3-2-3. Relations between Bina Marga and P. T. Jasa Marga

Since the government holds the shares of P. T. Jasa Marga 100%, P. T. Jasa Marga is placed under the control of Bina Marga in principle in light of everything. In Bina Marga, Planning Department is in charge of Jasa Marga. However, concrete business procedure between both the parties is not clarified, and is said to be clarified by Road Law now being prepared and a government regulation relating to it. For proper and prompt business operation, the supervisory system for permissions and approvals, standards, etc must be established as soon as possible. As for the future business sharing between both the parties, it is planned that Bina Marga covers from the planning to decision of each route, and that P. T. Jasa Marga covers from the feasibility study after it to detailed design, construction and administration. However, this shows a situation when P. T. Jasa Marga functions as a complete organization. In the present situation, Jasa Marga receives, at the time of completion, the routes being planned, designed and constructed by Bina Marga under the loans from various countries and under the national budget, and covers maintenance, operation and management only. The same method of handling is surmised to continue also for Jagorawi Toll Road and succeeding respective routes of Jakarta-Tangerang, Jakarta-Cikampek, Intra Urban, Outer Ring, etc. This method is peculiar to Indonesia. As far as the toll road system of the country is intended for preventing the local unbalance of governmental public investments and for collecting the construction cost + maintenance cost as toll charges for the principle of beneficiary charge, there is no problem. However, considering the objective of establishment of P. T. Jasa Marga, it is desirable to prepare a system which allows independent operation as soon as possible. For this purpose, the establishment of financial prospect is necessary, and it seems to be an impending necessity to

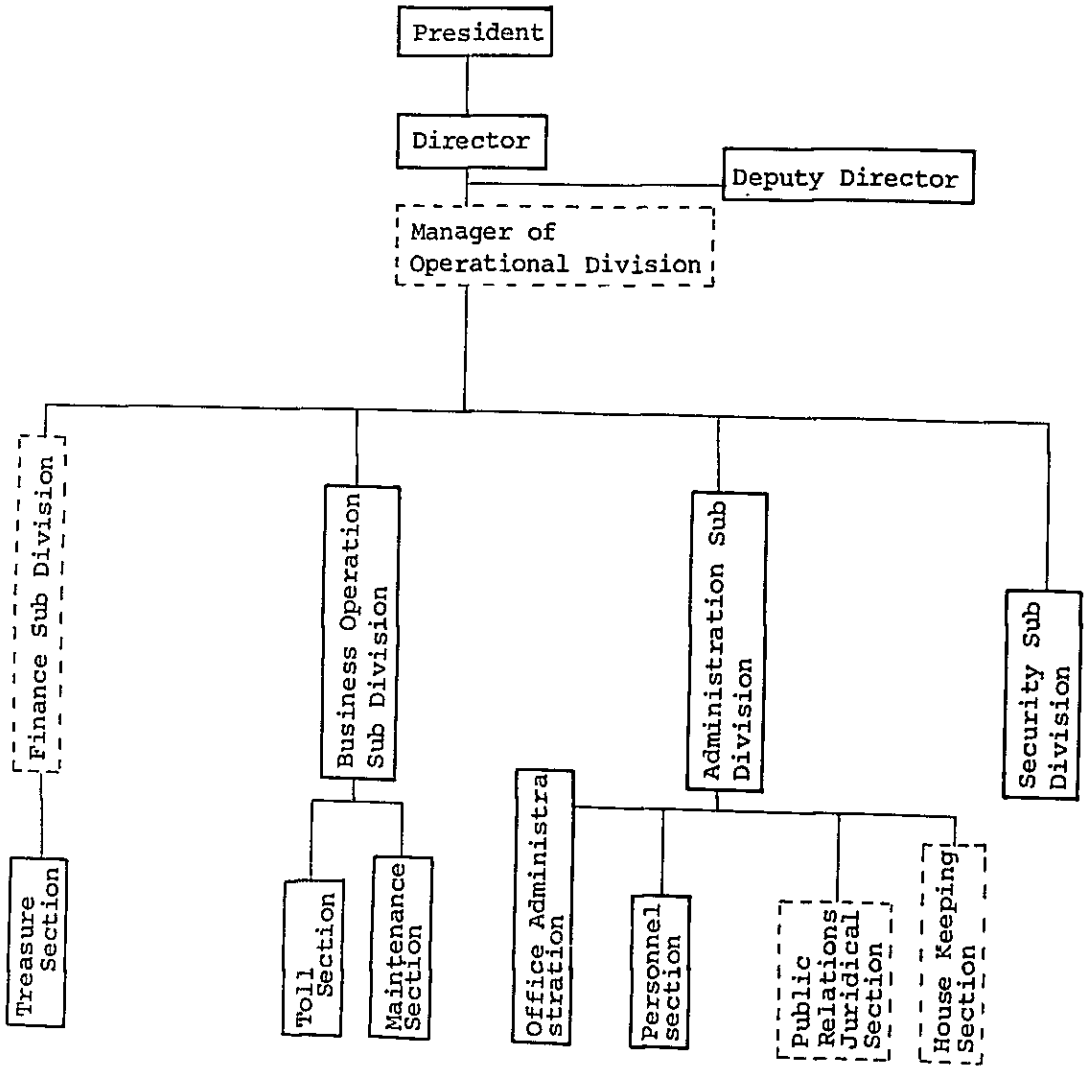
provide a planning division for long-term and comprehensive study of management in the organization, to form an execution idea, to discuss its prospect and to promote its materialization.

3-2-4. Present system of P. T. Jasa Marga

As mentioned before, P. T. Jasa Marga is very young, and is not a complete organization yet at present without future prospect. Therefore, it is difficult for the time being for them to construct a new route, and it is planned that when they have sufficient financial capability in future with sufficient prospect as a company, construction funds are procured fundamentally by introducing private funds, by means of bond issue, etc. Therefore, all the divisions and sub divisions shown in the above mentioned organization chart are not provided yet, and mainly divisions and sub divisions for work-site operations such as maintenance and control are provided, with emphasis placed on toll collection. Divisions and sub divisions for planning and construction are not yet provided. On the other hand, as preliminary stage, since business is performed together with the education and training of site workers, the personnel arranged are considerably many, for the business length.

Below are shown the present organization chart and personnel arrangement for work-site operations.

Fig. 3-10 Present organization chart of P. T. Jasa Marga



Note: The positions boxed in dotted lines are held concurrently. Manager of Operational Division and Chief of Finance Sub Division are held by President, and Chief of Public Relations/Juridical and Chief of House Keeping Section are held by Chief of Administration Sub Division

- Managerial position	11 persons
- Personnel for head office	14
- Personnel for toll collection	49
- Personnel for maintenance and traffic control	64
- Personnel for first aid	8
- Personnel for security	4
- Personnel for VHF operation	4
- Personnel for generator	8
Total:	162 persons

3-2-5. Budget of P. T. Jasa Marga

Table 3-10 shows a budgetary plan for revenue and expenditure of P. T. Jasa Marga.

These figures show the values estimated with the operation cost and revenue necessary for the whole route included, since Jagorawi Toll Road was scheduled to be opened completely within this fiscal year.

