1. Motor Grader

2. Tipper Truck

2-2. Snow Plough

2-3. Salt Spreader (1)

3. Asphalt Finisher

4. Asphalt Milling Machine

5. Asphalt Sprayer

6. Pickup Truck

7. Concrete Cutter

8. Multi Purpose Vehicle

8-2. Rotary Snow Blower

8-3. Salt Spreader (2)

8-4. Glass Cutter

9. Wheel Backhoe

9-2. Hydraulic Breaker

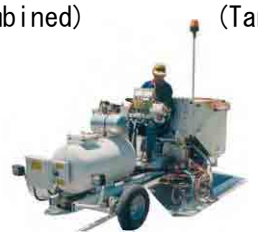
10. Backhoe Loader

11a. Vibration Roller (Combined)

11b. Vibration Roller (Tandem)

12. Wheel Loader

13. Truck with Crane



14. Line Marker

15. Pile Driver (Self- Propelled)

16. Crack Filler

17. Mobile Workshop Truck

17-2. On-Board Repair Equipment

Image Photo of the Equipment

LIST OF FIGURES & TABLES

ABBREVIATIONS

B&H	:	Bosnia and Herzegovina
CIF	:	Cost, Insurance and Freight (condition of transport cost)
CIP	:	Cost, Insurance and Place (condition of transport cost)
CO	:	Carbon monoxide
DAC	:	Development Assistance Committee of OECD
deg	:	degrees (unit of angle)
E/N	:	Exchange of Note
EU	:	European Union
HC	:	Hydro corbons
JICA	:	Japan International Cooperation Agency
KM	:	Convertible Mark (unit of local currency)
MOTC	:	Federal Ministry of transport and communications
NOx	:	Nitrogen oxides
OECD	:	Organization for Economic Cooperation and Development
pcs	:	pices
PM	:	Particular matter
PTO	:	Power Takeoff device
V/C	:	Verification of Contract

CHAPTER 1

BACKGROUND OF THE PROJECT

CHAPTER 1

BACKGROUND OF THE PROJECT

1.1 BACKGROUND OF THE REQUEST AND ITS SUMMARY

The road traffic is the main system of the transportation in Bosnia and Herzegovina (hereinafter referred to as “B&H”). Collapsed and disconnected road network by the conflict was the biggest obstacle for the recovery and it was the emergency subjects to be solved. The recovery and rehabilitation of the road network were implemented with generous assistances by several donors.

CESTE d.d. Mostar (hereinafter referred to as “CESTE”) is in charge of regular road maintenance work on the 15 routes of main road and 30 routes of regional road, total length 1,617km, located in the 5 cantons of Croats and Croats mixed territories. The equipment owned by CESTE is significantly insufficient. Many of those are aging and working with low operation rate. Thus CESTE is not able to complete the work only with owned equipment. Limited number of equipment is shared by each canton office and insufficient number is procured from private sector. That is the inefficient situation what the availability of equipment does not meet the necessary timing.

In above condition, the road maintained by CESTE is unstable for passing traffic as traffic control by rock falling and deteriorated damage of the road. Also safety measures are not carried out effectively in appropriate timing. Total length of main road and regional road corresponds with 40% and 30% of the Federation of Bosnia and Herzegovina (herein after referred to as “Federation”) respectively. So it has important role on the national road network and it affects the condition of cargo distribution network in the country.

On August 2004, The Government of B&H made a requests of the grant aid for the procurement of road maintenance equipment to CESTE who is the implementing agency under the Federal Ministry of Transport and Communications (hereinafter referred to as “MOTC”).

In response to the request, the Government of Japan entrusted to the Japan International Cooperation Agency (hereinafter referred to as “JICA”) to conduct the basic design study. JICA sent to B&H the study team from February 27, 2006 to March 7, 2006. The team made discussions with concerned officials to confirm the contents of the request and carried out several surveys such as present condition of the agency, field condition, related program and

necessary data collection. During the discussion, B&H side suggested the modification of requested equipment list and submitted revised equipment list. B&H side explained that new list was corresponded the change of the condition from original submission in 2004 i.e. deletion of purchased machines and fitting to the change of work requirement. The team convinced it was reasonable modification and officially received the revised equipment list which was attached on the Minutes of Discussion signed on March 6, 2006. The contents of final request are as follows.

Project Area :

5 cantons in the Federation, i.e. Posavina, Central Bosnia, Herzegovina Neretva, West Herzegovina, Herceg Bosna

Responsible Ministry :

Federal Ministry of Transport and Communications, (MOTC)

Implementing Agency :

CESTE d.d. Mostar, (CESTE)

Table 1.1-1 List of Requested Equipment

Equipment	No. of Unit	Equipment	No. of Unit
Motor Grader	3	Backhoe Loader	1
Dump Truck	14	Vibration Roller	5
Asphalt Finisher	1	Wheel Loader	5
Asphalt Milling Machine	2	Truck with Crane	2
Asphalt Sprayer	12	Line Marker	1
Truck	8	Pile Driver (Self-Propelled)	2
Concrete Cutter	5	Crack Filler	5
Multi Purpose Vehicle	2	Workshop Facility	1
Wheel Backhoe (with Hydraulic Breaker)	4		

1.2 ENVIRONMENTAL AND SOCIAL CONSIDERATIONS

This project concerns the maintenance of the existing roads and it doesn't affects the natural and social environment in the project area.

The Government of B&H has Rule book on protection of air pollution by official Gazette B&H No 18/76-812 and the Federal Government has Law on air pollution by Official Gazette F B&H, No 33/03. However, they don't have any original standard for the emission from the engines. B&H side requests to adopt the equivalent standard with Euro 3 of European Union (hereinafter referred to as "EU"). The Government of B&H aims to join EU and it is expected to regulate the emission standard in future. This project adopts the equivalent standard with Euro for the emission form procured equipment. Table 1.2-1 shows the emission standard for diesel engine truck of which gross vehicle weight is more than 3.5 ton.

Table 1.2-1 Standard Value for Diesel Truck

Emission	Euro 3 vale	Japan vale in 2005
Carbon monoxide (CO)	2.1 g/kWh	2.22 g/kWh
Hydrocarbons (HC)	0.66 g/kWh	0.17 g/kWh
Nitrogen oxides (NOx)	5.0 g/kWh	2.0 g/kWh
Particular matter (PM)	0.10 g/kWh	0.036 g/kWh

CHAPTER 2

CONTENTS OF THE PROJECT

CHAPTER 2

CONTENTS OF THE PROJECT

2.1 BASIC CONCEPT OF THE PROJECT

(1) Overall Objective and Project Objective

During the collapse of former Yugoslavia, the conflict between each ethnic group was happened in 1992 for the independence of B&H, and the battle for the dominance spread in whole country and continued more than three and a half year. In the result, they said that about 2 million of refugees and displaced persons were generated in and out the country. The fight was concluded by the Dayton peace agreement in December 1995. Then B&H has consisted of 2 entities, i.e. the Federation where major resident is Bosniaks and Croats and the Republic of Srpska (hereinafter referred to as “Republic”) where Serbs is major resident, and the district Brcko.

Only the conflict generated many deaths, wounded, refugees and displaced persons, but the basic infrastructure, which supported national economy, was destroyed including roads and bridges. In particular, disconnected national road network became a big obstacle of the movement between the territories of each ethnic groups and inter-entity. It was also a factor to disturb the acceleration of the minority return and the ethnic amicability. The recovery of the disconnected road network was an emergency subject at the period after the peace agreement for the security of the self-sustenance economy. Then the reconstruction and rehabilitation had been conducted through Emergency Transport Reconstruction Project I & II until year 2000 by the assistances with the several donors.

It seems that the emergency recovery work in the road sector is almost completed with the cooperation of several donors. However, road maintenance work is still forced to undertake with insufficient and old equipment. It is considered that the maintenance of road network is impossible by the present condition.

CESTE is the one of the companies in the Federation to carry out the road maintenance work. CESTE has executed the daily maintenance work on 807 km of main roads and 810 km of regional roads located in Posavina, Central Bosnia, Herzegovina Neretva, West Herzegovina and Herceg Bosna cantons. They have a important role as seen that approximately 40% of main roads and 30% of regional roads in the Federation is under their the responsibility. However, the execution of the work faces some difficulties. Therefore it is

recognized the necessity to strengthen the road maintenance equipment.

The overall objective and the Project objective are summarized as shown below:

Overall Objective:

To recover and develop the regional society and economy along the project road, and to accelerate the inter-entity exchange of humans and goods, the returns of displaced persons and amicability of each ethnic group

Project Objective:

To properly maintain concerned roads of 1,617 km in length

(2) Summary of The Project

To achieve the above objectives, this project is to strengthen the execution system of the maintenance work using CESTE's owned equipment by the procurement of insufficient equipment at present. It is expected to be possible the effective quality maintenance work at appropriate timing. In this project, Japan's Grant Aid shall procure the road maintenance equipment of CESTE.

2.2 BASIC DESIGN OF THE REQUESTED JAPANESE ASSISTANCE

2.2.1 DESIGN POLICY

(1) Basic Concept

CESTE provides the various kinds of services of regular road maintenance such as the daily inspection and repair. Major work items in summer season are overlay with milling work, repair of potholes, resurfacing of gravel road, milling work for anti slip, repair of shoulder, clearing of ditch and so on. During winter season, many work items in summer season are suspended and the major work items are shifted to snow removal and icing prevention. CESTE executes their works based on the contract with the Federal, Cantonal and Municipal Government. The annual work items and volume will be similar in every year. Therefore the basic design is carried out based on the past experience of work items and work volume done by CESTE.

Regarding the condition of the equipment owned by CESTE, the operation rate is low level due to aging of owned machines and also the total number is considerably insufficient. Some machines are shared by the several operative base points to cover the lack of number of equipment. The capacity of annual work is limited because of such worth efficiency of the work. Number of equipment procured in this project shall be decided based on the necessary work volume of each maintenance work items considering with number of working parties of each item.

(2) Policy for Natural Condition

The Project site spread in B&H and the climate shows a little differences by the location. During the coldest period of the winter, the temperature becomes often below 0℃ in every 5 cantons and sometimes -20℃ to -30℃ at some locations.

The major road maintenance work in winter season is snow removal and spreading of anti-freeze material on road surface. Considering the weather condition, equipment for the winter work shall be adopted the specification to correspond with cold districts.

(3) Policy for Laws and Regulations for Environmental Aspects

EU sets up the emission level for exhausted gas and particulate matter from the engine. The member nations are instructed to apply the standard value with revised internal laws and regulations. Each EU member nation issues the type approval of the engine for the domestic products and selling products which exhausted gas is cleared the emission standard level.

The information of type approval is shared with member nations.

The Government of B&H has the rule book on protection of air pollution but there isn't any emission standard at present. B&H aims to join EU member and it shall be regulated the emission standard in future in accordance with the Directives of EU, but there is no definite schedule at present. MOTC requests to adopt the standard of EURO 3 level for the project and it shall be respect with the environmental consideration. In this study, the emission standard of EURO 3 for the vehicle, Stage II for non road machinery with diesel engine, Stage I for non road machinery with gasoline engine and those equivalent standard shall be applied.

(4) Policy for the Management and Maintenance Level of CESTE

Each canton office conducts equipment management under CESTE. The chief of equipment in canton office prepares the control table of each equipment and reports the operation, repair and inspection records. Both of operators and mechanics have sufficient knowledge of the machines. They recognize the importance of regular maintenance work and conducts it. Even old model are operation under good maintenance. Service mechanics from maker agents are requested in case of heavy repair works.

With above reasons, CESTE has sufficient ability of maintenance and management for equipment. When equipment meets a trouble on the road, mechanics from the nearest base point come to repair it with only handy tools. Due to the above situation, the necessity of the mobile workshop with suitable facilities at field repair works will be considered in the Project. In addition, the existence of maker agent in neighbor countries providing heavy repair works is an important factor and it shall be studied for the procurement plan.

(5) Policy for Determination of Equipment Grade

CESTE does not need a special and/or a large equipment for their ordinary regular maintenance work. The basic specifications of equipment under the Project will be referred to the popular equipment and presently owned equipment, which is familiar for the staff of CESTE, with the consideration on the management and maintenance.

(6) Policy for Procurement from Third Countries

The society and economy of B&H is strongly related with European countries due to it's geographical situation in Balkans. European products of road construction equipment are well utilized and many maker agents of European brand are located in the country. Japanese products are very limited in the country and a few agents of Japanese brand exist. Therefore

it happened some cases that the popular equipment in Europe is not manufactured in Japan or there are differences on the specification between European and Japanese equipment. By this reason, the responsible agency requests to procure European products which are common in B&H.

The price of Japanese products will be much higher than European products due to the transportation fee because of the geographical location of B&H. The existence of maker agents affects on the procurement of spare parts and on the service level of repair. Also it is related with the continuance of benefit of the Project.

Procurement from third countries (European countries) will be studied in the Project due to above reasons. Consideration with quality, price, delivery and familiarity in B&H, 22 candidate countries are listed below.

- Member of DAC: Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxemburg, Netherland, Norway, Portugal, Spain, Sweden, Switzerland, United Kingdom
- Countries in former Yugoslavia: Slovenia, Croatia
- Others: Turkey, South Africa, Thailand

(7) Policy for Procurement Method and Schedule

As mentioned before, European products are popular while Japanese ones are very rare in B&H. One of that reason is fuel standard and emission standard of EU. It is necessary to get the approval of the engine and related parts to sell them in EU countries.

In some cases, the maintenance equipment utilized in B&H is not manufactured and sold in Japan due to the variation of work method and difference of material quality. Some equipment which CESTE requests for the Project are not manufactured in Japan. In such case, Japanese manufacturers can not apply the tender of the Project. The Project shall keep the occasion to offer the suitable lot for the Japanese products.

The period of procurement will be shorten by basically adopting the general specifications of ordinary machine of the makers for the motor grader, wheel loader and so on.

2.2.2 BASIC PLAN (Equipment Plan)

(1) Overall Plan

CESTE conducts road maintenance work in accordance with the “Regulations for the Maintenance Work on the Public Roads” of MOTC. Table 2.2.2-1 shows major work items.

Among those, it shall be studied on the work items carrying out by man-power or rented machines because of the low performance of aging equipment or lack of number. And the equipment plan shall be prepared to be possible carrying out effective work by CESTE’s owned equipment.

Present placement of the equipment isn’t permanent. The head office of CESTE has prepared the equipment plan every year corresponding with the works, and each machine is placed in each canton office based on that plan. In this project, number of machines at field survey of the study are listed by each canton office and necessary number of each machine shall be decided.

