-CABLEPIN-001	2X	4 (8)	24,000	96,000
5-3-8	スロットル変速ギヤケース Gear case for throttle	P4-THROTTLE/GEAR_CASE-OS-002		4	6,700	26,800
5-3-9	スロットルワイヤ-1900MM-2500MM Throttle wire 1900-2500mm	P4-CABLE/THROTTLE-SUS-2500-001	2X	4 (8)	7,100	28,400
5-3-10	スロットルハンドルブリミックス Throttle handle premix	P4-HANDLE-THROTTLE-001		4	18,700	74,800
5-3-11	スロットルウォームケースBKT付 Throttle warm case	P4-THROTTLE/GEAR_CASE-OS-001	2X	4 (8)	5,200	20,800
5-3-12	ユニバサルジョイントB-8改 Universal joint	P4-JOINT/UNIVERSAL-008A-001 (三好)		4	6,500	26,000
5-3-13	コネクトロッドSS6φX270 Connection lod SS 6x270	PA-APMONITOR-ROD-001	2X	4 (8)	1,800	7,200
5-3-14	コネクトロッド6φXM6X31X665 Connection lod 6x31x665	P9-THROTTLE-ROD-001	2X	4 (8)	4,900	19,600
5-3-15	BKT_スロットルワイヤー止金具 Throttle cable bracket	P9-PLQT0003160-01X		4	4,500	18,000
5-3-16	スロットル円盤プレート付LR組 Throttle disk	P4-THROTTLE/DISK-STD-002		4	38,900	155,600
5-4-1	ガラステープGT-6666FT巻 Glass tape GT-6666	P4-TAPE/GLASS-GT66-001	4X	4 (16)	13,800	55,200
5-4-2	ソフトロンテープ5M巻 Softron tape 5m	P4-TAPE/HEATPROOF-SOFTRON-001	10X	4 (40)	22,300	89,200
5-4-3	ヒートワイヤー 12/4 1.2M Heating wire	P4-WIRE/HEATING-1.2M-001 (アトム)	2X	4 (8)	20,300	81,200
5-4-4	耐熱リード線2sq 600V LKGB Lead wire	P4-WIRE/LEAD-2SG-001	5X	4 (20)	4,500	18,000
5-4-5	テープヒータ 8BTV2-CR 200V Tape heater	P4-WIRE/HEATING-8BTV2-001	30X	4 (120)	327,200	1,308,800
5-4-6	ヒーター式MY30/4000L水槽 Heater	P4-HEATER-MY30-001		4	802,800	3,211,200
5-4-7	ヒータ追加式MY30/4000L水槽 Additional heater MY30/4000L	P4-HEATER-MY30-008		4	45,900	183,600
5-5-1	Dシャフト427-01000-11450MM D shaft	P4-SHAFT/DRIVING-427,01000,11-001		1	50,800	50,800
6	ポンプ車(4,000L 4WD) 車両維持管理部品	型式: FTS33F	いすゞ自動車(株)			
6-1-1	オルターネーター Alternator	1812004165		2	123,500	247,000
6-2-1	ブレーキバルブ Brake valve	1481008720		2	50,800	101,600
6-2-2	油圧エアサーボブレーキ Hydraulic air servo brake	1478006631		2	65,700	131,400
6-2-3	油圧エアサーボブレーキ Hydraulic air servo brake	1478006642		2	65,700	131,400



6-2-4	パーキングブレーキワイヤー Parking brake wire cable	1799964674	4	14,800	59,200
6-3-1	クラッチカバー Clutch cover	1312204470	4	57,800	231,200
6-3-2	クラッチディスク Clutch disk	1312409011	4	36,600	146,400
6-3-3	クラッチリリースベアリング Clutch release bearing	1098201140	4	5,400	21,600
6-3-4	クラッチパイロットベアリング Clutch pilot bearing	8943922880	4	1,100	4,400
6-4-1	フロントガラス Front glass	1761180451	2	130,000	260,000
6-4-2	ヘッドライト(左) Head light (Left)	8976094280	1	33,000	33,000
6-4-3	ヘッドライト(右) Head light (Right)	8976094270	1	33,400	33,400
6-4-4	変速ワイヤーケーブル Shift wire cable	1336712590	2	15,700	31,400
7	エンジン分解組立用測定器 コンプレッションゲージ式				
	Compression gauge	(仕様) 用途: ディーゼルエンジン用			
		目盛: ゲージ目盛0.7MPa 最少目盛0.2MPa			
		標準装備の他、以下のエンジンのアダプターを装備すること			
		・三菱エンジン: 6D16, 6D24, 8DC9			
		・いすゞエンジン: 6HH1			
		コンプレッションゲージセット: AB-1204	1	73,300	73,300
		8DC用アダプター: GF-3	1	3,100	3,100
		6HH1用アダプター: GI-6	1	5,500	5,500
				機材費合計	29,500,000
				輸送費	1,000,000
				保険料	112,656
				技術者派遣費用	1,000,000
				合計	31,612,656

パッキン (A) 合計=8 → 72 予備 44個  
 パッキン (B) 合計=6 → 36 予備 10個  
 パッキン (C) 合計=4 → 72 予備 48個