Among it, for the initially planned toll revenue (35 million rupiah/month), the actual amount increased steadily as observed in 22 million rupiah for March, 38 million rupiah for April and 39 million rupiah for May, and is resonably estimated to exceed the initially planned amount.

In the table, the undefined amounts could not be estimated, because operation and management of a toll road were for the first time.

Table 3-10 Budgetary plan of revenue and expenditure
(1978 fiscal year)

March 1 to December 31

Code of title	Budgetary item	Budgetary amount of expenditure (Rp)	Budgetary amount of revenue (Rp)	Remarks
I	Personnel	145,833,333		
a	Basic salary	75,000,000		
b	Special allowance	6,250,000		
c	Overtime work allowance	18,750,000		
d	Commutation allowance	6,250,000		
e	Social insurance premiums	18,750,000		
f	Income tax	12,500,000		
g	Personnel training expenses	8,333,333		
II	Office expenses	35,000,000		
a	Telephone charge	2,500,000		
b	Electricity charge	5,000,000		
c	Office supplies expenses	4,166,667		
d	Printing and bookbinding expenses	12,500,000		
e	Postal and cable charges	1,666,667		
f	Travelling expenses	6,250,000		
g	Meeting expenses	1,250,000		
h	Other expenses	1,666,667		
III	Maintenance and operation expenses	75,000,000		
a	Office supplies expenses	1,666,667		
b	Company building maintenance expenses	4,166,667		

Code of title	Budgetary item	Budgetary amount of expenditure (Rp)	Budgetary amount of revenue (Rp)	Remarks
c	Communication and electronic apparatus maintenance expenses	1,666,667		
d	Fuel expenses	41,666,667		
e	Motor vehcile purchasing cost	8,333,333		
f	Machine and apparatus cost	12,500,000		
g	Warehouse and garage construction cost	5,000,000		
h	Expenses for repairing damage caused by unidentified persons	Undefined		
N	Waste disposal expenses	Undefined		
V	Operation expenses	36,666,667		
a	Public Relations expenses	2,500,000		
b	Corporate income tax	16,666,667		
c	Interests paid and fees	12,500,000		
d	Insurance premiums	1,666,667		
e	Auditing expenses	1,666,667		
f	Other expenses	1,667,667		
VI	Income			
a	Toll income		350,000,000	
b	Non-toll income		25,000,000	
c	Penalty		Undefined	
d	Other income		Undefined	
Total		292,500,000	375,000,000	

3-3. Toll collection

3-3-1. Toll system

(1) Classification of vehicle types and toll amounts

As described in 3-1, Jagorawi Freeway is opened to traffic for about half the whole route (about 27km), and therefore toll amounts are temporarily decided as shown in Table 3-12 by the Managing Board of P. T. Jasa Marga, based on the amounts decided as shown in Table 3-11 by Article 3 of Presidential Decree.

Table 3-11 Classification of vehicle types and toll rate per km

Classification of vehicle type	Toll rate per km (in rupiah)
Vehicles of less than 2.5 tons (passenger car, jeep, pickup, wagon, microbus)	11 ~15
Vehicles of 2.5 tons or more (truck, bus, trailer, tank car)	20 ~ 25

Table 3-12 Classification of vehicle types and toll amounts

Classification of vehicle types	Toll amount (in rupiah)
Vehicles of less than 2.5 tons (passenger car, jeep, pickup, wagon, microbus)	300
Vehicles of 2.5 tons or more (truck, bus, trailer, tank car)	500

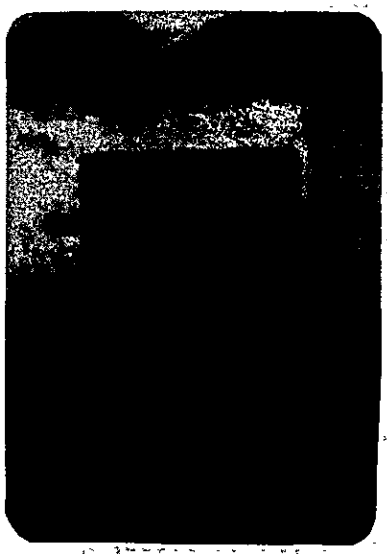


Photo 15 Toll sign

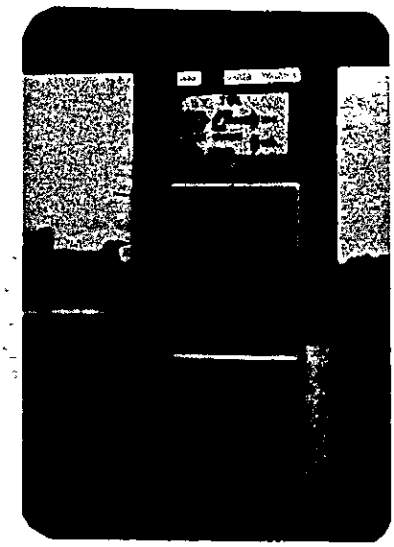


Photo 16 Toll booth

When the whole route is opened, Jagorawi Toll Road is scheduled to have 4 toll plaza, and at that time, closed system will be adopted.

(2) Discount system

As a toll road user service, the introduction of coupon tickets is decided, and for the time being, the adoption of 100-coupon ticket (10% discount will be applied) is considered.

(3) Non-revenue vehicles

The non-revenue vehicles are vehicles of Jasa Marga, vehicles of Jagorawi Project (vehicles of Bina Marga), and vehicles for construction. Each of these vehicles has a sticker having a symbol mark attached. For these vehicles, Jasa Marga prepares special lanes (see Photo 17).

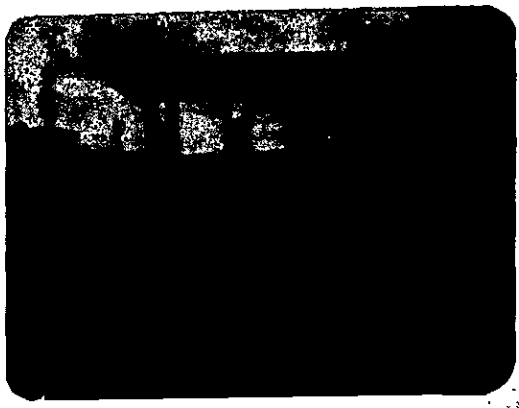


Photo 17 The left lane is exclusive for non-revenue vehicles

However, this method had better be reconsidered, together with the problem of open lanes of 3-3-2 (3) in preparation for the case where all the lanes must be used in some time zones because of traffic volume increase, and for the case where users are so accustomed to the use of the toll road as to unfairly use the exclusive lane.