Table 2.2.2-1 Major Items for Road Maintenance Work

Season	Road Maintenance Works
Summer Season	• Road Patrol Management in Summer Season regular patrol, extra patrol
	• Road Maintenance cleaning (manpower, machine), obstacle removal (manpower, machine), pothole patching, overlay, pavement milling, crack sealing, repair of gravel road (manpower, machine)
	• Shoulder Maintenance obstacle removal, maintenance work (manpower, machine), re-gravelling, shoulder & outside repair, repair of guard fence, cleaning (manpower)
	• Drainage Maintenance side ditch cleaning (manpower, machine), V-ditch cleaning(manpower, machine) pipe cleaning, ditch repair, V-ditch repair, pipe leveling, pipe repair
	• Road Sign Maintenance road sign repair and replacing , sign poll replacing, destination sign replacing, direction sign replacing
	• Road Marking Maintenance center line renewal, roadside line marking, pedestrian crossing / intersection marking, destination arrow marking, word painting
	• Road Facility Maintenance guardrail repair & replacing, guard fence repair & replacing, shoulder poll replacing, cat's eyes replacing, Km post replacing, shoulder block repair, shoulder block painting
	• Grass Cutting, Clipping Grass cutting (manpower, machine), timber clipping (manpower, machine)
	• Bridge Maintenance cleaning, anticorrosive painting
	• Tunnel Maintenance side wall cleaning
	• Slope Maintenance drainage pipe cleaning at concrete wall, concrete wall repair, masonry wall repair, slope repair
Winter Season	• Road Patrol Management in winter season Regular patrol, extra patrol during snow
	• Removal Snow・Anti-freezing snow removal & spreading anti-freezing by dump truck, snow removal by rotary blower with multi purpose vehicle, snow removal by wheel loader, snow removal and icing stripping by motor grader
Emergency	• Recovery at Disaster or Hazard Recovery work at rock fall・mud slide, repair of guardrail, guard fence & road signs at hazard

(2) Plan of Equipment Type

As the results of the examination of the work items in Table 2.2.2-1, concerned maintenance works and necessary equipment for this project are shown in Table 2.2.2-2.

Table 2.2.2-2 Type of Equipment by Work Items

Scope of Works/Necessary Equipment	Purpose of Use
Road Maintenance (Road surface, shoulder)	
Motor Grader	Reshape of shoulder, re-gravelling
Dump Truck	Hauling materials
Asphalt Finisher	Spreading asphalt mixture
Asphalt Milling Machine	Milling pavement surface, shaving for anti-slip
Asphalt Sprayer	Spraying bitumen emulsion
Concrete Cutter	Cutting and trimming pavement
Multi Purpose Vehicle	Cleaning road surface, cutting grass
Wheel Backhoe	Obstacle removal, maintaining shoulder/outside of shoulder, reshape of slope
Backhoe Loader	Obstacle removal , maintaining shoulder/outside of shoulder
Vibration Roller (Tandem Type)	Compaction of asphalt mixture
Vibration Roller (Combined Type)	Compaction of asphalt mixture, compaction of gravel course
Tire Roller	Compaction of asphalt mixture
Wheel Loader	Obstacle removal, loading material on dump truck
Crack Filler	Repair of crack
Hydraulic Breaker	Reshaping slope
Road Facility Maintenance	
Wheel Backhoe	Maintaining shape and cleaning of ditch
Backhoe Loader	Maintaining shape and cleaning of ditch
Truck with Crane	Repair and replacement of road sign/guardrail, setting and replacement of guard net
Line Marker	Marking road sign
Pile Driver (Self-Propelled)	Install and replacement of post for road sign/ guardrail
Snow Removal・Anti-freezing	
Motor Grader	Removal of snow & icing surface
Dump Truck	Removal of new snow, spreading of anti-freezing
Multi Purpose Vehicle	Removal of deep snow, spreading of anti-freezing
Wheel Loader	Removal of accumulated snow at road side, loading anti-freezing
Recovery at Emergency	
Dump Truck	Hauling material
Backhoe	Removal of fallen rocks/mud
Backhoe Loader	Removal of fallen rocks/mud
Wheel Loader	Removal of fallen rocks/mud
Truck with Crane	Replacement of damaged facility
Pipe Driver (Self-Propelled)	Replacement of damaged facility
Hydraulic Breaker	Crushing fallen rocks
Common Element	
Truck	Hauling material and labor
Mobile Work Shop	Repair work at site

(3) Plan of Equipment Specifications

The Specifications of equipment were examined in consideration of the following factors:

① The specifications of owned equipment

② Populating of equipment in B&H

③ The standard specifications of the maintenance work

The results of the examination are shown in Table 2.2.2-3.

Table 2.2.2-3 Basic Specifications of Equipment

Equipment	Work Contents Reasons of Selection	Basic Specifications
Motor Grader	Reshaping gravel road, Removing snow & icing road surface Road width of one lane is 3.5m. Front blade for removal of icing road surface	Attached Front Blade (3.7m length class)
Dump Truck	• In summer: Hauling material, emergency use • In winter: Removing snow with attached snow plough, soil spreader • Max loading capacity is more than 14t, due to mounted spreader on the deck (weight of unit: 1.5t, hopper cap. 6m^3, tank cap. 2.6ℓ) Diesel engine, equivalent of EURO 3, cold district correspondence, Driving system: more than 4WD, PTO for plough & spreader on front and deck	• Max loading: 14t class • 4WD • PTO (front, deck)
Snow Plough for Dump Truck	Removing new snow Mountable on a dump truck, blade length: 3～4m	• Blade length: 3～4m
Soil Spreader (1)	Spreading anti-freezing Mountable on the deck, maximum size for spreading wide range, wet type system for quick effect (with liquid tank)	• Hopper Capacity: 6m^3 • Liquid tank: 2m^3
Asphalt Finisher	Spreading and leveling asphalt mixture (overlay) Paving width: 1～2m Max. width: 3m with attached unit	Paving width: 1～2m (Max. 3m)
Asphalt Milling Machine (1)	Milling pavement surface for overlay Milling width: 1m (size of existing pothole), Milling depth ≧ 200mm (thickness of asphalt pavement: 150mm + 50mm)	Milling width: 1m Milling depth≧200mm
Asphalt Milling Machine (2)	Milling of pavement surface for anti-slip Milling width: 2m (work efficiency), Milling depth ≧ 200mm (thickness of asphalt pavement: 150mm + 50mm)	Milling width: 1m Milling depth≧200mm
Asphalt Sprayer	Spraying asphalt emulsion Compact type, self-sanction pump (for pothole repair)	• Asphalt emulsion • Compact type • Self-sanction pump

Equipment	Work Contents Reasons of Selection	Basic Specifications
Truck	Hauling material and labor Mounted tools on the truck: Cleaning kit, scythe, shovel, bitumen, water tank (500ℓ), total loading capacity is 800kg, Vehicle weight≦2t, Seating capacity: 4～5 persons, Engine type: diesel, equivalent EURO 3, cold district correspondence, Driving system: 4 x 4	• Loading capacity: 800kg • 4WD • Seating capacity≧5
Concrete Cutter	Cutting pavement at patching work of pothole and overlay work Cutting depth ≧150mm	Maximum cutting depth ≧150mm
Multi Purpose Vehicles	In summer: Cutting grass on shoulder In Winter: Removing snow, spreading anti- freezing Attachment at front and rear, PTO mounted, 4 x 4 driving system for snow road	• PTO (front, deck) • 4 x 4 drive system
Rotary Snow Blower for Multi Purpose Vehicle	Removing deep snow on the shoulder Able to attach with a Multi Purpose Vehicle, Rotary width is 2m taking account of works on shoulder etc.	• Rotary system • Rotary width: 2m
Soil Spreader (2)	Spreading anti-freezing Able to attach with a Multi Purpose Vehicle, Tank Volume is a standard size for a Multi Purpose Vehicle, Wet type is recommended for efficient work (liquid tank attached)	• Hopper capacity: $2m^3$ • Liquid tank: $1m^3$
Grass Cutter for Multi Purpose Vehicle	Cutting grass on shoulder Able to attach with a Multi Purpose Vehicle, Front arm type for cutting grass at outside of guardrail, Cutting width is 1m	• Cutting width: 1m • Front arm type
Wheel Backhoe	Protection work for rock fall (removing unstable rock), reshaping slope, cleaning mud in V type ditch, emergency work High mobility, maximum size in wheel type (Bucket capacity): $0.8m^3$, Hydraulic port for breaker	• Bucket capacity: $0.8m^3$ • Hydraulic port attached for breaker
Hydraulic Breaker for Backhoe	Protection work for rock fall (Removing unstable rock), reshaping slope, emergency work More than 1,000kg weight adjustable to Backhoe	Unit weight≧1,000kg
Backhoe Loader	Removing obstacle on shoulder, removing fallen rock and mud, mixing and loading anti-freezing Common and popular size of Backhoe bucket ($0.2m^3$) and Loader bucket ($1m^3$)	• Backhoe Bucket capacity≧$0.2m^3$) • Loader bucket capacity ≧$1m^3$
Vibration Roller (Combined Type)	Compaction of asphalt mixture (overlay), compaction of gravel course Operation weight (3t class) is suitable for milling width (1m) at overlay work	• Operation weight: 3t class
Vibration Roller (Tandem Type)	Compaction of asphalt mixture (pothole work) Operation weight (1～2t class) is suitable for working width for pothole (0.6～1.0m)	• Operation weight: 1～2t class
Wheel Loader	Loading fallen mud, loading material, emergency work, snow removal and loading anti-freezing Bucket capacity ($2m^3$ class) is suitable for existing equipment and is good for working range of loading anti-freezing	• Bucket capacity: $2m^3$ class

Equipment	Work Contents / Reasons of Selection	Basic Specifications
Truck with Crane	Hauling and setting guardrail and protection net for fallen rock Loading capacity (4t class) is suitable for existing equipment and material, amounted crane (2.8t class) is necessary for loading and unloading	• Maximum loading capacity: 4t class • Maximum lifting capacity: 2.8t
Line Marker	Marking centerline and side line Overall width is less than 2m in considering of work in mountain area, type of paint is cold type	• Overall width≦2mm • Cold paint type
Pile Driver (Self-Propelled)	Installing guardrail and setting guard fence Self-propelled type is suitable for series work (more than 10m), size of pile is more than 100mm, pressing length is more than 1m	• Self-Propelled Type • Size of pile≧100mm • Pressing length≧1m
Crack Filler	Filling asphalt in crack on road surface Simple and compact type is easy for handling at sporadic crack, the function of equipment is only heating and filling	• Compact type • With heater
Mobile Workshop Truck	Repair work at field site Loading capacity (3～4t class) is suitable for the amount of tool and material for repair work, hanging device is necessary for removing parts, 4 x 4 driving system is necessary in winter	• Loading capacity: 3～4t class • 4 x 4 drive system • Hanging device • Tool and equipment amounted

(4) Plan of Necessary Number of Equipment

The necessary number of equipment for each work item was examined and the number of owned equipment by CESTE was compared with necessary number. Then the insufficient number of each equipment was obtained. Also the Project considered the formation of working team for each work item. The Project determined the necessary number of equipment based on the number of owned equipment in each canton office so far.

1) Overlay with milling work

Overlay with milling work is done for resurfacing of the pavement at heavily cracked segment, deeply rutted portion and unevenly repaired pothole patching on the pavement road, total 1,284 km in length for 5 cantons. Existing pavement has aged but overlay work hasn't carried out enough. Presently overlay with milling work has carried out by 1 party. The work is postponed by the equipment lack such as the use on the other work and the time loss to mobilize other canton. The insufficient maintenance has deteriorated the pavement. To correspond the necessary repair work volume, this project plans work formation by 2 parties. The equipment formation will be placed at Mostar office for the southern area and Livno office for the northern area basically and will be mobilized to each canton in accordance with work schedule of annual work plan. And compact asphalt sprayer is planned to introduce for the required quality by even spreading of bitumen which is carried out manually with handy tool at present.

Equipment	Number			Remarks
	use	own	need	
Asphalt Finisher	2	1	1	
Asphalt Milling Machine	2	1	1	milling width 1 meter
Asphalt Sprayer	2	0	2	
Concrete Cutter *	2	1	1	
Vibration Roller	2	1	1	combined type
Truck	4	2	2	transport of material, tools, etc.

*) number of owned is total 7 units but remaining 6 units are considered in pothole repair

2) Pothole repair

The system of pothole repair is corresponded by each canton as the existence of pothole is recognized during the patrol carried out by each canton office and repaired by them temporally and finally. Presently each canton office has 1 formation, only Livno office has 2 formation, for the complete repair. Some canton offices are not able to meet the required work volume, so it is observed remaining the temporal repair portion. To maintain properly all paved roads, 1,284 km in length, it is required to increase the parties of pothole repair. Based on the road length of each canton, this project plans the placement of repair parties as shown below.

Canton	Office	Road Length	Party
Posavina	Orasje	88 km	1
Central Bosnia	Kiseljak	178 km	2
Herzegovina Neretva	Mostar	304 km	2
West Herzegovina	Grude	211 km	2
Herzeg Bosna	Livno	503 km	3

Therefore this project plans to procure insufficient equipment to formulate 10 parties.

As the same with overlay, the compact asphalt sprayer is planned to introduce for the required quality by even spreading of bitumen which is carried out manually with handy tool at present. Filling work of crack is quite important to prevent the pothole. This work is carried out manually at present and the required work volume is not able to complete due to the low work efficiency. By this reason this project plans to introduce a crack filler at each canton.

Equipment	Number			Remarks
	use	own	need	
Asphalt Sprayer	10	0	10	
Concrete Cutter *	10	6	4	
Vibration Roller	10	6	4	tandem type
Truck	10	6	4	transport of material, tools
Crack Filler	5	0	5	

*) refer to overlay with milling work

3) Milling work for anti-slip

In B&H the aggregate of the asphalt concrete is usually used calcareous stone which is worn easily. Surface of the pavement becomes slippery due to the abrasion of aggregate. So it is necessary the anti-slip treatment to put striped pattern on the surface by milling work. Presently a milling machine for the overlay work, milling width 1 meter, is utilized. However this situation makes interrupt of overlay work to carry out the anti-slip treatment and affects on the other work. Actually conducted work volume is quite little at present. CESTE plans the work focused on danger section every few years such as curve and slope. The road width is generally more than 6 meter and machine which is milling width 2 meter is planned with consideration of work efficiency.

Equipment	Number			Remarks
	use	own	need	
Asphalt Milling Machine	1	0	1	milling width 2 meter
Truck	1	0	1	transport of safe tool, traffic man

4) Removing obstacle, maintaining ditch, mixing anti-freezing, etc.

A backhoe loader is utilized for multi purpose such as removing obstacle, repairing gravel road, maintaining shoulder, re-graveling shoulder, repairing road side, cleaning ditch, repairing ditch, adjusting drain pipe, repairing pipe culvert, repairing masonry wall, repairing side slope, mixing anti-freezing, loading material and so on. It is the most frequently used machine on the road maintenance work in B&H. It should be placed at each canton but aged machine placed at Mostar office was scrapped in 2004. Therefore insufficient 1 unit is planned to procure for placing at every cantons.

Equipment	Number			Remarks
	use	own	need	
Backhoe Loader	5	4	1	

5) Loading on dump track, removing snow on shoulder

A wheel loader is necessary machine for loading on dump truck and each canton office needs 1 unit at least. In Herzeg Bosna canton, maintaining road length is the longest with 698 km in length. 3 base point of Livno office are located at a distance and materials are stored in each base point. Therefore 1 unit in 4 cantons and 3 units in Herzeg Bosna canton then total 7 units are necessary. At present insufficient number is lent from private sector through a year and this project plans to replace them by owned machines.