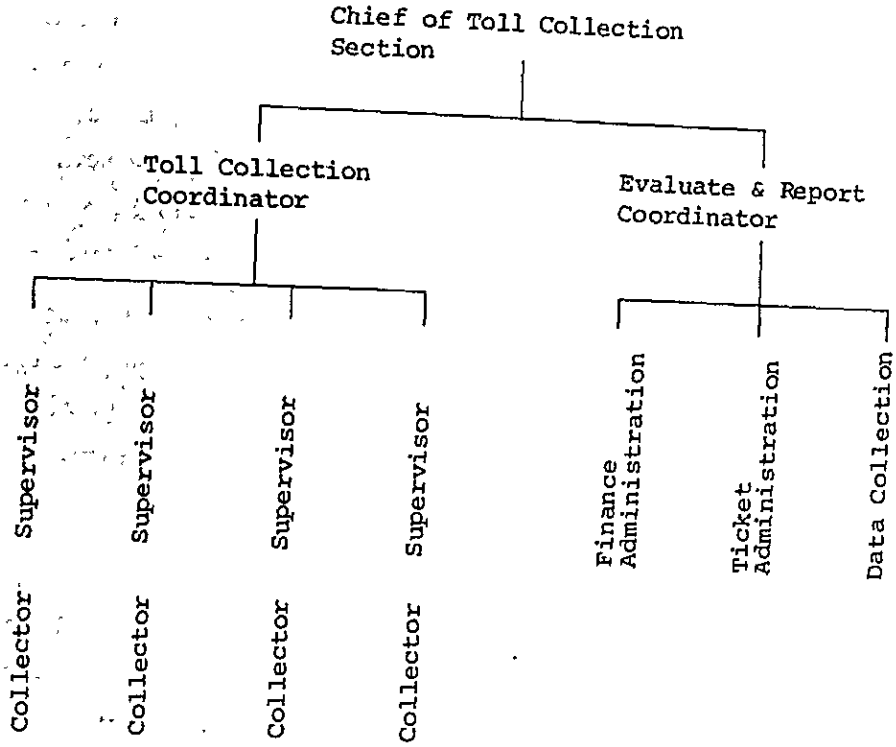
As a penalty for fraud vehicles, those who have used the road unfairly without paying tolls must pay 10 times the amounts of neglected tolls. This is a severe rule, compared with the Japanese rule stipulating 3 times.

3-3-2. Toll collection system

(1) Organization of toll collection section

As described in the organization of P. T. Jasa Marga in 3-3-2, Toll Collection Section belongs to Business Operation Sub Division. The organization is as follows:

Fig. 3-11 Organization of toll collection section



The main contents of the above respective functions are as follows:

- Chief of Toll Collection Section ... Generalizes toll collection section
- Toll Collection Coordinator .... Checks supervisor and ordinary collectors and prepares work schedules
- Supervisor ..... Supervises collectors, prepares change accounts necessary for toll collection, and controls tickets in the booths.
- Collector .... Collects tolls in the booth.
- Evaluate & Report Coordinator ... Supervises finance administration, ticket administration and data collection.

- Finance Administration .... Calculates the cash collected by collectors and totalizes twice a day, for remittance to bankers.
- Ticket Administration .... Makes inventory control of delivered and new tickets, and distributes them as requested by supervisor.
- Data Collection ..... Totalizes and tabulates such data as traffic volume.

Of the above, there are 24 collectors (including 4 female collectors), and their average age is 22 years old.

For training of newly employed collectors, they are positioned in combination with experienced collectors.

(2) Contents of collection work

Collectors work for continuous 8 hours in their respective booths, and their work contents are as follows. At the start of work, each collector prepares change account necessary for collection, cash box and report paper beforehand in the office, and goes to the booth (Tickets are distributed by the supervisor as many as required in the respective booths). When he reaches the booth, he takes over the duties of his predecessor, after confirming the tickets, collecting equipment, etc. Then, he signs on the report paper prepared in the booth, to the effect that he has accepted, thus completing the preparation for start of work.

Then, the collector inserts a ticket with "vehicle type", "direction of destination", "serial number", "amount" and "public requlation" printed, into a time clock (device to print year, month, date, hour and minute) for one approaching vehicle, and hands the printed ticket to the driver, collecting cash. At this time, the collector hands a leaflet with caution for driving printed. He

repeats these works. At present, because it is not long since the road was opened, and because the booth is the sole place to contact drivers, collectors distribute the leaflet and collect tolls simultaneously. However, particularly when cash is handled, change account errors may be caused. If possible, leaflet distribution should be preferably made at any other place.

Photo 18 Toll collection work

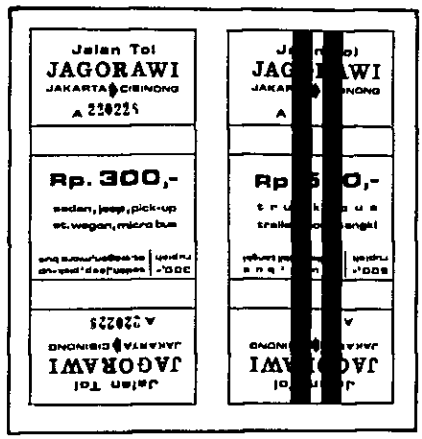


Photo 19 Ticket

Collectors identify vehicle types visually, but when vehicles hard to be identified as to types come in at night, etc, they confirm the weights (see the photo 20) described in the bodies, for identification of vehicle types.

Photo 20 Weight indication of vehicle

The indication of the photo is made on such vehicles as trucks and buses, and it is a convenient system for collectors to be able to confirm vehicle types, in the adoption of the present vehicle classification.

The above are the contents of work by collectors in the booth. After the duty is over, each collector returns to the office with collected cash, stubs of ticket, etc, and submits them to the supervisor, terminating his duty.

(3) Working diagram for collectors and number of open lanes

As described in (2), collectors work for continuous 8 hours. An example of working diagram is shown below.

Table 3-13 Working diagram of toll collectors

SHIFT I 07:00 - 15:00

SHIFT II 15:00 - 23:00

SHIFT III 23:00 - 07:00

NUMBER OF DAYS	GATE I				GATE II				GATE III				GATE IV				GATE V				GATE VI				STAND BY		
	I	II	III	FREE	I	II	III	FREE	I	II	III	FREE	I	II	III	FREE	I	II	III	FREE	I	II	III	FREE	I	II	III
1.	11	12	13	14	21	22	23	24	31	32	33	34	41	42	43	44	51	52		54	61	62		64		53	63
2.	64	12	13	11	14	22	23	21	24	32	33	31	34	42	43	41	44	52		51	54	62		64		53	63
3.	64	61	13	12	14	11	23	22	24	21	23	32	34	31	43	42	44	41		52	54	51		62		53	63
4.	64	61	62	13	14	11	12	23	24	21	22	33	34	31	32	43	44	41		53	54	51		63		42	52
5.	64	61	62	13	14	11	12	23	24	21	22	33	34	31	32	43	44	41		53	54	51		63		42	52
6.	63	61	62	64	13	11	12	14	23	21	22	24	33	31	32	34	43	41		44	53	51		54		42	52
7.	63	54	62	61	13	64	12	11	23	14	22	21	33	24	32	31	43	34		41	53	44		51		42	52
8.	63	54	51	62	13	64	61	12	23	14	11	22	33	24	21	32	43	34		42	53	44		52		31	41
9.	63	54	51	62	13	64	61	12	23	14	11	22	33	24	21	32	43	34		42	53	44		52		31	41
10.	52	54	51	63	62	64	61	13	12	14	11	23	22	24	21	33	32	34		43	42	44		53		61	41

As obvious from Table 3-13 collectors for Shifts I and II take one holiday after four working days, and collectors for Shift III take two holidays after four working days. Shifts are successive in the order of I, II III.

Since one time duty covers continuous 8 hours, they are relieved for meals, etc by trainee collectors or supervisor. Since the duty time is continuous in this way, tea is served twice for collectors.

Photo 21 Inside of tool booth

As for the opening of lanes, as obvious also from Table 3-13, six lanes are opened from 7:00 to 23:00, and 4 lanes, from 23:00 to 7:00.

In addition, one exclusive lane for non-revenue vehicles is opened for each direction (though no collector is positioned for the booths of the exclusive lanes, policemen are positioned to watch vehicles).

At present, all the lanes (8 lanes) are opened in the daytime, because of the training period. It seems necessary to consider the proper number of open lanes in correspondence to traffic volume, if possible, in future.

3-3-3. Toll collecting equipments and totalling and auditting system

As equipments now used in Jagorawi Toll Road, installed are time clocks to print dates on tickets, traffic counters to count passing vehicles (count two exles as one vehicle) independently, and loop coils to count vehicles independently.

These equipments work smoothly without any large troubles, since it is not so long since they started operation. Therefore, there was observed no scene of actual maintenance. It is intended to make maintenance only when there occurs a large error (for example, when the number of vehicles reported by collectors is greatly different from the number of vehicles counted by equipments Jasa Marga adopts system to perform the maintenance directly, and has four engineers for this purpose. In future, with the extension of service length, many equipments will be introduced, and a substantial maintenance system will have to be established. Otherwise, machine troubles will not allow smooth operation of the collection system, and will cause difficulties particularly in light of auditting.

With regard to the totalizing and auditting system, the present traffic counters and loop coils do not have satisfactory checking functions. (A traffic counter counts only axles, and two axels as one vehicle. Therefore, when three-axle vehicles pass, the number of vehicles must be adjusted. A loop coil may count two very close vehicles as one vehicle.) In this situation, for actual auditting, the amount of cash collected by collectors is collated with the total amount obtained from stubs of tickets.

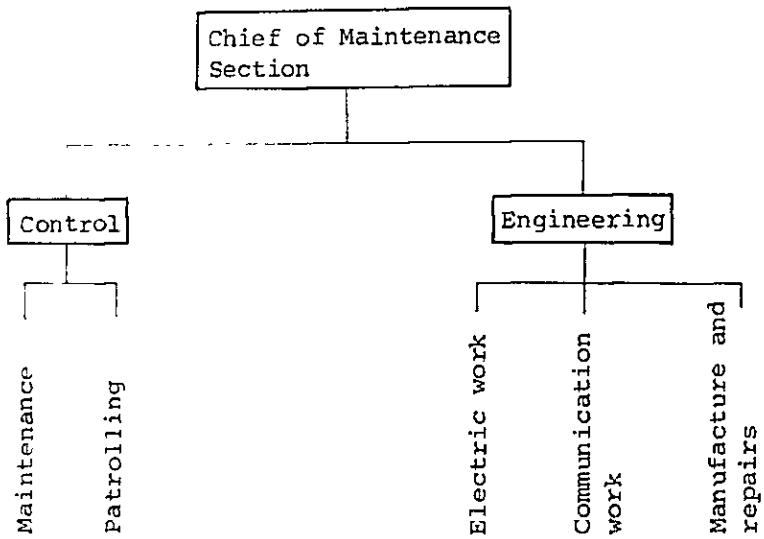
At present, there is only one toll plaza, and auditting system can be made sufficiently. But when the road length is extended, with toll plaza scattered, the auditting system will have to be established.

3-4. Maintenance and repairs

3-4-1. System of maintenance and repairs section and its work

As in charge of maintenance and repairs, there is Maintenance Section in Business Sub Division. Maintenance Section is in charge of the five jobs shown in the following organization chart.

Fig. 3-12 Organization of maintenance and repairs section



The contents of the respective jobs are as follows:

° Manufacture and repairs

To manufacture and repair signs, and to repair machines and tools.

All the signs used in Jagorawi Toll Road are manufactured here, and several workers make them manually.

Still now, as soon as signs are made, they are installed in sites.

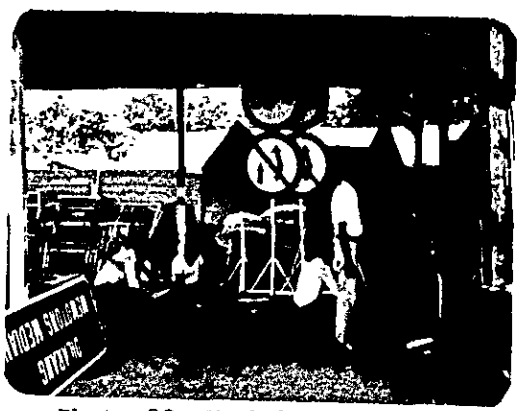


Photo 22 Workshop

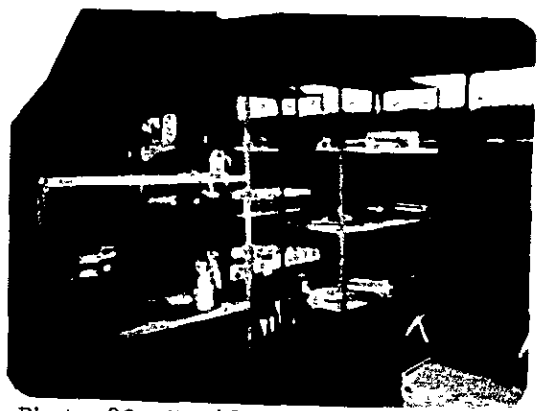


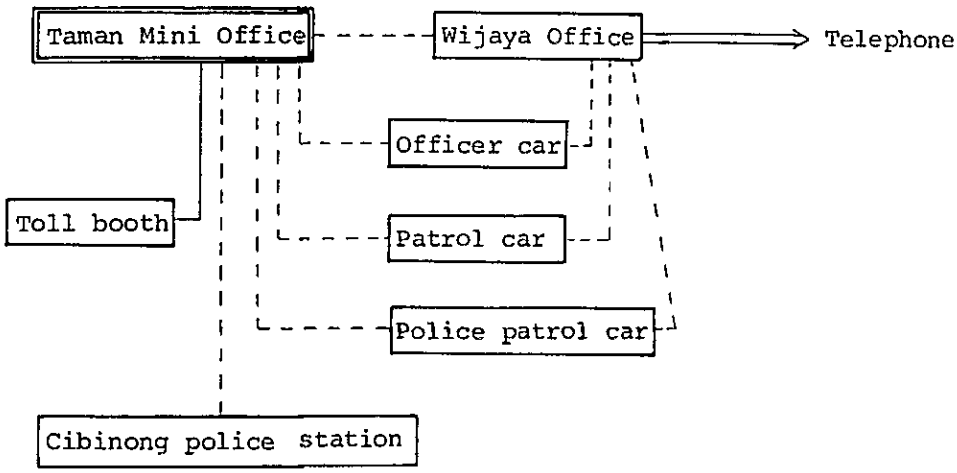
Photo 23 Inside of workshop

° Communication

To communicate with patrol cars and other base, with one VHF radio equipment stationed.

The communication system now established is as shown below.