Equipment	Number			Remarks
	use	own	need	
Wheel Loader	7	2	5	

6) Cleaning ditch, measure for falling rock, maintaining side slope

B&H has large mountainous terrain and there are many falling rock section due to the crumbly calcareous ground. The measure for falling rock is important subject to secure the safety road. To prevent the falling rock it is necessary removing loose stone and reshaping cut slope. And it becomes a factor to deteriorate pavement because accumulated fallen rock, which is frequently happening at small scale, at the shoulder and ditch disturbs surface drain. During winter spread sand for anti-slip is accumulated in the side ditch and it is necessary to clean it up. At present the work is not on schedule as insufficient machines are lent from private sector and machines are only available on leisure period of private company. Actually one machine works both cleaning ditch and maintaining slope so this project plans to place 1 unit each at every cantons

Equipment	Number			Remarks
	use	own	need	
Wheel Backhoe	5	1	4	with hydraulic breaker

7) Installation and replacement of guardrail

Old guardrail was fixed at lower height in accordance with standard of former Yugoslavia. It is considered unsafe and it is required to replace them in accordance with present standard. And there are many danger spots remaining without any guardrail on the regional roads. CESTE prepare the work plan with the policy that installation of guardrail is proceeded successively at important route and danger spot preferentially. Presently each canton office is lent a machine respectively from private sector. The necessary formation for the total work volume of CESTE in a year is 2 parties. Therefore this project plans to procure the insufficient equipment to formulate 2 parties.

The equipment formation will be placed at Mostar office for the southern area and Livno office for the northern area basically and will be mobilized to each canton in accordance with work schedule of annual work plan.

Equipment	Number			Remarks
	use	own	need	
Truck with Crane	2	0	2	
Pile Driver	2	0	2	self-propelled

8) Road marking

The paint of the road marking is scraped early due to the sand spread for anti-slip in winter season. For the 1,284 km of paved road it is necessary to paint centerline and sideline. Presently each canton office is lent a machine respectively from private sector but it is possible to complete the work by 1 party. Therefore this project plans to procure the equipment to formulate 1 party.

Equipment	Number			Remarks
	use	own	need	
Line Marker	1	0	1	
Truck	1	0	1	transport material, safe tool, etc.

9) Snow removal, spreading anti- freezing

According to the maintenance work regulation of MOTC, it is regulated to stand by snow removal formation in 24 hours between November 15 to March 15 in next year at base point where watch man, labor, equipment and communication system shall be placed. After stopped snow the stable traffic shall be secured within 5 hours and 8 hours in mountainous terrain. Stand-by level has 4 steps and it becomes level 1 on November 15. In case of snow, stand-by level goes up to level 2 or more. MOTC has prepared implementation program of the road maintenance in winter, and the program specifies the necessary number of equipment. According to the program the necessary number of motor grader, dump truck and multi purpose vehicle at stand-by level 1 are shown below respectively.

Canton (stand-by point)	Office	Motor Grader	Dump Truck	Multi Purpose Vehicle
Posavina (2)	Orasje	0	2	1
Central Bosnia (2)	Kiseljak	1	4	1
Herzegovina Neretva (3)	Mostar	1	6	0
West Herzegovina (2)	Grude	0	2	1
Herzeg Bosna (7)	Livno	2	12	1

This project plans to procure the insufficient number of equipment at stand-by level 1.

Equipment	Number			Remarks
	use	own	need	
Motor Grader	4	1	3	with front blade
Dump Truck	26	12	14	with snow plough, soil spreader
Multi Purpose Vehicle	4	2	2	with rotary blower, soil spreader

The above equipment shall utilize also during summer season.

Motor grader : flattening gravel road, reshaping shoulder, reshaping side ditch, etc.

Dump truck : transport of mud, soil, rock, aggregate, crushed gravel & asphalt concrete

Multi purpose vehicle : cutting grass & branch at road side, cleaning road & tunnel wall, etc.

10) Repair of equipment at site

In case the trouble of equipment mobilized to the site a mechanic from nearest base point is sent soon with the tools. The repair by the handy tools is limited and it is not able to correspond well in many case. When Broken machine can not transport to the base point, the

mechanic from maker agent is requested. It takes 2 to 7 days for the mobilization usually and parking machine becomes danger of the traffic. And it is reasonable and effective to introduce a mobile workshop compared with placement of maintenance facility, such as arc welder, gas welder compressor, etc., at every base points. Therefore this project plans to introduce minimum required 1 unit of mobile workshop to correspond the repair at the field.

Equipment	Number			Remarks
	use	own	need	
Mobile Workshop	1	0	1	with maintenance facility

The number of procurement for each equipment is shown in Table 2.2.2-4.

Table 2.2.2-4 Number of Equipment to be Procured

No.	Equipment	No. of Unit	No.		No. of Unit
1	Motor Grader	3	11	Vibration Roller	5
2	Dump Truck (with Snow Plough)	14	12	Wheel Loader	5
3	Asphalt Finisher	1	13	Truck with Crane	2
4	Asphalt Milling Machine	2	14	Line Marker	1
5	Asphalt Sprayer	12	15	Pile Driver (Self-Propelled)	2
6	Truck	8	16	Crack Filler	5
7	Concrete Cutter	5	17	Mobile Workshop Truck	1
8	Multi Purpose Vehicle	2			
9	Wheel Backhoe (with Hydraulic Breaker)	4			
10	Backhoe Loader	1			

(5) Spare Parts

Most of the European equipment maker have agents in B&H or neighbor countries. CESTE procures spare parts and consumables from those agents now to maintain equipment. Service agents for Japanese equipment procured under the Project also shall be prepared around B&H to supply spare parts and consumables.

CESTE has adequate amount of budget for procurement of spare parts and consumables so far. The head office of CESTE makes order to the agent according to the request of parts. It isn’t happened the situation suspended the repair due to the lack of parts. Therefore It is possible that CESTE by itself procures the parts for equipment under the project. The procurement plan of the Project will be formulated by equipment body excluding spare parts and consumables.

2.2.3 BASIC DESIGN

Taking into account the basic specifications of the equipment indicated in the preceding sections, the detailed specifications of each equipment was studied on the basis of the catalogs and specifications issued by the equipment makers, and its result, which is the required details for the tender(s) level, have prepared in another volume. The summaries of the specifications are indicated in Table 2.2.3-1.

Table 2.2.3-1 (1/7) Specifications for Equipment

MOTOR GRADER			TIPPER TRUCK			ASPHALT FINISHER		
Engine Output	kW	≧100	Engine Output	kW	≧270	Engine Output	kW	≧25
Operation Weight	kg	≧11,000	Weight			Operation Weight	kg	≧4,500
Dimensions			・Max. Loading Capacity	kg	≧14,000	Dimensions (transportation)		
・Overall Length	mm	≦9,500	・Vehicle Weight	kg	≧7,500	・Overall Length	mm	≦6,500
・Overall Width (excl. blade)	mm	≦2,600	・Gross Vehicle Weight	kg	≧21,500	・Overall Width	mm	≦2,600
・Overall Height (excl. cabin	mm	≦3,300	Dimensions			・Overall Height	mm	≦3,700
・Blade			・Overall Length	mm	≦8,200	Running Gear		
Length	mm	≧3,700	・Overall Width	mm	≦2,600	・Type		Crawler
Height	mm	≧600	・Overall Height	mm	≦3,400	Performance		
・Min. Road Clearance	mm	≧350	・Wheel Base	mm	≧3,200	・Max. Paving Speed	m/min	≧15
・Wheel Base	mm	≧5,500	Performance			・Hopper Capacity	ton	≧3.0
Performance			・Max. Travel Speed	km/h	≧85	Working Range		
・Max. Travel Speed			・Min. Turning Radius	mm	≦9,000	・Standard Paving Width	mm	≦2,000
Forward－Reverse	km/h	≧40-35	・Climbing Ability	deg	≧20	・Max. Paving Width	mm	≧1,800
・Min. Turning Radius	mm	≦7,300	Engine			(with attachment)	mm	≧2,800
・Forward Oscillation	deg	≧14	・Type		Water Cooled Diesel	・Max. Paving Thickness	mm	≧150
・Blade			・Displacement	cc	≧11,000	Engine		
Max. Lift	mm	≧440	・Battery		Cold district correspondence	・Type		Diesel
・Articulation	deg	≧25	Power Line			・Displacement	cc	≧2,000
Engine			・Transmission		≧12	Feeder		
・Type		Water Cooled Diesel	・Driving System		6×4	・Max. Speed	m/min	≧15
・Displacement	cc	≧6,000	PTO		Front , Deck	Spreader		
・Battery		Cold district correspondence	Tire			・Max. Revolution	rpm	≧50
Tire			・Size		≧11-R22.5	Screed		
・Size		13-R24以上	・Quantity (excl. spares)	pcs.	10	・Max. Vibrating Frequency	Hz	≧50
Cabin		Steel Cabin	Deck		W/Side gate and Tail gate	Heating System		LPG or Electric
Optional Items			Attachment			Accessories		
・Tire Chain		Heavy-duty Non-skid Chain	・Snow Plough			・Canopy		Equipped
・Front Blade		Equipped	Width	mm	≧3,400	Others		
・Heater		Cabin Heater	・Salt Spreader			・Emission Control Level		≧equivqlent Stage II
・Revolving Light / Flasher	pcs.	1	Hopper Capacity	m^3	≧5.8			
Others			Liquid Tank Capacity	ℓ	≧2,000			
・Emission Control Level		≧equivqlent Stage II	Control Panel and Display in the Cockpit					
			Optional Items					
			・Tire Chain		Non-skid Chain			
			・Windows with Heating Elements		Equipped			
			(Front window, Rear window, Side mirror)					
			・Defroster (Front, Side)		Equipped			
			・Revolving Light / Flasher	pcs.	2			
			Others					
			・Emission Control Level		≧equivqlent Euro3			

Table 2.2.3-1 (2/7) Specifications for Equipment

ASPHALT MILLING MACHINE (1)			ASPHALT MILLING MACHINE (2)			ASPHALT SPRAYER		
Engine Output	kW	≧120	Engine Output	kW	≧300	Engine Output	kW	≧2.0
Operation Weight	kg	≧13,000	Operation Weight	kg	≧25,000	Dimensions		
Dimensions (transportation)			Dimensions (transportation)			・Overall Length	mm	≦3,000
・Overall Length	mm	≦8,500	・Overall Length	mm	≦11,000	・Overall Width	mm	≦1,800
・Overall Width	mm	≦2,500	・Overall Width	mm	≦2,600	・Overall Height	mm	≦1,200
・Overall Height	mm	≦3,000	・Overall Height	mm	≦3,300	Performance		
Running Gear			Running Gear			・Discharge Rate	ℓ/min	≧15
・Type		Tire or Crawler	・Type		Tire or Crawler	・Spray Pump		Self-suction pump
Performance			Performance			・Tank		Nothing (delivering can)
・Traveling Speed	km/h	≧5.0	・Traveling Speed	km/h	≧4.0	Engine		
・Max. Working Speed	m/min	≧25	・Max. Working Speed	m/min	≧25	・Type		Gasoline or Diesel
Working Range			Working Range			・Displacement	cc	≧100
・Cutting Width	mm	≧1,000	・Cutting Width	mm	≧2,000	Tire		
・Max. Cutting Depth	mm	≧150	・Max. Cutting Depth	mm	≧200	・Quantity	pcs.	≧2
Engine			Engine			Accessories		
・Type		Diesel	・Type		Diesel	・Spray Hose		
・Displacement	cc	≧5,500	・Displacement	cc	≧14,800	Dia.×Length	mm	≧13×4,000
Milling Machine			Milling Machine			Quantity	pcs.	≧2
・Number of Cutting Bits	pcs.	≧80	・Number of Cutting Bits	pcs.	≧140	・Spray Bar		
Conveyor			Conveyor			Dia.×Length	mm	≧13×1,600
・Belt Discharge Height	m	≧3.8	・Belt Discharge Height	m	≧4.2	Quantity	pcs.	≧2
Accessories			Accessories			・Spray Nozzle		
・Cutting Bits	set	≧2	・Cutting Bits	set	≧2	Quantity	pcs.	≧4
Others			Others			Others		
・Emission Control Level		≧equivqlent Stage II	・Emission Control Level		≧equivqlent Stage II	・Spray Agent		Asphalt Emulsion
						・Emission Control Level		≧equivqlent Stage I

Table 2.2.3-1 (3/7) Specifications for Equipment

PICKUP TRUCK		
Engine Output	kW	≧100
Weight		
・Max. Loading Capacity	kg	≧800
・Vehicle Weight	kg	≧1,700
・Gross Vehicle Weight	kg	≧2,700
Dimensions		
・Overall Length	mm	≦5,300
・Overall Width	mm	≦1,900
・Overall Height	mm	≦1,900
・Wheel Base	mm	≧2,300
Performance		
・Max. Travel Speed	km/h	≧140
・Min. Turning Radius	mm	≦7,000
Engine		
・Type		Diesel
・Displacement	cc	≧2,400
・Battery		Cold district correspondence
Power Line		
・Transmission		≧5
・Driving System		4×4
Tire		
・Size		≧215/70 R15
・Quantity (excl. spares)	pcs.	4
Seating Capacity	person	≧5
Optional Items		
・Tire Chain		Non-skid Chain
・Revolving Light / Flasher	pcs.	1
Others		
・Emission Control Level		≧equivqlent Euro3

CONCRETE CUTTER		
Engine Output	kW	≧7.0
Operation Weight	kg	≧90
Dimensions		
・Overall Length	mm	≦1,900
・Overall Width	mm	≦620
・Overall Height	mm	≦1,100
Performance		
・Cutter Blade Dia	mm	≧400
・Max. Cutting Depth	mm	≧150
Engine		
・Type		Air Cooling Gasoline
・Displacement	cc	≧300
Accessories		
・Cutter Blade	pcs.	≧3
Others		
・Emission Control Level		≧equivqlent Stage I

MULTI PURPOSE VEHICLE		
Engine Output	kW	≧130
Weight		
・Max. Loading Capacity	kg	≧5,800
・Vehicle Weight	kg	≧5,400
・Gross Vehicle Weight	kg	≧11,000
Dimensions		
・Overall Length	mm	≦8,000
・Overall Width	mm	≦2,600
・Overall Height	mm	≦3,400
・Wheel Base	mm	≧3,200
Performance		
・Max. Travel Speed	km/h	≧80
・Min. Turning Radius	mm	≦8,500
・Climbing Ability	deg	≧35
Engine		
・Type		Diesel
・Displacement	cc	≧4,200
・Battery		Cold district correspondence
Power Line		
・Transmission		≧F9-R1
・Driving System		4×4
PTO		Front , Deck
Tire		
・Size		≧80 R20
・Quantity (excl. spares)	pcs.	
Attachment		
・Rotary Snow Blower		
Dia. of Rotary Scraper	mm	≧750
Projection Distance	m	≧15
・Salt Spreader		
Hopper Capacity	m^3	≧2.0
Liquid Tank Capacity	ℓ	≧800
Control Panel and Display in the Cockpit		
・Glass Cutter		
Cutting Width	mm	≧1,000
Type		Front Arm Type
Optional Items		
・Tire Chain		Heavy-duty Non-skid Chain
・Revolving Light / Flasher	pcs.	2
Others		
・Emission Control Level		≧equivqlent Euro3

Table 2.2.3-1 (4/7) Specifications for Equipment

WHEEL BACKHOE		
Engine Output	kW	≧100
Operation Weight	kg	≧18,000
Dimensions		
・Overall Length	mm	≦9,800
・Overall Width	mm	≦2,600
・Overall Height	mm	≦4,000
・Min. Road Clearance	mm	≧300
Performance		
・Max. Travel Speed	km/h	≧30
・Tail Swing Radius	mm	≦3,300
・Swing Speed	rpm	≧8.0
・Max. Digging Force	kN	≧100
Working Range		
・Max. Digging Depth	mm	≧5,300
・Max. Dumping Height	mm	≧6,000
・Max. Vertical Wall Digging Depth	mm	≧4,000
・Max. Digging Height	mm	≧8,800
・Max. Digging Reach	mm	≧9,000
Engine		
・Type		Water Cooled Diesel
・Displacement	cc	≧5,500
・Battery		Cold district correspondence
Hydraulic Unit		
・Pomp Flow ×Qty.	ℓ/min	≧340
Tire		
・Size		≧10-R20
・Quantity (excl. spares)	pcs.	4
Bucket		
・Capacity (heaped)	m^3	≧0.8
・Bucket Width	mm	≧1,000
Attachment		
・Hydraulic Breaker	kg	≧1,000
Optional Items		
・Tire Chain		Heavy-duty Non-skid Chain
・Heater		Cabin Heater
・Breaker Hydraulic Port	set	1
・Slope Bucket	pcs.	1
・Revolving Light / Flasher	pcs.	1
Others		
・Emission Control Level		≧equivqlent Stage II

BACKHOE LOADER		
Engine Output	kW	≧65
Operation Weight	kg	≧7,000
Dimensions		
・Overall Length	mm	≦6,200
・Overall Width	mm	≦2,600
・Overall Height	mm	≦3,800
・Min. Road Clearance	mm	≧350
Performance		
・Max. Travel Speed	km/h	≧35
・Max. Digging Force	kN	≧55
Working Range (Backhoe)		
・Max. Digging Depth	mm	≧4,200
・Max. Dumping Height	mm	≧4,000
Working Range (Loader)		
・Max. Dumping Reach	mm	≧700
・Max. Dumping Height	mm	≧2,600
Engine		
・Type		Water Cooled Diesel
・Displacement	cc	≧4,000
・Battery		Cold district correspondence
Hydraulic Unit		
・Pomp Flow ×Qty.	ℓ/min	≧150
Tire		
・Size	Front	≧70 R18
	Rear	≧70 R18
・Quantity (excl. spares)	pcs.	4
Backhoe Bucket		
・Capacity (heaped)	m^3	≧0.2
・Bucket Width	mm	≧580
Loader Bucket		
・Capacity (heaped)	m^3	≧1.0
・Bucket Width	mm	≧2,280
Cabin		Steel Cabin
Optional Items		
・Tire Chain		Heavy-duty Non-skid Chain
・Heater		Cabin Heater
Others		
・Emission Control Level		≧equivqlent Stage II

VIBRATION ROLLER (Combined Type)		
Engine Output	kW	≧19
Operation Weight	kg	≧2,600
Dimensions		
・Overall Length	mm	≦2,900
・Overall Width	mm	≦1,400
・Overall Height	mm	≦2,800
・Wheel Base	mm	≧1,700
Performance		
・Max. Running Speed	km/h	≧8
・Min. Turning Radius	mm	≦3,900
・Compacting Width	mm	≧1,100
・Vibration Frequency	Hz	≧50
・Centrifugal Force	kN	≧20
Engine		
・Type		Diesel
・Displacement	cc	≧1,400
・Battery		Cold district correspondence
Running Gear		
・Roller (Front)		
Type		Steel
Dia.	mm	≧650
Width	mm	≧1,100
・Tire (Rear)		
Type		Smooth
Size		≧60 R15
Quantity	pcs.	4
Others		
・Emission Control Level		≧equivqlent Stage II

Table 2.2.3-1 (5/7) Specifications for Equipment

VIBRATION ROLLER (Tandem Type)			WHEEL LOADER			TRUCK WITH CRANE		
Engine Output	kW	≧12	Engine Output	kW	≧90	Engine Output	kW	≧150
Operation Weight	kg	≧1,400	Operation Weight	kg	≧9,400	Weight		
Dimensions			Dimensions			・Max. Loading Capacity	kg	≧4,000
・Overall Length	mm	≦2,200	・Overall Length	mm	≦7,300	・Vehicle Weight	kg	≧6,800
・Overall Width	mm	≦1,200	・Overall Width	mm	≦2,500	・Gross Vehicle Weight	kg	≧10,800
・Overall Height	mm	≦2,600	・Overall Height	mm	≦3,300	Dimensions		
・Wheel Base	mm	≧1,300	・Min. Road Clearance	mm	≧380	・Overall Length	mm	≦9,500
Performance			・Wheel Base	mm	≧2,800	・Overall Width	mm	≦2,600
・Max. Running Speed	km/h	≧8	Performance			・Overall Height	mm	≦3,200
・Min. Turning Radius	mm	≦3,300	・Max. Running Speed			・Wheel Base	mm	≧4,000
・Compacting Width	mm	≧800	Forward－Reverse	km/h	≧30－24	Performance		
・Vibration Frequency	Hz	≧60	・Min. Turning Radius	mm	≦5,500	・Max. Running Speed	km/h	≧80
・Centrifugal Force	kN	≧17	・Max. Digging Force	kN	≧85	・Min. Turning Radius	mm	≦9,000
Engine			Working Range			Engine		
・Type		Diesel	・Dump Clearance	mm	≧2,700	・Type		Water Cooled Diesel
・Displacement	cc	≧700	・Dump Reach	mm	≧900	・Displacement	cc	≧3,900
・Battery		Cold district correspondence	・Max. Digging Depth	mm	≧300	・Battery		Cold district correspondence
Running Gear			Engine			Power Line		
・Roller (Front)			・Type		Water Cooled Diesel	・Transmission		≧F6-R1
Type		Steel	・Displacement	cc	≧5,500	Tire		
Dia.	mm	≧540	・Battery		Cold district correspondence	・Size		≧70 R19.0
Width	mm	≧800	Tire			・Quantity (excl. spares)	pcs.	6
Quantity	pcs.	1	・Size		≧17.5-R25	Performance of Crane		
・Roller (Rear)			Bucket			・Max. Lifting Capacity	tm	≧4.0
Type		Steel	・Type		General Purpose Buckets	・Horizontal Working Range	mm	≧5,000
Dia.	mm	≧540	・Capacity (heaped)	m^3	≧2.0	・Vertical Working Range	mm	≧7,800
Width	mm	≧800	Cabin		Steel Cabin	・Swing Range	deg	≧360
Quantity	pcs.	1	Optional Items			Optional Items		
Others			・Tire Chain		Heavy-duty Non-skid Chain	・Tire Chain		Non-skid Chain
・Emission Control Level		≧equivqlent Stage II	・Heater		Cabin Heater	・Revolving Light / Flasher	pcs.	1
			・Revolving Light / Flasher	pcs.	1	Others		
			Others			・Emission Control Level		≧equivqlent Euro3
			・Emission Control Level		≧equivqlent Stage II			

Table 2.2.3-1 (6/7) Specifications for Equipment

LINE MARKER		
Engine Output	kW	≧15
Dimensions		
・Overall Length	mm	≦4,000
・Overall Width	mm	≦1,800
・Overall Height	mm	≦2,500
Performance		
・Discharge Rate	ℓ/min	≧6
・Painting Width	mm	100～300
・Tank Capacity	ℓ	≦450
・Number of Tanks	pcs.	1
・Standard Working Speed	km/h	≧8
・Type of Paint		Cold
Engine		
・Type		Diesel
・Displacement	cc	≧900
Compressor		
・Type		Cylinder or Screw
・Discharge Rate	m^3/min	≧0.3
・Discharge Pressure	MPa	≧6
Running Gear		
・Tire		
Size		≧5.0－R8
Quantity	pcs.	4
Optional Items		
・Revolving Light / Flasher	pcs.	1
Accessories		
・Spray Hose	pcs.	≧2
Others		
・Emission Control Level		≧equivqlent Stage Ⅱ

PILE DRIVER (Self-Propelled)		
Engine Output	kW	≧25
Operation Weight	kg	≧2,600
Dimensions		
・Overall Length	mm	≦2,500
・Overall Width	mm	≦3,000
・Overall Height	mm	≦2,800
Performance		
・Size of Pile	mm	≧100
・Pressing Length	mm	≧1、600
・Pressing Force	MPa	≧12
・Running Speed	km/h	≧2
Engine		
・Type		Diesel
・Displacement	cc	≧1,500
Running Gear		
・Tire		Crawler
Optional Items		
・Revolving Light / Flasher	pcs.	1
Others		
・Emission Control Level		≧equivqlent Stage Ⅱ

CRACK FILLER		
Engine Output	kW	≧2
Dimensions		
・Overall Length	mm	≦1,600
・Overall Width	mm	≦900
・Overall Height	mm	≦1,200
Performance		
・Discharge Rate	ℓ/min	≧2
・Tank Capacity	ℓ	≦200
Engine		
・Type		Gasoline
・Displacement		≧100
Burner		
・Fuel		LPG
Running Gear		
・Tire		
Quantity	pcs.	≧2
Accessories		
・Filling Hose		
Dia.×Length	mm	≧19×3,000
Quantity	pcs.	≧3
・Filling Bar／Nozzle		
Dia.×Length	mm	≧19×1,000
Quantity	pcs.	≧3
・Filling Nozzle		
Quantity	pcs.	≧3
Others		
・Emission Control Level		≧equivqlent Stage Ⅰ

Table 2.2.3-1 (7/7) Specifications for Equipment

MOBILE WORKSHOP TRUCK			
Engine Output	kW	≧120	Tool and Equipment
Weight			・Arc welder / engine-generator ・Gas welder
・Max. Loading Capacity	kg	≧2,000	(including welding tools, face shield, protective gloves, carrier)
・Vehicle Weight	kg	≧6,000	・Compressor ・Workbench ・Measuring Instruments
・Gross Vehicle Weight	kg	≧8,000	・Repairing Tools (hand tools, electric tools)
Dimensions			・Tool cabinet ・Battery service equipment
・Overall Length	mm	≦7,500	・Portable power tools ・Manual drum pump
・Overall Width	mm	≦2,600	・Grease pump ・Grease gun ・Oil measure
・Overall Height	mm	≦3,900	・Portable hydraulic jack ・Lever block
・Wheel Base	mm	≧3,700	・Wire rope ・Nylon Sling ・Fire extinguisher
・Work Shop Room	mm	L×W×H	・Crane / Lift (≧1t)
		≧3,800×2,000×2,000	
Performance			
・Max. Travel Speed	km/h	≧80	
・Min. Turning Radius	mm	≦8,600	
・Climbing Ability	deg	≧20	
Engine			
・Type		Diesel	
・Displacement	cc	≧4,000	
・Battery		Cold district correspondence	
Power Line			
・Transmission		≧6+1	
・Driving System		4×4	
Tire			
・Size		≧R20	
・Quantity (excl. spares)	pcs.	≧4	
Optional Items			
・Tire Chain		Non-skid Chain	
・Revolving Light / Flasher	pcs.	1	
Others			
・Emission Control Level		≧equivqlent Euro3	

2.2.4 IMPLEMENTATION PLAN

2.2.4.1 Implementation Policy

(1) Project Implementing System

It is assumed that the Project implements with the system of Japan's Grant Aid. The Project shall proceed after the conclusion of Exchange of Note (E/N) by the concerned two Government. The responsible agency is the Federal Ministry of Transport and Communications (MOTC) and the Implementation agency is the CESTE d.d. Mostar (CESTE).

The Japanese consultant firm who is recommended by JICA to B&H side will conduct the services for detailed design, assisting tender and supervision of procurement based on the agreement with MOTC. The supplier, who is Japanese firm decided by the tender, will procure the equipment based on the contract with MOTC.

The overall relationship for the implementation of the Project is indicated in the Figure 2.2.4-1.

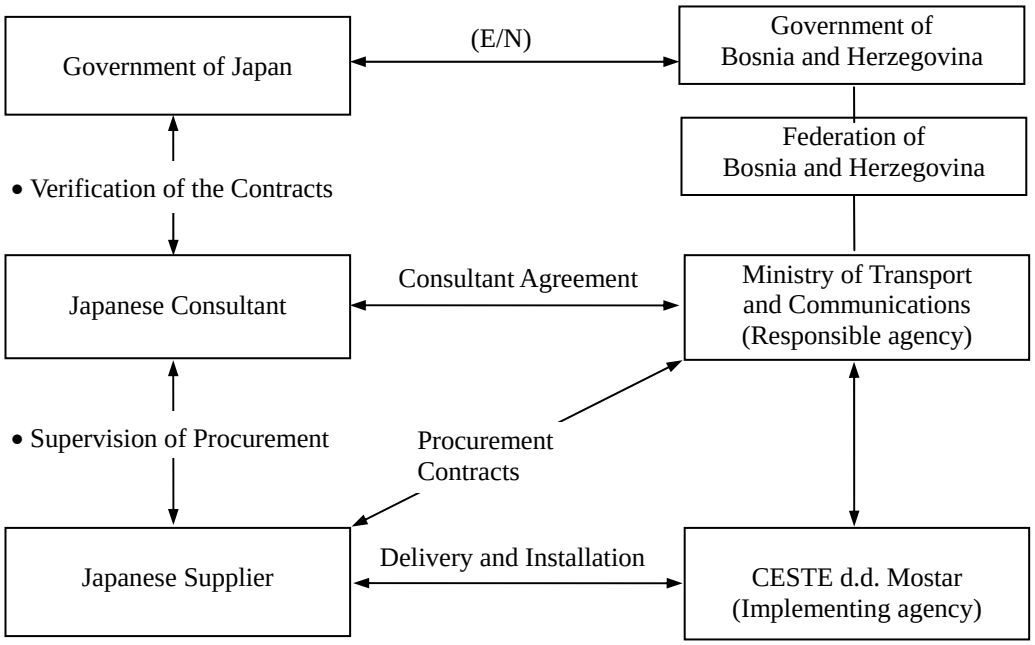


Figure 2.2.4-1 Overall Project Organization

(2) Consultant

After the signing of E/N, MOTC shall promptly conclude an agreement for the consulting services on the execution of this Project with a Japanese consulting firm. The consultant shall provide the engineering services on the detailed design, preparation of tender documents, assistance in tender, procurement supervision etc., and shall take a responsibility up to the turning over of the equipment.

(3) Supplier

The supplier, who qualified by the evaluation on the required quality and specifications through the general competitive bidding, will make a contract with MOTC for the procurement of the equipment of this Project. The Supplier shall take a responsibility for the honest execution of the delivery of the requested equipment on the schedule, the confirmation of assembling/running test and the provision of guidance for installation, operation and maintenance.

2.2.4.2 Implementation Conditions

(1) Customs Procedure

The following three transport methods are considered:

(i) by ship
(ii) self-propelled
(iii) by truck

It is very difficult to set up the entry point into B&H as various delivery routes will be chosen by the procured countries and transport modes. On the scheme of Japan's Grant Aid, customs clearance and tax exemption shall be obligation of B&H side. In case, the places of application of customs are dispersed, the process of customs clearance by B&H side become harder. The delivery site of the equipment will be at the Mostar base point. The consultant will lead the supplier that the customs clearance shall be conducted at the customs office of Mostar.