Fig. 3-13 Communication system diagram



---VHF radio ——Interphone ═══ Telephone

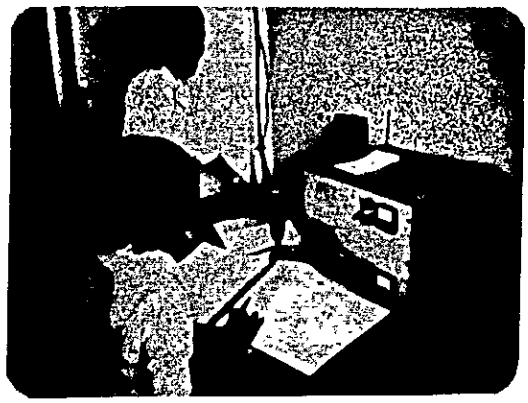


Photo 24 Communication room

In the above diagram, the Cibinong police base is not yet completed, and only an antenna is installed in the building for the base.

At present, ordinary telephones are not installed in Taman Mini Office, and therefore for communication with outside such as Bina Marga, indirect telephone contact through radio communication with Wijaya Office is made.

° Electric Work

To service electric apparatus such as lightings, and air conditions in offices and toll booths, and two generators as power source for them, since general commercial power is not supplied at present.

° Patrolling

To patrol for maintenance and traffic control by one passenger patrol car and four small trucks.

° Maintenance

To deal with traffic accidents reported by patrolling, to repair damaged places, to perform cleaning, and to operate the generators.

Of the above respective jobs, 24-hour duty system by three shifts is established for communication, electric work and generator operation. As for the working diagram communication and electric work are covered by 4 groups, and generator operation, by 5 groups, with one holiday for four working days.

For patrolling, one group consists of six workers. Two is on full duty from 6:00 to 18:00; two is on full duty from 18:00 to 6:00 and on standby duty from 6:00 to 14:00; and the remaining two stands by at night. Every day three groups are on duty, and one group is off. At present, in light of control length and traffic volume, no jobs are entrusted to any sub-contractors, and for the time being, this set-up will last. However, the introduction of entrusting is considered for future. The maintenance machines now held by Jasa Marga are as shown in Table 3-14.

Table 3-14 Machinary for maintenance and control

No.	TYPE OF EQUIPMENT	TOTAL	REMARK
1.	CHIEF CAR	1	VOLVO
2.	PATROL CAR	4	DATSUN
3.	SIGN CAR	2	SCOUT
4.	PICK UP	1	TOYOTA
5.	POWER BROOM	2	WISCONSIN
6.	WATER TANK TRUCK	2	5000 L-CAPACITY
7.	FLAT BED TRUCK	1	CHEVROLET
8.	WRECKER	2	a) 10 Ton - H. I. b) 5 Ton - DAIHATSU
9.	TIRE ROLLER	1	SAKAI
10.	SPREADER HANDY	1	WISCONSIN
11.	COMPRESSOR	1	I.R.
12.	AMBULANCE	1	V.W.
13.	GENERATOR	2	CATERPILAR 120 KVA
14.	POLICE PATROL CAR	6	VOLVO

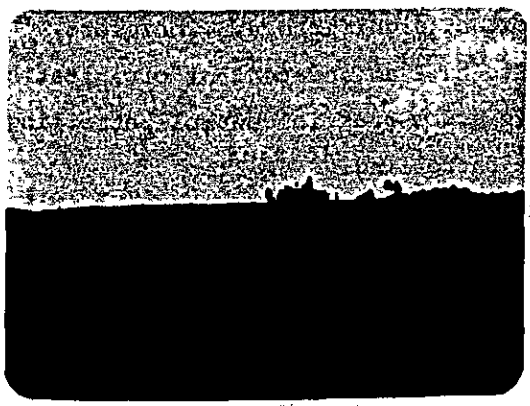


Photo 25 Maintenance machines

Photo 26 Patrol car (for maintenance working)

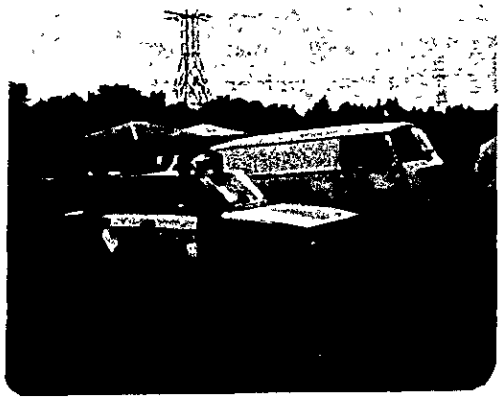


Photo 27 Patrol car and ambulance

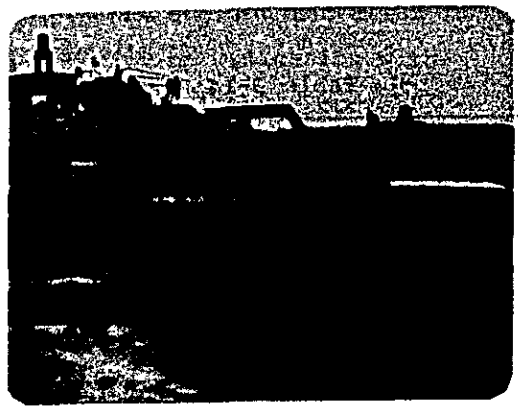


Photo 28 Sign car

3-4-2. Characteristics and problems of maintenance and repairs

(1) Maintenance

Most maintenance work in Jagorawi Toll Road comprises partolling and the disposal of traffic accidents, and other work is little made, probably because it is not long since the road was opened to traffic.

(a) Patrolling

In the present patrolling, traffic control and maintenance are not discriminated, and both are covered by the same patrolling.

However, when the toll road is completed as a network in future, with the increase of traffic volume, traffic control will have very important significance. Therefore, in future, it is necessary to have an independent organization for traffic control and to execute traffic control patrolling separately from maintenance patrolling.

The present patrolling is made at a considerable frequency as mentioned before, but one patrolling team does not always consists of two persons, but sometimes one person. Considering contact on an emergency, two-person patrolling is surmised necessary.

Check items for maintenance are mainly concerned with

road surface under usual cirsumstances, but several times a year or after abnormal weather conditions, faces of slopes, water channels, structures, etc will have to be checked additionally.

(b) Cleaning

At present, road surface cleaning by sweeper is not made, and gross refuses only are collected by patrolling.

Traffic volume is small, and road surface is sometimes washed by strong rainfall, remaining not so dirty. However, some time in future, surface cleaning will have to be done, and in this case, mechanical work by sweeper, etc will have to be made, for the safety of the cleaning work.

For collecting gross refuses and collecting trashes on faces of slopes, conventional manual work by patrolling is estimated to be made, but as for the clothes of the workers, it is desirable to make them wear luminous zebra vests which allow visual identification from running vehicles.

Furthermore, for the road surface, faces of slopes, water channel of medial strip, etc, it is desirable to decide cleaning frequencies suitable for them, for periodical cleaning.

(c) Drainage

Since the soil on the land surface of Java Island is volcanic laterite liable to be eroded by rainfall, drainage canals are surmised to be liable to be buried or loaded by sediment transport. When strong rainfall peculiar to this district occurs, drainage may become defective, to cause easily the situations of overflow, ponding, etc. Therefore, it is surmised necessary to check and clean drainage canals frequently.