(2) Delivery Schedule

The initial operation and regular inspection before turnover will be conducted at the Mostar base point. After turnover, equipment will be forwarded to each canton office. Therefore, related staffs in each canton office have to trip to Mostar office to attend the guidance. It is afraid that the delivery time of each machine become irregular because of the differences of necessary period for manufacturing by the machine. The consultant will lead the supplier to

prepare the delivery schedule of equipment for adjusting the arrival period and to conduct smooth and efficient guidance for initial operation and inspection.

2.2.4.3 Scope of Works

Regarding inland transportation, it was studied on few points, i.e. there are only 4km distance form customs office in Mostar to the final destination of procured equipment, all procedure will be complete within a day according to a staff of customs office, unloading and transference are not necessary at customs by the deriver directly. Therefore, the cost of procurement of equipment including inland transportation is to be borne by the Japanese side. After delivery and turnover of the equipment at Mostar base point, the equipment will be forwarded to each canton offices which cost is to be borne by the B&H side. The equipment procured under this project is not required the installation work. Table 2.2.4-1 shows the demarcation of undertakings of both Governments.

Table 2.2.4-1 Undertaken of Both Governments

Item	Contents	Undertaken by		Remarks
		Japan	B&H	
Procurement of Equipment	Procurement	○		
	Land and Marine Transportation	○		Up to Customs
	Customs Clearance		○	
	Inland Transportation	○		Beyond Customs
Operation Guidance	Operation Guidance	○	○	
	Inspection Guidance	○	○	
Maintenance Work	Forwarding the equipment		○	to operating office
	To Secure Storage Place		○	
	To maintain Equipment		○	
	To maintain Road		○	

2.2.4.4 Consultant Supervision

After the signing of E/N, the Japanese consultant firm shall conclude the agreement for consulting services with MOTC based on the scope of works mentioned in E/N. The consultant will conduct detailed design and procurement supervision in consideration with the background of formulation of the project and the policy of the Basic Design Study.

(1) Detailed Design

- Discussion and confirmation with B&H side
- Review of equipment specifications
- Preparation of tender documents
- Explanation and approval by the B&H side on the tender documents
- Assistance for tendering (public announcement, provision of tender document, execution

of tender, evaluation of tender)

- Assistance for contract (negotiation, witness of contract, verification of contract)

(2) Procurement Supervision

- Confirmation of the issuance of order sheets for the equipment
- Carrying out a factory inspection
- Assignment of an inspection agency for a pre-shipment inspection
- Discussion and consultation with B&H side (delivery schedule, customs clearance, program of guidance etc.)
- Guidance of initial operation and inspection
- Final inspection and turnover

2.2.4.5 Procurement Plan

(1) Country of Origin

Under Japan's Grant Aid scheme, procured equipment shall be principally origin of Japan or recipient country. Based on the following reasons it is necessary to include third countries and Japan. The detail of proposed countries are mentioned in Section 2.2.1.

- The equipment for this project isn't manufactured in B&H.
- Some types of equipment for this project aren't manufactured in Japan.
- Some maker agents of Japanese manufacture do not exist their office in B&H.
- The transportation cost from Japan may be higher.
- European machinery is widely used in B&H compared with Japanese one and familiarized for operation and repair.
- B&H side wants the equipment of European brand taking into consideration of management and maintenance.

(2) Delivery Route

There are various routes, distance and transportation method depend on the location of factory of manufacturer.

Delivery routes for equipment from third countries are not fixed in the procurement plan due to the above reasons. So the quotation by CIP based was applied for the Project cost estimation. CIP means including the cost of packing, loading/unloading, transportation to the destination and insurance.

In case of Japanese products, the following routes were examined.

- Japan (by sea)→Polce Port of Croatia (by railway/road)→Delivery site of Mostar
  Polce Port of Croatia is the nearest international seaport from Mostar and connects with domestic major cities by railway network. 90% of the cargo of the port is trading cargo to/from B&H. The annual handling cargo volume of the port is around 3 million ton.

- Japan (by sea)→Koper Port of Slovenia (by railway/road)→Delivery site of Mostar
  Koper Port of Slovenia is the largest international seaport in former Yugoslavia and perform as the key station for Mideast and Eastern Europe. This port connects with other countries by railway and trunk roads network. The annual handling cargo volume of the port is over 12 million ton.

Polce Port handles bulk cargo like ore raw material which is 70% of whole cargo. The transport period will be longer for transshipment with small conventional ship at neighboring port due to no regular shipment to Polce Port from Japan. While, Koper Port is a multi purpose use and regularly handles disembarkation of vehicles. In addition, Koper Port has regular shipment from Japan, then it is easy to secure the shipment.

Regarding transportation method from the disembarkment port, railway transport has an advantage compared with road transport in case long range transportation. In this Project, the nearest Mostar railway station is not popularly utilized for cargo and there is no stevedoring facility, so the railway transport is not reliable method for this Project. The delivery of this Project will use the road transport to the delivery site of Mostar via Koper Port.

2.2.4.6 Quality Control Plan

To confirm the equipment which satisfies the technical specifications appointed in the contract with the supplier, the consultant will carry out the following inspections on each stage of the procurement of the equipment.

- Confirmation of the insurance of the order sheets for the equipment
- Carrying out a factory inspection
- Assignment of an inspection agency for a pre-shipment inspection
- Carrying out turnover inspection

2.2.4.7 Operational Guidance Plan

(1) Tuning-up and Trial Operation of Equipment

The supplier will dispatch an engineer(s) for tuning-up and trial operation of equipment at the timing of delivery to confirm the appropriate operation. The number of equipment type will be 17 kinds (25 kinds including attachments) and the number of makers will be many. In this project, it plans that one engineer will be in charge various types of equipment and total 2 engineers will be provided for the trial operation and initial guidance.

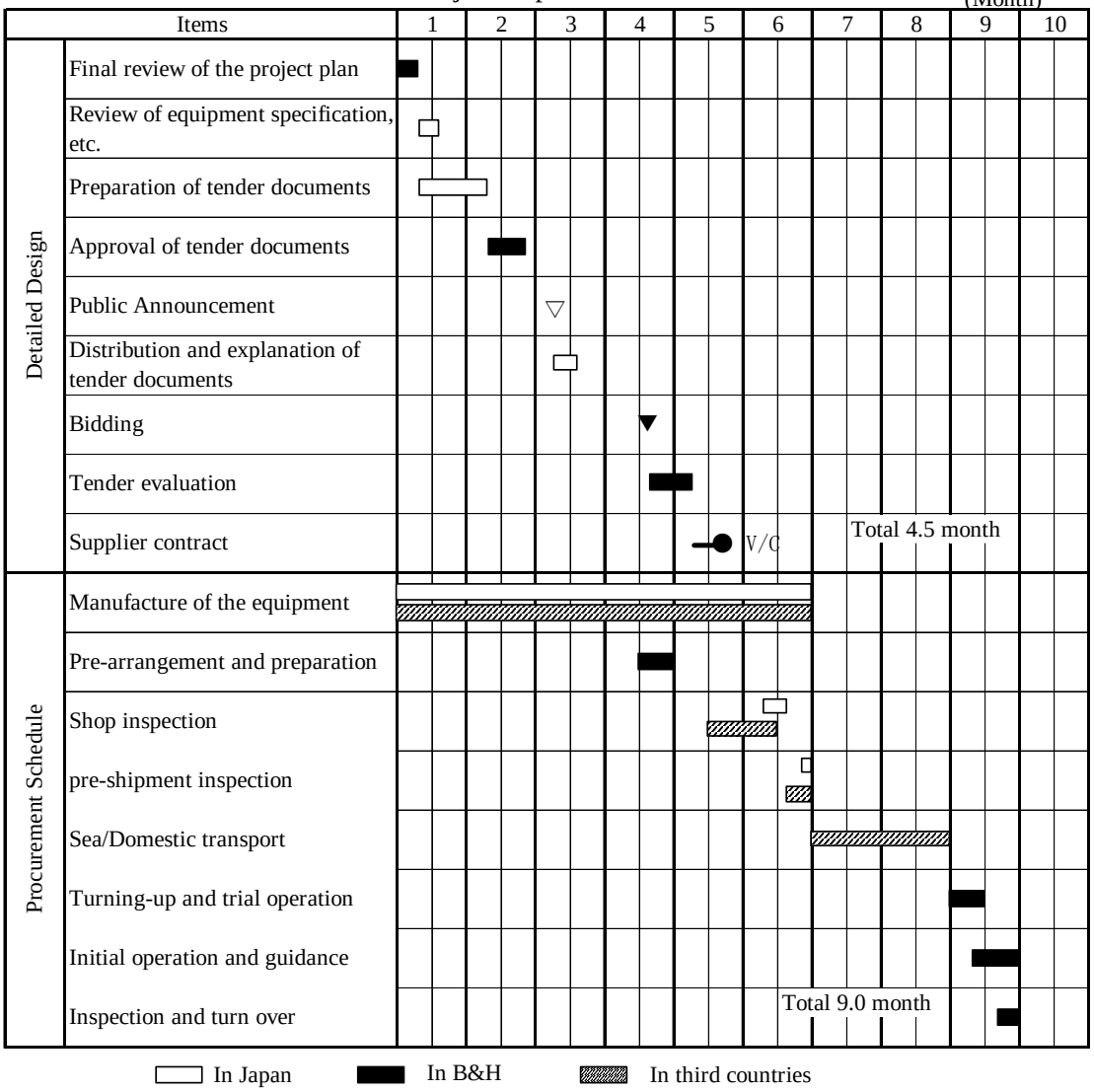
(2) The Execution Program for the Initial Operation Guidance

The initial operation guidance will provide for the technique of equipment operation and regular maintenance. CESTE has enough knowledge about the operation of general equipment of European brands. So this guidance will be emphasis on the typical points of each equipment at the operation and maintenance.

2.2.4.8 Implementation Schedule

Table 2.2.4-2 shows the implementation plans for the detailed design, tender and procurement up to turn over.

Table 2.2.4-2 Project Implementation Schedule



2.3 OBLIGATIONS OF RECIPIENT COUNTRY

The following necessary measures should be taken by the Government of B&H on the condition that the Grant Aid by the Government of Japan is extended to the Project:

- To bear commissions to the Japanese foreign exchange bank for its banking services, based upon the Banking Arrangement.
- To ensure prompt tax exemption and customs clearance to import the equipment under the Project.
- To ensure prompt forwarding the equipment to base point of each canton office from the delivery site.
- To secure land for parking of equipment at base point of each canton office.
- To ensure legal steps necessary for entry to and stay in B&H for Japanese nationals who will be engaged in the Project.
- To exempt Japanese nationals engaged in the Project from custom duties, internal taxes and other fiscal levies which may be imposed in B&H.
- To secure the necessary personnel and obligations at the execution of the guidance for initial operation and maintenance.
- To accomplish appropriate operation and maintenance of the procured equipment.
- To execute maintenance properly and effectively for the Project road.
- To bear all expenses, other than those covered by the Japan’s Grant Aid, necessary for the Project.

2.4 PROJECT OPERATION PLAN

(1) Maintenance System of Equipment

CESTE is the implementing agency of the Project and the headquarter has a responsibility of all owned equipment. The headquarter programs the assignment of equipment to each canton office in accordance with work items and work volume.

Actual work such as inspection, care and simple repair is conducted in main base point of each canton office. They have maintenance facilities and manage the work with record books of equipment. In case of the procurement of expensive parts or the necessary of a repair by maker agent, a canton office applies the permission to the headquarter. Under such system, the headquarter manages the equipment and each canton office inspects and maintains the equipment at present.

The equipment procured under this project also shall be placed at each canton office based on the equipment plan prepared by the headquarter and the maintenance shall be conducted by canton offices. With the consideration on the present situation, it will be possible to properly maintain the new equipment by the present system.

(2) Staffing Plan

Table 2.4-1 shows the number of staff in CESTE in March, 2006. Table 2.4-2 shows the additionally necessary number of staff for the equipment procured under the Project. But the major number of staff for the equipment is already operated by private machines. Therefore only increase number of staffs is listed in the table.

Table 2.4-1 Staff Number of CESTE

Position	Number of Staff
Administration	31
Mechanic	15
Operator	43
Worker	145
Total	234

Table 2.4-2 Necessary Number of Staff by Type of Equipment

No.	Equipment	No. of Unit	Operator	Worker
1	Motor Grader	3	0	0
2	Dump Truck	14	0	0
3	Asphalt Finisher	1	0	0
4	Asphalt Milling Machine	2	2	2
5	Asphalt Sprayer	12	0	0
6	Truck	8	8	0
7	Concrete Cutter	5	0	0
8	Multi Purpose Vehicle	2	0	0
9	Wheel Backhoe	4	4	0
10	Backhoe Loader	1	1	1
11	Vibration Roller	5	5	0
12	Wheel Loader	5	0	0
13	Truck with Crane	2	0	0
14	Line Marker	1	0	0
15	Pile Driver	2	0	0
16	Crack Filler	5	0	0
17	Mobile Workshop Truck	1	1	1
Total		**73**	**21**	**4**

21 number of operator/driver and 4 supporting staff will be necessary assigned for the equipment procured by the Project as shown in Table 2.4-2. The equipment required additional staff is the same model already utilized by CESTE at present. This condition facilitates the easiness for CESTE to educate the new staff. Therefore management and maintenance of the equipment will be conducted by this organization.

2.5 PROJECT COST ESTIMATION

2.5.1 INITIAL COST ESTIMATION

Total project cost necessary to implement the Project is estimated at 773 million yen. The costs to be borne by both governments of Japan and B&H is 773 million yen and 0.3 million yen respectively based on the scope of works of both governments as stated previous section. The conditions of this estimation are shown in below (3). However, this cost estimate is provisional and would be further examined by the Government of Japan for the approval of the Cabinet.

(1) Cost borne by the Government of Japan

Total Project Cost

Item		Project Cost (Million Yen)
Equipment	Road Maintenance	approximately 746
	Snow Removal	
Detailed Design and Procurement Supervision		approximately 27

(2) Cost borne by the Government of B&H

Forwarding cost from delivery site to each regional office : 4,500 KM
(approximately 324,000 Yen)

(3) Conditions in the Cost Estimate

①	Time of cost estimate	:	March 2006
②	Exchange rate	:	140.79 Yen=1.00 Euro 71.98 Yen=1.00 KM
③	Procurement periods	:	Approximately 14 months as shown in the Implementation Schedule
④	Others	:	The Project is implemented in accordance with the system of Japan's Grant Aid

2.5.2 OPERATION AND MAINTENANCE COST

Estimated fuel and oil cost which is newly necessary under this project is shown in Table 2.5.2-1 and estimated maintenance and repair cost is shown in Table 2.5.2-2. The newly necessary fuel and oil cost is approximately 273,079 KM/year. The maintenance and repair cost is approximately 357,599 KM/year. Estimated personnel cost which is for 21 operates and 4 workers is approximately 631,200 KM/year. The total cost of operation and

maintenance is approximately 1,261,878 KM (approximately 90.8 million Yen) which will be 10% of annual budget of the Implementing agency. But the rental cost for private machines which shared 1/4 of annual budget will substantially decrease after execution of the project. Therefore it is possible to allocate that saving budget for operation and maintenance cost. Operation and maintenance cost before and after execution the project is shown in Table 2.5.2-3.

Table 2.5.2-1 Estimated Cost of Fuel and Oil

No.	Equipment	Spec. (kw)	No. of Unit	Working Hour		Fuel Consumption		
				(h/day)	(day/ year)	litter/ h・unit	litter/ year・unit	litter/ year
1	Motor Grader	110	3	5	180	12	10,800	32,400
2	Dump Truck	400	14	5	180	20	18,000	252,000
3	Asphalt Finisher	30	1	5	120	4	2,400	2,400
4a	Asphalt Milling Machine (1)	165	1	5	120	24	14,400	14,400
4b	Asphalt Milling Machine (2)	270	1	5	120	40	24,000	24,000
5	Asphalt Sprayer	2.5	12	2	120	0.5	120	1,440
6	Truck	65	8	3	180	4	2,160	17,280
7	Concrete Cutter	10	5	2	120	2	480	2,400
8	Multi Purpose Vehicle	110	2	5	180	9	8,100	16,200
9	Wheel Backhoe	104	4	5	180	18	16,200	64,800
10	Backhoe Loader	55	1	5	180	8	7,200	7,200
11a	Vibration Roller (Combined Type)	20	1	5	120	3	1,800	1,800
11b	Vibration Roller (Tandem Type)	20	4	5	120	3	1,800	7,200
12	Wheel Loader	120	5	5	180	14	12,600	63,000
13	Truck with Crane	130	2	5	120	7	4,200	8,400
14	Line Marker	30	1	5	120	5	3,000	3,000
15	Pile Driver	50	2	5	120	4	2,400	4,800
16	Crack Filler	4	5	3	120	1	360	1,800
17	Mobile Workshop Truck	130	1	3	180	7	3,780	3,780
Total								455,400
Newly necessary fuel consumption (with out the rental equipment)								154,500

: Fuel consumption with out the rental equipment

Conditions in the cost estimate;

- Fuel consumption is based on the “Depreciation Calculation Table for Construction Equipment, Etc.” (2006 Version), Japanese edition
- Oil cost is estimated on 1% of fuel consumption cost
- Diesel price : 1.75 KM/litter = 125.97 Yen/litter

Fuel Cost (Annual)	154,500 L x 1.75 KM/L = 270,375 KM	19,460,000 Yen
Oil Cost (Annual)	270,375 KM x 1% = 2,704 KM	190,000 Yen
Total	**273,079 KM**	**19,650,000 Yen**

Table 2.5.2-2 Estimated Cost of Maintenance and Repair

No.	Equipment	Spec. (kw)	No. of Unit	Rate of Maintenance and Repair Cost/ Year・Unit	Maintenance and Repair Cost/ Year・Unit	Maintenance and Repair Cost/ Year (0000 Yen)
1	Motor Grader	110	3	0.35/18 = 0.019	25.5	76.5
2	Dump Truck	400	14	0.60/13.5 = 0.044	58.1	813.4
2-1	Snow Plough	-	14	0.45/12 = 0.038	7.1	99.4
2-2	Salt Spreader (1)	-	14	0.45/12 = 0.038	19.4	271.6
3	Asphalt Finisher	30	1	0.45/16.5 = 0.027	27.9	27.9
4a	Asphalt Milling Machine (1)	165	1	0.40/16.5 = 0.024	73.7	73.7
4b	Asphalt Milling Machine (2)	270	1	0.40/16.5 = 0.024	114.7	114.7
5	Asphalt Sprayer	2.5	12	0.50/6.75 = 0.074	1.2	14.4
6	Truck	65	8	0.45/15 = 0.030	7.5	60.0
7	Concrete Cutter	10	5	0.40/ 9 = 0.044	1.8	9.0
8-1	Multi Purpose Vehicle	110	2	0.45/15 = 0.030	74.7	149.4
8-2	Rotary Snow Blower	-	2	0.45/12 = 0.038	13.1	26.2
8-3	Salt Spreader (2)	-	2	0.45/12 = 0.038	15.7	31.4
8-4	Glass Cutter	-	2	0.45/12 = 0.038	14.9	29.8
9-1	Wheel Backhoe	104	4	0.45/11.3 = 0.040	48.0	192.0
9-2	Hydraulic Breaker	-	4	0.25/9.8 = 0.026	6.6	26.4
10	Backhoe Loader	55	1	0.70/16.5 = 0.042	51.2	51.2
11a	Vibration Roller (Combined Type)	20	1	0.35/16.5 = 0.021	8.5	8.5
11b	Vibration Roller (Tandem Type)	20	4	0.35/16.5 = 0.021	6.4	25.6
12	Wheel Loader	120	5	0.70/16.5 = 0.042	60.0	300.0
13	Truck with Crane	130	2	0.45/15 = 0.030	18.0	36.0
14	Line Marker	30	1	0.40/12 = 0.033	33.3	33.3
15	Pile Driver	50	2	0.70/12 = 0.058	51.6	103.2
16	Crack Filler	4	5	0.55/11.3 = 0.049	4.8	24.0
17	Mobile Workshop Truck	130	1	0.45/15 = 0.030	30.3	30.3
Total						2,573.6

Conditions in the cost estimate;

- Rate of annual maintenance and repair cost
  = Rate of maintenance and repair cost for standard working year / standard working year
- Working Lifetime=Working Lifetime of Japan ×1.5 (Apply to actual condition in BiH)
- Equipment Price
  = Body price or estimated price (CIF)
- Rate of maintenance and repair cost, standard working year and body price is based on the "Depreciation Calculation Table for Construction Equipment, Etc." (2006 Version), Japanese edition

Annual Maintenance and Repair Cost	**357,599 KM**	**25,736,000 Yen**

Table 2.5.2-3 Operation and maintenance cost before and after execution of the project

Item	Operation and maintenance cost (KM)		
	Before Execution (2005)	After Execution (2009)	Balance Amount
Fuel and Oil Cost	941,893	1,214,972	+273,079
Maintenance Cost	498,316	855,915	+357,599
Personnel Cost	4,087,462	4,718,662	+631,200
Rental Cost	3,875,817	603,299	-3,272,518
Total	9,403,488	7,392,848	-2,010,640

2.6 OTHER RELEVANT ISSUES

In case this project is executed by the Japan's Grant Aid, B&H side shall execute its obligation in accordance with aforesaid scope of work of both countries.

Regarding the customs clearance and tax exemption at the Mostar customs, the transport plan is prepared on the condition that customs clearance takes just 1 day after the application. If the procedure becomes delay, it may be required additional cost for the waiting. The supplier in advance shall get the confirmation of the transport schedule with B&H side.

In this project, spare parts of the equipment is not included. Implementing agency shall prepare the procurement plan of the spare parts of each equipment and allocate the necessary budget. In particular, fuel, oil, grease, consumables, etc. become necessary soon after the delivery and budget allocation shall be adjusted to the project schedule.

MOTC has several experiences of the execution of the projects under Japan's Grant Aid and there isn't any other subjects to be difficult for the execution of the project.

CHAPTER 3

PROJECT EVALUATION AND RECOMMENDATION

CHAPTER 3

PROJECT EVALUATION AND RECOMMENDATION

3.1 PROJECT EFFECT

This project aims to strengthen the implementing structure for maintaining the stable road traffic by the execution of proper maintenance on the 45 routes of main road and regional road, total 1,617 km in length, located in concerned 5 cantons in the Federation.

By the implementation of the project, the direct beneficiary is residents of concerned 5 cantons estimated at approximately 690 thousands persons and indirect beneficiary is people of B&H approximately 3.8 million. The expected effects appearing by the project are to strengthen the maintenance structure of CESTE by the operation with owned equipment, to improve the work efficiency and ability with sufficient number of equipment and to be possible the proper repair at appropriate timing. As the result, the quality of the maintenance will be higher.

The project effects are summarized as follows:

(1) Problems

The maintenance equipment owned by CESTE is insufficient to execute the road maintenance work, and it becomes difficult to carry out the proper maintenance at appropriate timing.

(2) Countermeasure

To strengthen the deficient road maintenance equipment

(3) Direct Effects

- To be possible securely executing the maintenance work which not able to covered so far because of the lack of machine (ex. Increasing working party : 1 party for Overlay with milling machine, 1 party for surface milling for anti-slip, 4 parties for repair of potholes, etc.)
- To secure the stable road traffic with the prevention of deterioration and the preservation of serviceability of concerned roads
- To improve the safety of the road by the execution of proper maintenance

(4) Indirect Effect

- To secure the smooth national distribution network of B&H by the preservation of serviceability of main roads and regional roads
- To extend the service life of the road by the prevention of deterioration with the quickly work of repairing the damages like potholes

Regarding the direct effect, it is estimated that annual equipment cost including operation and maintenance is saved approximately 2.60 million KM which is corresponded to about 50% of equipment cost in 2005 amount 5.32 million KM by the implementation of the project. It is expected that annual work volume of maintenance work executed by CESTE is increased due to the saving of the budget and improving the work ability.

The value of the result by the project are shown below.

Table 3.1-1 Proposed Result by the Project

Work Item	2005(present)	After project
Overlay with milling machine	2,540 ton	6~7,000 ton
Surface milling for anti-slip	13,000 m2	227,000 m2
Reshaping of rock slope	3,000 m3	520,000 m3

Other else it is expected the increase of annul work volume on the several work items such as repair of pothole, filling crack, reshaping shoulder, installing protection fence, digging and reshaping ditch, improving drainage, installing/replacing road sign, renewal of road marking, installing/replacing guard rail, replacing reflection device, cutting bush and branch and so on. It doesn't clear the increasing volume of each item, but it is possible to allocate the budget about 2 times compared with present for the above work items totally.

3.2 RECOMMENDATION

3.2.1 RECOMMENDATION TO THE RECIPIENT COUNTRY

For the appearance and continuation of the project effect mentioned above, B&H side shall take measures on the subjects listed below.

- To organize necessary staffs for the efficient operation and to systemize secure maintenance like a routine inspection and repair on the newly placed equipment
- To prepare the procurement plan of spare parts and consumables necessary for the

maintenance and to allocate that budget

- To execute the proper maintenance works at appropriate timing in accordance with the maintenance work regulation of MOTC

Those subjects will not be difficult for CESTE with their managing ability and technical knowledge and it will be solved by B&H side. And it is recommended that the Federal and cantonal governments shall understand existing condition of their roads and allocate the budget corresponding with necessary maintenance work.

3.2.2 TECHNICAL ASSISTANCE & COOPERATION WITH OTHER DONORS

Works carried by CESTE are the routine work in accordance with the maintenance work regulation of MOTC and they follows that work method and procedure. Technical knowledge of the staffs is enough level to carry out those maintenance work. Therefore, the technical assistance for the implementation of this project is not required.

This project concerns to conduct the maintenance works on the existing roads. Although directly it is not necessary the cooperation with an other donor, some road improvement projects assisted by foreign fund, which solve a root cause of aged pavement by the overlay or reconstruction, will make more effect of the maintenance work by CESTE.

APPENDICES

1. Member List of the Study Team
2. Study Schedule
3. List of Parties Concerned in the Recipient Country
4. Minutes of Discussions

APPENDIX 1

MEMBER LIST OF THE STUDY TEAM,

Appendix 1 : Member List of the Study Team

1) Field Surveys

Name	Title	Affiliation
Ms. ISHIZAWA Yuko	Leader	Chife of Project Monitoring and Coordination Team, Administration and Coordination Group, Grant Aid Management Dep., JICA
Mr. MURAKAMI Keiichi	Chief Consultant / Management & Operation Planner	Katahira & Engineers International
Mr. KOBAYASHI Kiyohito	Road Construction Equipment Planner / Road Operation & Maintenance Planner	Katahira & Engineers International
Mr. YAMAJYUKU Tsuyoshi	Road Construction Equipment Planner / Road Operation & Maintenance Planner	Katahira & Engineers International

2) Explanation of the Draft Final Report

Name	Title	Affiliation
Mr. NAKAGAWA Atsushi	Leader	Transportation and Electric Power Team, Project Management Group Ⅰ, Grant Aid Management Dep., JICA
Mr. MURAKAMI Keiichi	Chief Consultant / Management & Operation Planner	Katahira & Engineers International
Mr. KOBAYASHI Kiyohito	Road Construction Equipment Planner / Road Operation & Maintenance Planner	Katahira & Engineers International

APPENDIX 2

STUDY SCHEDULE

Appendix 2 : Study Schedule

1) Field Surveys (Feb. 26. 2006～Mar. 30. 2006)

No.	Date			Ms. ISHIZAWA	Mr. MURAKAMI, Mr. KOBAYASHI Mr. YAMAJYUKU
1	Feb.	26	Sun	Tokyo10:30 (LH711) →Frankfult14:15 Frankfult15:50 (LH3536) →Vienna17:10	
2		27	Mon	Courtesy Call to EOJ in Austria, Disscution with JICA Office Vienna13:30 (OS757) →Sarajevo14:45 Courtesy Call to EOJ	
3		28	Tue	Courtesy Call to MOF, Disscution with MOTC Sarajevo→Mostar	
4	Mar.	1	Wed	Disscution with CESTE d.d. Mostar, Site Inspection	
5		2	Thu	Disscution with CESTE d.d. Mostar Mostar→Sarajevo	
6		3	Fri	Courtesy Call to Ministry of Communications and Transport, Sarajevo Putivi	
7		4	Sat	Disscution with Study Team	
8		5	Sun	Disscution with Study Team	
9		6	Mon	Signing of M/D, Report to EOJ	
10		7	Tue	Sarajevo7:50 (OS760) →Vienna9:05 Report to EOJ and JICA Office	Disscution with MOTC
11		8	Wed	Vienna17:55 (LH3537) →Frankfult19:30 Frankfult20:45 (NH210) →	Sarajevo→Mostar Disscution with CESTE d.d. Mostar
12		9	Thu	→Tokyo15:55	Site Inspection (Mostar)
13		10	Fri	—	Site Inspection (Mostar)
14		11	Sat	—	Site Inspection (Grude)
15		12	Sun	—	Site Inspection (Livno)
16		13	Mon	—	Site Inspection (Kiseljak)
17		14	Tue	—	Site Inspection (Orasje) Orasje→Sarajebo
18		15	Wed	—	Sarajevo→Banja Luka Courtesy Call to MOTC (Republic of Srpska) Visit to Kozara Putivi
19		16	Thu	—	Banja Luka→Mrkonjic→Sarajevo Visit to Mrkonjic Putivi
20		17	Fri	—	Visit to Sarajevo Putivi and RAD
21		18	Sat	—	Data analysis
22		19	Sun	—	Data analysis
23		20	Mon	—	Data analysis
24		21	Tue	—	Disscution with MOTC Site Inspection (Agent of Equipment)
25		22	Wed	—	Sarajevo→Mostar→Sarajevo Disscution with CESTE d.d. Mostar
26		23	Thu	—	Data analysis Site Inspection (Agent of Equipment)
27		24	Fri	—	Data analysis
28		25	Sat	—	Data analysis
29		26	Sun	—	Data analysis
30		27	Mon	—	Disscution with MOTC Report to EOJ
31		28	Tue	—	Sarajevo7:50 (OS760) →Vienna9:05 Report to EOJ and JICA Office
32		29	Wed	—	Vienna17:55 (LH3537) →Frankfult19:30 Frankfult20:45 (LH710) →
33		30	Thu	—	→Tokyo15:55