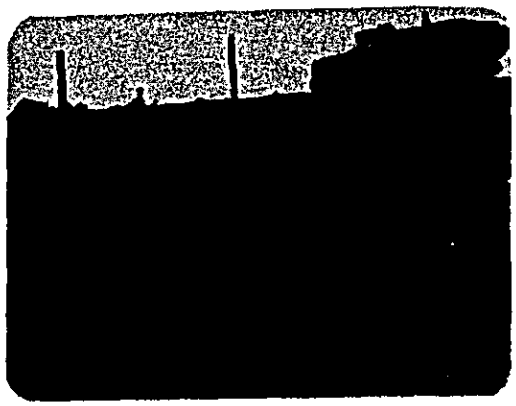


Photo 29 Culvert box

(d) Planting

On the median, planting is not observed yet, and now trees to be planted are being selected. In selecting the trees, it is necessary to consider such trees which do not rot at the roots, are not sensitive to exhaust gas, and little extend branches. For planting on the faces of slopes, there are seen places where grass are hard to take root on relatively steep slopes. However, also in order to prevent the sediment transport caused by the erosion of slope faces due to the strong rainfall peculiar to the district, it seems necessary to keep planting by such control as fertilization.

(2) Repairs

(a) Faces of slopes

Jagorawi Toll Road passes through gentle topographic features, with sufficiently wide land taken for the road and very gentle slope gradient determined, and therefore has no steep long faces of slopes, being free from large scale slope collapse. Furthermore, because of this, few guard rails are installed, excluding partial high embankment portions. Therefore, the disposal of damages due to accidents, etc is easy.

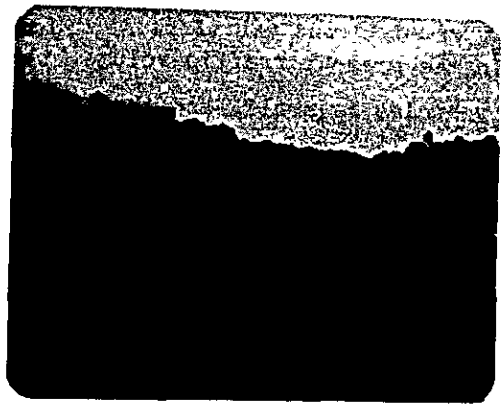


Photo 30 A face of slope and a sign for confirming interval of vehicles

(b) Bridges

Temperature is 27°C on the average throughout a year, changing little, and the temperature difference between day and night is surmised to be about 10°C at the largest. Therefore, excluding long bridges, most bridges employ continuous pavement by dummy joints. For shoes of bridge, thin rubber shoes of bridge are used, and there is little need of considering such problems as expansion joint breakage, shoes of bridge corrosion and breakage. These arrangements are very advantageous for maintenance.

For bridge type, topographically, long effective spans are not required. Since steel is imported and expensive, all bridges are of concrete, and most adopt prestressed concrete girders. Therefore, no need of repainting is another advantage.

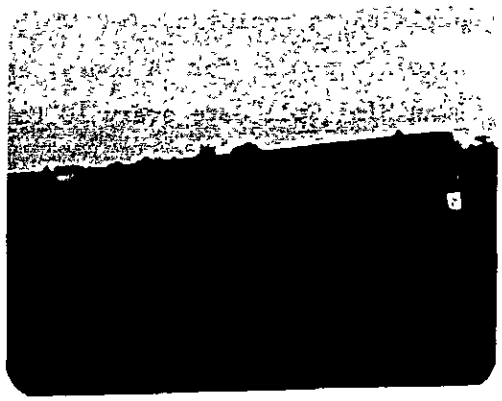


Photo 31 A bridge on Jagorawi Toll Road

(c) Pavement

In the present traffic volume, the ratio of heavy motor vehicles is small, and the life of road surface is surmised to be long.

However, it seems unavoidable that faulting by settlement in the portions where structures as placed, and damages, etc of defective portions on subgrade are caused, to require partial repairs. Therefore, it will be necessary to make Constant check,to determined repair standard values and to perform partial prepairs.

Even though maintenance and repairs are relatively easy at present, points where repairs are required will increase, involving working difficulties, together with the increase of control length and traffic volume. At that time, standards for safe and efficient execution of work become necessary (see Chapter 4).

3-5. Traffic control and service for users

3-5-1. System of traffic control section and its work

(1) Patrolling and roadside aid

As described in 3-4-1, the patrolling for traffic control is done together with the patrolling for maintenance and repairs, and there is no independent organization for the formar.

The motor vehicles possessed are as shown in Table 3-14. Of them, an emergency patrol car stands by at Taman Mini Toll Plaza constantly day and night, to turn out on an emergency such as accident.

Patrols are made for 24 hours, and each patrol starts from Taman Mini Toll Gate every 10 to 15 minutes. On their way, they stand by for one hour at Citeureup Interchange and returns. When they find any accident or a disabled car on their way of patrolling, they provide aid. For this purpose, patrol cars are loaded with gasoline, water, rope, fire extinguisher, etc.

The police commit six patrol cars and 20 policemen. They patrol constantly day and night by two cars, and keep two cars stand by. The expenses for police patrol cars such as gasoline are borne by P. T. Jasa Marga. An organization of expressway patrol unit is considered for future.

Photo 32 Equipments carried by patrol car (for maintenance working)

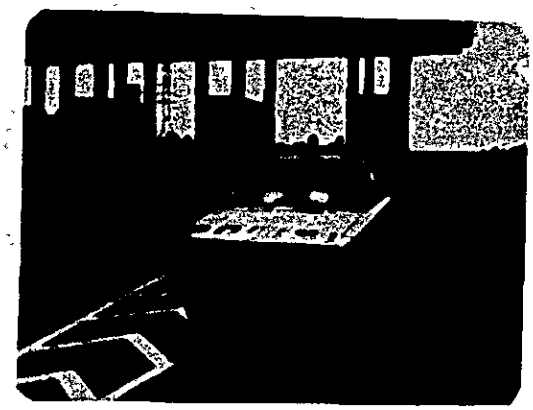


Photo 33 Police patrol car

(2) Fire fighting and first aid activities

Fire fighting and first aid in Jagorawi Toll Road are covered by P. T. Jasa Marga themselves. For this purpose, they possess one ambulance (see Photo 28) at Taman Mini Toll Gate, with two ambulance men (nurses) stationed, out of 8-person force. They work in three shifts of morning, afternoon and night, and take two consecutive holidays for six working days in an 8-day cycle.

There is no problem in ordinary carriage of the injured, but when large casualties occur by a bus accident, etc, they will have to ask for the help of the local fire brigade. But P. T. Jasa Marga does not conclude any assistance agreements for such cases. An emergency system covering a communication and contact system and improvement of first aid medical service will have to be established as soon as possible.

3-5-2. Restrictions on the use of the toll road

The matters to be observed by users of toll roads are stipulated as follows, under Managing Board of P. T. Jasa Marga's Regulation No. 1 of 1978.

(1) Prohibited acts of users on toll roads

a. To use a toll road in a way to destroy the road.
b. To stop on a toll road in the other places than those designated.
c. To cross the median.
d. To throw away a thing onto a toll road.
e. To leave a trouble car for more than one hour.
f. To enter a motor vehicle considered dangerous, into a toll road.