EOJ : Embassy of Japan　　MOF : Ministry of Foreign Affairs　　MOTC : Ministry of Transport and Communicati

M/D : Minute of Discuttion

2) Explanation of the Draft Final Report (Feb. 11. 2007～Feb. 19. 2007)

No.	Date			Mr. NAKAGAWA	Mr. MURAKAMI, Mr. KOBAYASHI
1	Feb.	11	Sun	Tokyo13:15(LH715)→Munchen17:45 Munchen19:25(LH3502)→Sarajevo20:50	Tokyo11:40(OS052)→Vienna16:05 Vienna20:10(OS759)→Sarajevo21:25
2		12	Mon	Courtesy Call to MOF and MOTC	
3		13	Tue	Courtesy Call to EOJ Sarajevo→Mostar Disscution with CESTE d.d. Mostar	
4		14	Wed	Disscution with CESTE d.d. Mostar Mostar→Sarajevo	
5		15	Thu	Disscution with MOTC	
6		16	Fri	Signing of M/D Report to EOJ	
7		17	Sat	Sarajevo7:00(LH3503)→Munchen8:25 Munchen9:45(LH967)→Frankfult10:55 Frankfult13:30(LH710)→	Data analysis
8		18	Sun	→Tokyo8:35	Sarajevo7:50(OS760)→Vienna9:05 Vienna13:40(OS051)→
9		19	Mon	—	→Tokyo9:30

EOJ : Embassy of Japan　　MOF : Ministry of Foreign Affairs　　MOTC : Ministry of Transport and Communicati

M/D : Minute of Discuttion

APPENDIX 3

LIST OF PARTIES CONCERNED IN THE RECIPIENT COUNTRY

Appendix 3 : List of Parties Concerned in the Recipient Country

《 Bosnia and Herzegovina 》

Ministry of Foreign Affairs

Mr. Sefik Fadzan	Minister Counsellor Head of Department for Multilateral Economic Relations and Reconstruction
Ms. Alma Vrazalica	Second Secretary, Multilateral Economic Relations and Reconstruction

Ministry of Communications and Transport

Mr. Nikola Sefo	Secretary

《 Federation of Bosnia and Herzegovina 》

Federal Ministry of Transport and Communications

Mr. Nedzad Brankovic	Minister
Mr. Zaim Heco	Assistant Minister
Mr.Pavo Boban	Assistant Minister
Mr. Esad Osmanbegovic	Secretary

CESTE d.d. MOSTAR

Mr. Jozo Krivic	Director
Mr. Tomislav Susac	Maintenance and Management Director
Ms. Ludmila Kovacevic	Accountants Director

Sarajevo Putivi

Ms. Dubravka Sekeric	Director

RAD

Mr. Sejfudin Sinanovic	Director

《 Republic of Srpska 》

Republican Ministry of Transport and Communications

Mr. Miroslav R. Cicic	Assistant Minister for Road Traffic

Kozara Putivi

Mr. Brano Cakic	Maintenance and Management Director

Mrkonjic Putivi

Mr. Trivun Milanovic	Director

《 Embassy of Japan 》

Mr. Futao Motai	Ambassador
Mr. Susumu Ueda	First Secretary
Mr. Ryutaro Murotani	First Secretary

《 Japan International Cooperation Agency Austria Office 》

Mr. Masao Shikano	Resident Representative
Mr. Katsutoshi Fushimi	Assistant Resident Representative

《 Japan International Cooperation Agency BH Contact Point 》

Ms. Kazuyo Hashimoto	Project Formulation Adviser

APPENDIX 4

MINUTES OF DISCUSSIONS

Minutes of Discussions
on the Basic Design Study
on the Project for Procurement of Road Construction Machinery (Phase-2)
in Bosnia and Herzegovina

In response to the request from the Government of Bosnia and Herzegovina (hereinafter referred to as "B&H"), the Government of Japan decided to conduct a Basic Design Study on the Project for Procurement of Road Construction Machinery (Phase-2) (hereinafter referred to as "the Project") and entrusted the study to the Japan International Cooperation Agency (hereinafter referred to as "JICA").

JICA sent to B&H the Basic Design Study Team (hereinafter referred to as "the Team"), headed by Ms. Yuko Ishizawa, Chief of Project Monitoring and Coordination Team, Administration and Coordination Group, Grant Aid Department, JICA, and is scheduled to stay in the country from February 27 to March 28, 2006.

The Team held discussions with the concerned officials of the Government of B&H and conducted a field survey. In the course of the discussions and the field survey, both sides have confirmed the main items described in the attached sheets. The Team will proceed to further works and prepare the Basic Design Study Report.

Sarajevo, 6 March, 2006

Ms. Yuko ISHIZAWA
Leader
Basic Design Study Team
Japan International Cooperation Agency

Mr. Sci. Zaim HECO
Assistant Minister
Federal Ministry of Transport & Communications
Federation of Bosnia and Herzegovina

Mr. Sefik FADZAN
Minister Counsellor
Head of Dept. for Multilateral
Economic Relations and Reconstruction
Ministry of Foreign Affairs
Bosnia and Herzegovina
Witness

Mr. Jozo KRIVIC
Director
CESTE d.d. Mostar
Federation of Bosnia and Herzegovina

ATTACHMENT

1. Objective of the Project

The objective of the Project is to rehabilitate and reconstruct main and regional roads in B&H by using the road construction equipment provided by Japan's Grant Aid, and to contribute to the improvement of national road network in B&H.

2. Project Site

The Project site covers the main and regional roads in five Provinces, which are Herzegovina Neretwa, Central Bosnia, West Herzegovina, Herceg Bosna, and Posavina, as shown in Annex-1.

3. Responsible and Implementing Organizations

The responsible Ministry is the Ministry of Transport and Communications, Federation of Bosnia and Herzegovina.

Implementing agency is the CESTE d.d. Mostar.

The organization charts of the above-mentioned Ministry and Agency are shown in Annex-2 and Annex-3 respectively.

4. Items Requested by the Government of B&H

As a result of the series of discussions, requested components are confirmed as listed in Annex-4.

The final components of the Project will be decided after further studies, and JICA will assess the appropriateness of the request and will report to the Government of Japan.

5. Japan's Grant Aid Scheme

(1) B&H side understands the Japan's Grant Aid scheme and the necessary measures to be taken by the Government of B&H explained by the Team as described in Annex-5.

(2) B&H side promised to take necessary measures, as described in Annex-6, for smooth implementation of the Project as a condition for the Japan's Grant Aid to be implemented.

6. Schedule of the Study

(1) The consultants will proceed to further studies in B&H by March 28, 2006.

(2) JICA will prepare the draft report and dispatch a mission to B&H in order to explain its contents around the end of June 2006.

(3) When the contents of the report are accepted in principle by the Government of B&H, JICA will complete the final report and send it to the Government of B&H by the end of September 2006.

7. Other Relevant Issues

(1) B&H side should undertake necessary preparation work in the depot, if required, such as repairing of the building, the foundation work, securing the parking place, etc. before the delivery of the equipment.

(2) B&H side should secure the sufficient budget and personnel for the implementing agency so that the equipment is utilized properly and effectively for the purpose of the Project.

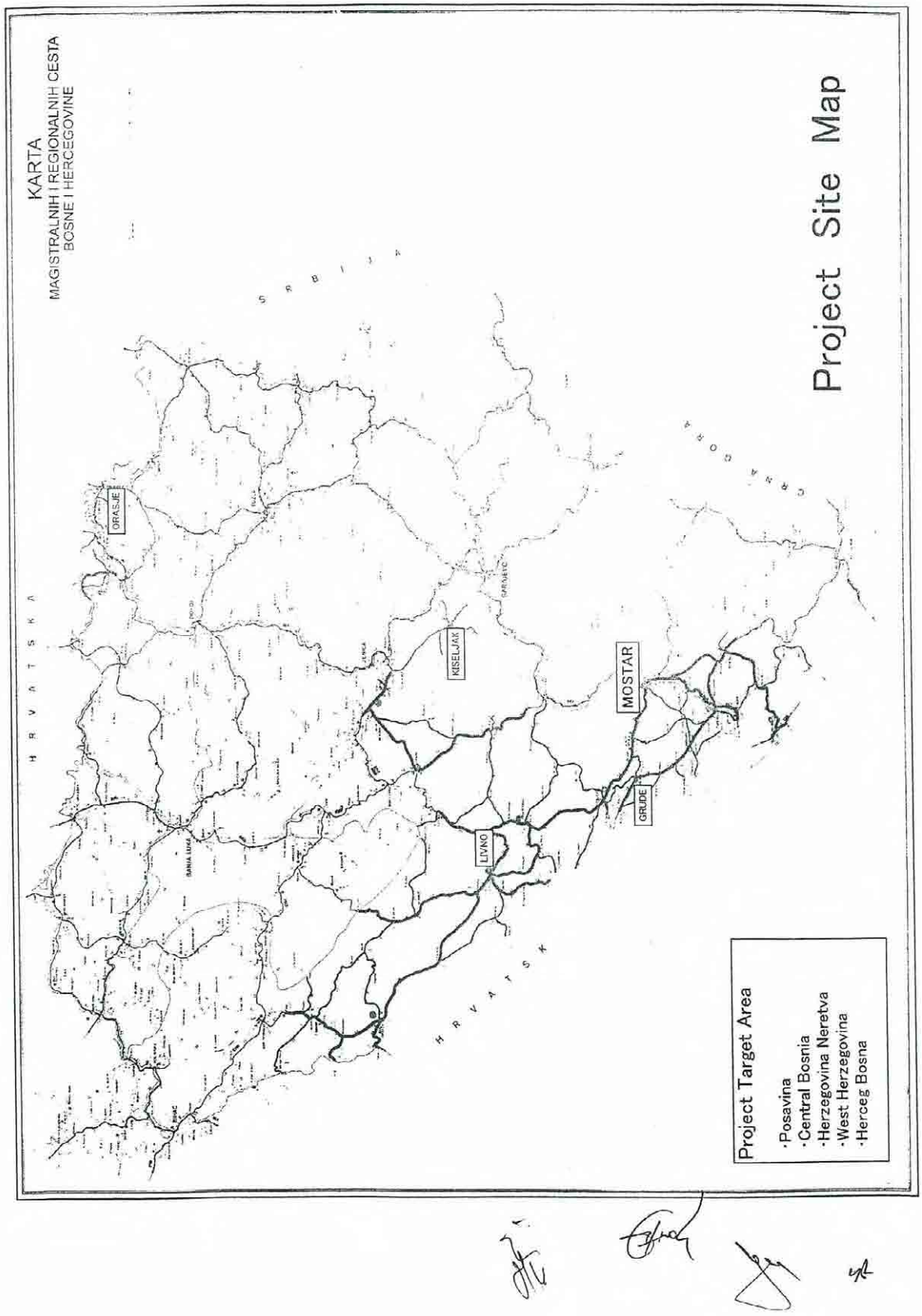
(3) The B&H side confirms that the ownership of the properties provided under the Project belongs to Federal Ministry of Transport & Communications, and shall not be transferred to private sector.

(4) B&H side requested to the Team that the EURO3 shall be applied for the equipment of the Project as the emission standard.

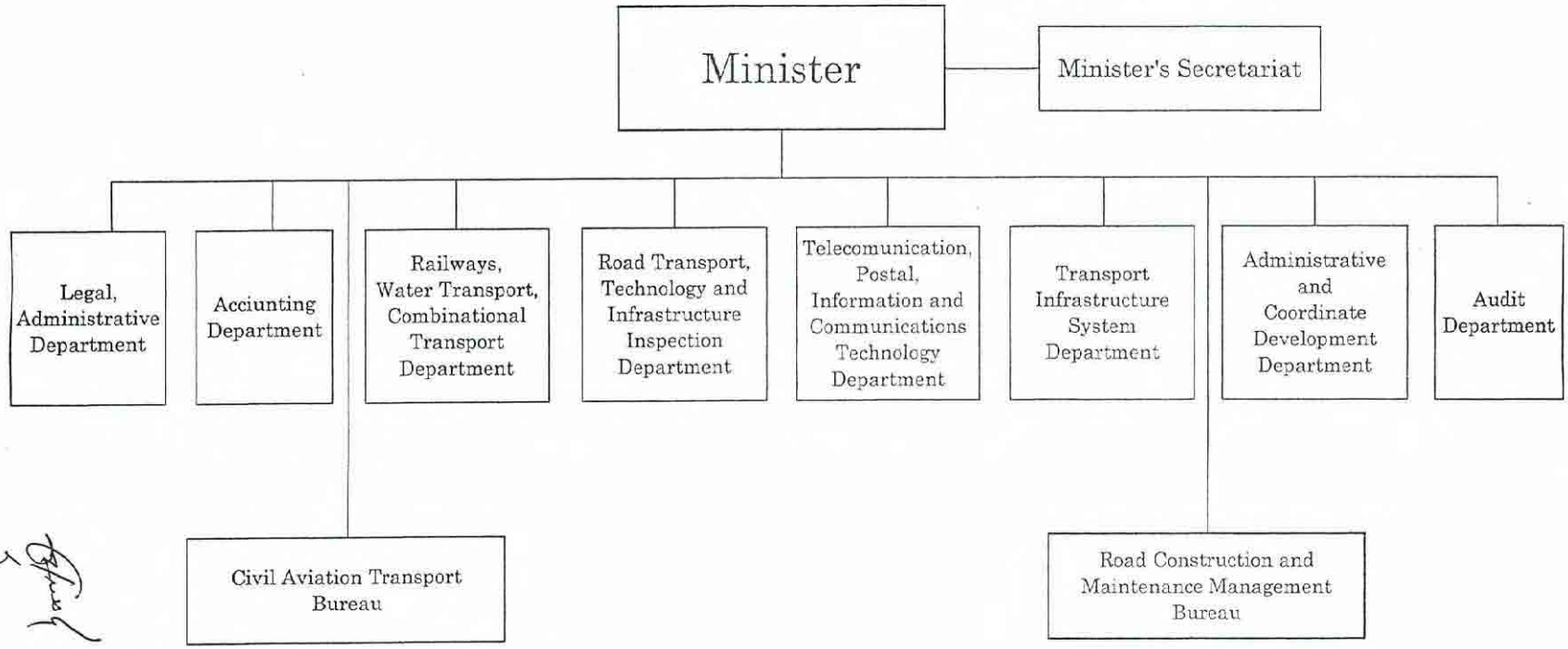
(5) The answers to the Questionnaire shall be prepared by B&H side together with the Team.

(6) B&H side shall provide necessary number(s) of counterpart personnel to the Team during the period of their studies in B&H.

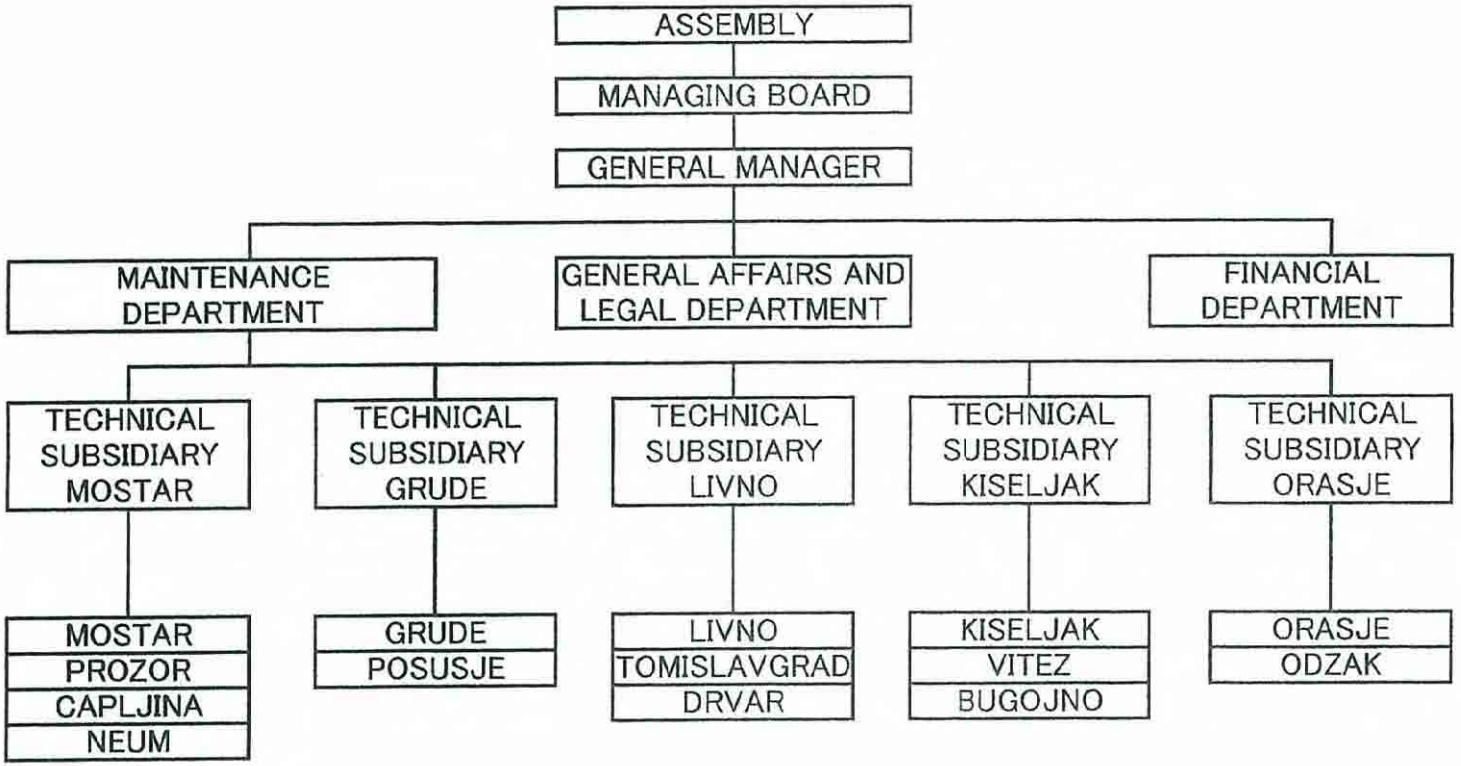
ANNEX-1


KARTA
MAGISTRALNIH I REGIONALNIH CESTA
BOSNE I HERCEGOVINE
Project Site Map
HRVATSKA
SRBIJA
CRNA GORA
HRVATSK
ORAŠJE
KISELJAK
LIVNO
MOSTAR
GRUDE
Project Target Area
·Posavina
·Central Bosnia
·Herzegovina Neretva
·West Herzegovina
·Herceg Bosna

Ministry of Communications and Transport
Organizational Chart



ANNEX-2



THE ORGANIZATION CHART OF CESTE

ANNEX-3

Annex-4

List of Equipment Requested by the B&H side

No.	Item	Quantity
1	Motor Grader	3
2	Tipper Truck	14
3	Asphalt Finisher	1
4	Asphalt Milling Machine	2
5	Asphalt Sprayer	3
6	Pickup	8
7	Asphalt Cutter	5
8	Multipurpose Vehicle	2
9	Wheel Excavator with Breaker	4
10	Backhoe Loader	1
11	Combine Roller	5
12	Wheel Loader	5
13	Maintenance Truck with Crane	1
14	Line Marker	1
15	Self Moving Crawler Pile Driving Machine	2
16	Machine for Point Filling	1
17	Workshop Equipment & Tools	1

JAPAN'S GRANT AID

The Grant Aid Scheme provides a recipient country with non-reimbursable funds to procure the facilities, equipment and services (engineering services and transportation of the products, etc.) for economic and social development of the country under principles in accordance with the relevant laws and regulations of Japan. The Grant Aid is not supplied through the donation of materials as such.

1. Grant Aid Procedures

Japan's Grant Aid Scheme is executed through the following procedures.

Application	(Request made by the recipient country)
Study	(Basic Design Study conducted by JICA)
Appraisal &Approval	(Appraisal by the Government of Japan and Approval by the Cabinet)
Determination of Implementation	(The Note exchanged between the Governments of Japan and recipient country)

Firstly, the application or request for a Grant Aid project submitted by a recipient country is examined by the Government of Japan (the Ministry of Foreign Affairs) to determine whether or not it is eligible for Grant Aid. If the request is deemed appropriate, the Government of Japan assigns JICA (Japan International Cooperation Agency) to conduct a study on the request.

Secondly, JICA conducts the study (Basic Design Study) using (a) Japanese consulting firm(s).

Thirdly, the Government of Japan appraises the project to see whether or not it is suitable for Japan's Grant Aid Scheme, based on the Basic Design Study report prepared by JICA, and the results are then submitted to the Cabinet for approval.

Fourthly, the project, once approved by the Cabinet, becomes official with the Exchange of Notes (E/N) signed by the Governments of Japan and the recipient country.

Finally, for the implementation of the project, JICA assists the recipient country in such matters as preparing tenders, contracts and so on.

2. Basic Design Study

(1) Contents of the study

The aim of the Basic Design Study (hereafter referred to as "the Study") conducted by JICA on a requested project (hereafter referred to as "the Project") is to provide a basic document necessary for the appraisal of the Project by the Government of Japan. The contents of the Study are as follows:

- Confirmation of the background, objectives, and benefits of the Project and also institutional capacity of agencies concerned of the recipient country necessary for the Project's implementation.
- Evaluation of the appropriateness of the Project to be implemented under the Grant Aid Scheme from a technical, social and economic point of view.
- Confirmation of items agreed on by both parties concerning the basic concept of the Project.
- Preparation of a basic design of the Project.
- Estimation of costs of the Project.

The contents of the original request are not necessarily approved in their initial form as the contents of the Grant Aid project. The Basic Design of the Project is confirmed considering the guidelines of the Japan's Grant Aid Scheme.

The Government of Japan requests the Government of the recipient country to take whatever measures are necessary to ensure its self-reliance in the implementation of the Project. Such measures must be guaranteed even though they may fall outside of the jurisdiction of the organization in the recipient country actually implementing the Project. Therefore, the implementation of the Project is confirmed by all relevant organizations of the recipient country through the Minutes of Discussions.

(2) Selection of Consultants

For smooth implementation of the Study, JICA uses (a) registered consulting firm(s). JICA selects (a) firm(s) based on proposals submitted by interested firms. The firm(s) selected carry(ies) out a Basic Design Study and write(s) a report, based upon terms of reference set by JICA. The consultant firm(s) used for the Study is (are) recommended by JICA to the recipient country to also work on the Project's implementation after the Exchange of Notes, in order to maintain technical consistency.

3.Japan's Grant Aid Scheme

(1) Exchange of Notes (E/N)

Japan's Grant Aid is extended in accordance with the Notes exchanged by the two Governments concerned, in which the objectives of the Project, period of execution, conditions and amount of the Grant Aid, etc., are confirmed.

(2) "The period of the Grant Aid" means the one fiscal year, which the Cabinet approves, the Project for. Within the fiscal year, all procedures such as exchanging of the Notes, concluding contracts with (a) consultant firm(s) and (a) contractor(s) and final payment to them must be completed. However, in case of delays in delivery, installation or construction due to unforeseen factors such as national disaster, the period of the Grant Aid can be further extended for a maximum of one fiscal year at most by mutual agreement between the two Governments.

(3) Under the Grant Aid, in principle, Japanese products and services including transport or those of the recipient country are to be purchased. When the two Governments deem it necessary, the Grant Aid may be used for the purchase of the products or services of a third country. However, the prime contractors, namely, consulting, constructing and procurement firms, are limited to "Japanese nationals". (The term "Japanese nationals" means persons of Japanese nationality or Japanese corporations controlled by persons of Japanese nationality.)

(4) Necessity of "Verification"

The Government of recipient country or its designated authority will conclude contracts denominated in Japanese yen with Japanese nationals. Those contracts shall be verified by the Government of Japan. This "Verification" is deemed necessary to secure accountability to Japanese taxpayers.

(5) Undertakings required of the Government of the Recipient Country

In the implementation of the Grant Aid Project, the recipient country is required to undertake such necessary measures as the following:

a) To secure land necessary for the sites of the Project and to clear, level and reclaim the land prior to commencement of the construction,

b) To provide facilities for the distribution of electricity, water supply and drainage and other incidental facilities in and around the sites,

c) To secure buildings prior to the procurement in case the installation of the equipment,

d) To ensure all the expenses and prompt excursion for unloading, customs clearance at the port of disembarkation and internal transportation of the products purchased under the Grant Aid,

e) To exempt Japanese nationals from customs duties, internal taxes and other fiscal levies which will be imposed in the recipient country with respect to the supply of the products and services under the Verified Contracts,

f) To accord Japanese nationals, whose services may be required in connection with the supply of the products and services under the Verified contracts, such facilities as may be necessary for their entry into the recipient country and stay therein for the performance of their work.

(6) "Proper Use"

The recipient country is required to maintain and use the facilities constructed and the equipment purchased under the Grant Aid properly and effectively and to assign staff necessary for this operation and maintenance as well as to bear all the expenses other than those covered by the Grant Aid.

(7) "Re-export"

The products purchased under the Grant Aid should not be re-exported from the recipient country.

(8) Banking Arrangements (B/A)

a) The Government of the recipient country or its designated authority should open an account in the name of the Government of the recipient country in a bank in Japan (hereinafter referred to as "the Bank"). The Government of Japan will execute the Grant Aid by making payments in Japanese yen to cover the obligations incurred by the Government of the recipient country or its designated authority under the Verified Contracts.

b) The payments will be made when payment requests are presented by the Bank to the Government of Japan under an Authorization to Pay (A/P) issued by the Government of the recipient country or its designated authority.

(9) Authorization to Pay (A/P)

The Government of the recipient country should bear an advising commission of an Authorization to Pay and payment commissions to the Bank.

(End)

Major Undertakings to be taken by Each Government

No.	Items	To be covered by Grant Aid	To be covered by Recipient Side
1	To bear the following commissions to the Japanese bank for banking services based upon the B/A		
	1) Advising commission of A/P		●
	2) Payment commission		●
2	To ensure prompt unloading and customs clearance at the port of disembarkation in recipient country		
	1) Marine and land transportation of the products from Japan to the recipient country	●	
	2) Tax exemption and custom clearance of the products at the port of disembarkation		●
	3) Internal transportation from the handing over point to the project site		●
3	To accord Japanese nationals whose services may be required in connection with the supply of the products and the services under the verified contact, such facilities as may be necessary for their entry into the recipient country and stay therein for the performance of their work.		●
4	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 contracts		●
5	To maintain and use properly and effectively the facilities constructed and equipment provided under the Grant Aid		●
6	To bear all the expenses, other than those to be borne by the Grant Aid, necessary for the transportation and installation of the equipment		●

(B/A: Banking Arrangement, A/P: Authorization to pay)

Minutes of Discussions
on the Basic Design Study
on the Project for Procurement of Road Maintenance Equipment (Phase-2)
in Bosnia and Herzegovina
(Explanation of Draft Final Report)

In February 2006, the Japan International Cooperation Agency (hereinafter referred to as "JICA") dispatched the Basic Design Study Team on the Project for Procurement of Road Maintenance Equipment (Phase-2) (hereinafter referred to as "the Project") in the Bosnia Herzegovina (hereinafter referred to as "B&H"). Through discussions, field survey and technical examination of the results in Japan, JICA prepared a draft report of the study.

In order to explain and to consult with the officials concerned of the Government of B&H on the components of the draft report, JICA sent to B&H the Basic Design Explanation Team (hereinafter referred to as "the Team"), headed by Mr. Atsushi NAKAGAWA, Transportation & Electric Power Team, Project Management Group I, Grant Aid Management Department of the JICA, from February 7 to 17, 2007.

In the course of the discussions, both sides confirmed the main items described in the attached sheets.

Sarajevo, February 16, 2007

Atsushi NAKAGAWA
Leader
Basic Design Explanation Team
Japan International Cooperation Agency

MSc. Zaim HECO
Assistant Minister
Federal Ministry of Transport & Communications
Federation of Bosnia and Herzegovina

Sefik FADZAN
Minister Counsellor
Head of Dept. forMultilateral Economic
Relations and Reconstruction
Ministry of Foreign Affairs
Bosnia and Herzegovina

Jozo KRIVIC
Director
Ceste d.d. Mostar
Federation of Bosnia and Herzegovina

ATTACHMENT

1. Contents of the Draft Report

The B&H side agreed and accepted in principle the contents of the Draft Report explained by the Team.

2. Japan's Grant Aid Scheme

The B&H side reconfirmed the Japan's Grant Aid scheme and the necessary measures to be taken by the Government of B&H explained by the Team as described in Annex-3 and Annex-4 of the Minutes of Discussions (M/D) signed by both sides on March 6, 2006.

3. Schedule of the Study

JICA will complete the Final Report in accordance with the confirmed items and send it to the B&H side by the end of April 2007.

4. Other Relevant Issues

(1) B&H side confirmed that the emission standard of equipment to be purchased under the Project shall be EURO 3 & Stage II of European Union or equivalent standards which satisfy the regulation of B&H while the standard of non-road machinery with gasoline engine shall be Stage I or Stage II of European standard or equivalent standards which satisfy the regulation of B&H. B&H side also confirmed Draft Material Specification explained by the Team satisfied the regulation of B&H.

(2) B&H side should undertake necessary preparation work in the depot, such as preparation of the storage space, securing the parking place, and etc., before the delivery of the equipment.

(3) B&H side should secure the sufficient budget and personnel so that the equipment is utilized properly and effectively for the purpose of the Project.

(4) B&H side confirmed that the ownership of the properties provided under the Project belong to Federal Ministry of Transport & Communications, and shall not be transferred to private sector.

(5) B&H side confirmed that CESTE d.d. Mostar will stay as a company with the majority of state capital.

(6) Both sides agreed that this draft design handed to B&H side from the Team is confidential and should not be duplicated or released to any outside parties.

(7) Both side agreed that the title of the Project has been changed from "The Project for Procurement of Road Construction Machinery (Phase 2)" to "The Project for Procurement of Road Maintenance Equipment (Phase 2)".