(2) Matters to be observed by the users of toll roads.

a. To check and fix the motor vehicle before it is entered into a toll road.
b. To wear a safety belt.
c. To run at 60km/hr at the lowest.
e. To run on the left lane.
f. To pass another car ahead from the right lane.
g. To give a signal for changing the lane.
h. To keep the interval of vehicles.
i. To decrease speed at the time of rainfall.
j. To use a shoulder when a car is in trouble.
k. Not to run in a way to cause danger for traffic.

(3) Dimensions of motor vehicles to run on toll roads

Motor vehicles with 4 or more wheels must satisfy the following dimensions.

a. Weight: 20 tons or less
b. Height: 4.5m or less
c. Length: 12.75m or less (18m or less in the case of a trailer)

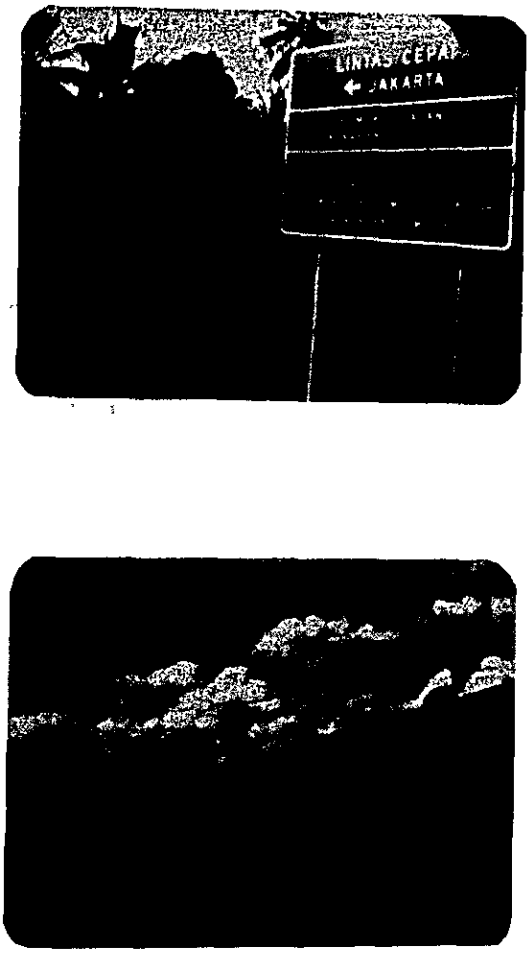


Photo 34 A sign of vehicles which are prohibited to run on toll roads (two-hweeled motor vehicles, three-wheeled motor vehicles, and vehicles without motor are prohibited to run on toll roads)

(4) Amounts of penalties

In the mentioned above,

a. For (1) prohibited acts a (destruction of road) and f (entry of dangerous vehicle), amounts estimated by P. T. Jasa Marga.

b. For (1) prohibited acts b (illegal stop) and c (crossing of median), 5,000 rupiah.

c. For prohibited act e (leaving of trouble car);

Vehicles of less than 2.5 tons

Working charge without lifting	3,000 rupiah
Working charge with lifting	5,000 rupiah
Wrecker charge per km	100 rupiah

Vehicles of 2.5 tons or more

Working charge without lifting	3,000 rupiah
Working charge with lifting	5,000 rupiah
Wrecker charge per km	200 rupiah

In addition to the above, the regulations stipulate that users who did not pay tolls must pay 10 times the tolls, that drivers should obey other laws and regulations and so on.

The legal base for the regulations is not clear, and they can be considered a kind of passage agreements between P. T. Jasa Marga and the users of toll roads. In future, when the system of road laws is improved, it is desirable to make the regulations legally based.

The penalties for fraud vehicles and vehicles violating the regulations should be appropriated to improve traffic safety facilities.

Photo 35 Wrecker

3-5-3. Restrictions along the road

(1) Keep-out regulations

There are wire netting fences on the boundaries between

Jagorawi Toll Road and private land, but they are broken at various points, for the inhabitants along the road to enter into the road or to cross the road. Fortunately, because of small traffic volume, only one accident caused by crossing pedestrians occurred.

Jagorawi Toll Road is not completed yet, and three are few frontage-roads and crossing structures. In this situation, unconditional control cannot be effected, and at present, such crossing must be overlooked. P. T. Jasa Marga is at a loss how to solve the problem. They are planning to construct a few pedestrian bridges between the starting point and Taman Mini Toll Gate, particularly at places where there are many crossing pedestrians. As soon as the bridges are completed, they will develop service roads, etc and intensify control.

Therefore, since the entry and crossing of pedestrians involve large danger together with the increase of traffic volume, the problem must be settled fundamentally. For this purpose, it is necessary to attain matching with the land use planning along the road, to construct frontage roads, to gather together crossing points, and to keep people out at the crossing points.

For this objective, the present road area should be classified into "motorway area" and "the other area", and in the "motorway area", fences should be erected on the boundaries, to perfectly keep people out. Also in "the other area", it is needless to say necessary to control land for frontage roads, parking areas, but stops, green belt for noise buffer zone, etc, and care should be taken not to allow the land to be occupied illegaly for dumping grounds and houses.

Photo 36 Fence is used for drying clothes

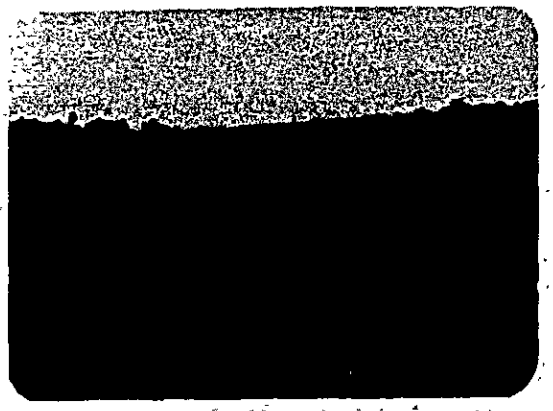


Photo 37 People are crossing

(2) Restrictions for advertisements

At present, Jagorawi Toll Road is wide (R.O.W. = 90m) and passes through fields, and no advertisements are seen along the road.

Since roadside advertisements impair the scenery of the road and prevents the visual identification of road signs, they should be controlled in places where many signs are installed and sight distance is required for alignment, as in and around an interchange. Electric advertisements may cause confusion in identifying motor vehicle lamps.

In Japan, for Shinkansen lines of railways and expressways, exterior advertisements are forbidden in a certain range (500m from the line or road) by prefectural regulations and similar regulations should be examined also for Indonesia.

Example and Suggestion on Toll Road

IV. Example and Suggestion on Toll Road

In chapter 2 the toll road system and its future conception of the Republic of Indonesia were described and in chapter 3 the present situation and problems relating to the management and operation of Jagorawi toll road now under actual management and operation of the Republic of Indonesia were described. In the Republic of Indonesia only part of the planned toll roads has been opened, and so as the toll road system becomes developed in the futur- more problems may arise.

Most of these problems may deeply relate to the politics, economy, financial policy, legal system and administrative institutions of the Republic of Indonesia. Therefore, at this moment it is difficult to make an accurate forecast and find an exact conclusion.

This chapter will introduce and make some suggestions as to the toll road system.

4-1. Outline of the toll road systems in other countries

4-1-1. Toll road system in the United States of America

United States' modern toll road system originates from the Pennsylvania Turnpike that opened in 1940. In 1950s after the end of World War II there was a construction boom of toll roads. As many as thirty states set to the construction or planning of toll roads. Almost all roads of high speed standards in the central and eastern parts of the United States were planned, built and offered as toll roads.

The reason why the United States introduced the toll road system is that the road improvement works were not able to catch up with the demand for the rapidly increased automobile traffic volume from the standpoint of financial resources.

With the dawn of the twentieth century the United States where the age of motorization soon began taxed the automobiles in several ways. In 1901 an automobile registration tax was adopted in the state of New York, which triggered a series of taxations. In 1919 an automobile fuel tax appeared in the state of Oregon, and in 1932 the automobile

fuel came to be taxed as a federal tax. These taxes were reserved, in almost all states, as special financial resources for roads but not enough to cope with the demand for the rapidly increasing automobile traffic volume of the times. This led to the construction of toll roads in many parts of the United States.

In 1956 based on the interstate highway law and the road revenue law, the fuel tax was federally reserved as the special financial resources. In addition to them, in 1968 the federal subsidy to the interstate highways was decided to be 90% in principle, and the federally subsidized highways were decided to be offered free of charge. As a result, the 68,000km-long inter-state highways system was rapidly improved, and the construction of toll roads declined. Now, about 4,700km-long toll roads are offered for public use. Of them, 3,300km-long toll roads from part of the inter-state roads system.

The organizations which own and operate the toll roads in the United States are the states' road departments and the public corporations, etc. established by the state laws. For a single toll road there is an organization like a clerical union of a country.

The toll of the toll roads is determined in such a manner that the maintenance and operating cost and the entire repayment of principal and interest to bonds can be, in principle, covered. The fundamental principle in determining the toll is based on "repayment policy".

The construction expenses of toll roads are raised by issuing bonds. The bonds are guaranteed by the toll revenues from the toll roads, road utilization taxes including gasoline tax or states' governments. A syndicate group of several financial organizations accept the issuance of these bonds. On completing the repayment of all bonds the toll roads are, of course, offered free of charge.

As mentioned above, federally subsidized roads are built free of charge but even part of toll bridges and tunnels is

also subsidized on the assumption that they be offered free of charge after their construction expenses were repaid by the revenue of their tolls. The federal fund is also granted to the rebuilding of inter-state toll roads with two lanes.

4-1-2. Toll roads system in Italy

Full-scale construction of toll roads in Italy originates in the legislation of the construction motorway and ordinary road law based on the Romita Plan worked out in 1955.

In the Romita Plan which was a 15-year plan for the purpose of improving the foundation of the industrial zone in the northwestern part and developing less developed areas in the southern part of Italy, 1,130km-long automobile roads were decided to be built within ten years from 1956, and a license system was introduced to the construction and management of the toll roads (In the sourthern part the roads were decided to be offered free of charge of because of the difficulty in repayment).

The main constituents of the undetakings of the toll roads are licensed companies including Autostrade invested by the Industrial Rehabilitation Institute (I. R. I.), with which the construction and management of the toll roads were entrusted. At present Autostrade Company is granted a comprehensive license to build and manage 22 routes (2,900km) of the important automobile arterial roads. The 22 routes take 43% of all the motorway network. There are 25 other licensed companies, and more than 50% of their capitals is invested by local public bodies.

The 1955 law stipulated that the government grant subsidy within 40% of the over-all construction cost to these licensed companies, authorize them to manage the roads as toll roads for thrity years after the completion of the roads, and order them to return the roads free of charge to the government after their repayment. The percentage of subsidy was decided by an agreement based on the repayment study.

When there was more than 5% profit of the Plan during the period, the difference was decided to be paid to the national treasury. Even taxational special measures were approved to them.

In 1961 this comprehensive subsidy was abolished. Instead, it was improved to a system which allocate a subsidy within 4% of the over-all construction cost each year over thirty years. In this case it was decided to expect about 5% profit in the repayment study and determine the percentage of the subsidy.

The fund is raised mainly by long-term lonas from the public works financing corporation. In addition to them domestic bonds and foreign bonds are issued.

As to the toll, the same toll rate system is applied nationwide (the toll is increased by 20% in sections where the construction cost were high). The minister of public works decides the toll in consultation with the minister of finance the intervention of companies.

The over-all length of the planned motorway including those now in use, under study and under construction reach 6,700 km. Of them, free-of-charge roads run 750km (11%), the arterial roads of Autostrade running 2,900km(43%) and the roads of the other licensed companies running 3,050km (46%).

The 2,900km - long important arterial roads under the management of Autostrade Company are adopted pooling system of financial account under unitized accounts.
The arterial roads will be completed in 1978, and the repayment is scheduled to complete in 2003. Therefore, until 1977 part of the revenue from the roads in use will be invested for the construction of new roads. After 1978 there is no construction of roads, and the company will exclusively manage and operate the arterial roads. It is expected that for several years the company will suffer from deficits with their loans decreasing for the first time in the second half of 1980.

4-1-3. Toll road system in France

The toll road system in France originates in the motorway law in 1955. Although the law stipulates that the travelling through the motorways is, in principle, free of charge, the law still stipulates that the construction, management, etc. of the motorway can be entrusted with Societe d'Economic Mixtes. After this, roads within cities and surrounding the cities came to be built without collecting the tolls, while inter-city motorways came to be built as toll roads.

Societe d'Economic MMxtes is a semi-official enterprise (the third sector) with more than 51% of the capital invested by local public bodies. As of 1975 there are five such companies. They are granted license of 35 years including the construction period. The period of repayment is set at 30 years after the opening of the roads. Initially, about 30% of non-interest advance money (subsidy) was received from the national fund with the rest financed with a long-term borrowed money from the national credit bank of highway. This financial restrictions did not promote the construction of highways. Therefore, the advance money system was abolished in 1971. Instead, the companies were allowed to borrow from private financing organizations. The national credit bank of highway is a financing organization set up jointly by five companies of Societe d'Economic Mixtes and issues debentures guaranteed by the government and finances to the Societe d'Economic Mixtes.

In 1970 the motorway law was revised, and to introduce private fund more positively, licensed companies consisting of groups of private companies were entrusted with the construction, management, etc. There are four such companies. Contracts with the government are based on biddings. The period for entrusting is for 35 years after half of the over-all length was opened to traffic. There are three conditions to raising the fund by the licensed companies.

In the first place, the capital should be 10% of the total required fund. In the second place, the percentage of the government-guaranteed bond should be below 75% of the total required fund. In the third place, the percentage of the fund raised independently by an licensed company should be beyond 15% of the total required fund.

The toll of a toll road can be determined freely by an licensed company for 10 years after half of the over-all length was opened to traffic. Since this period is a financially difficult period to the management of any licensed company, the companies can decide their tolls according to the economic principle. From the eleventh year onward, standard tolls determined by the government are charged. However, the government has nothing to do with the appointment and dismissal of officers, salaries, etc. Dividend on profit is free. However, when the government's fund is appropriated for this purpose, it is required to pay the amount of profit beyond 7% before the maturity. When the period for entrusting exceeds 20 years, the government reserves the right to cancel the contracts.

As of 1972, 2,172km-long motorways are offered for use, and additional 3,600km-long roads will be offered for use. Of the 3,600km-long roads, part of roads including those linking the harbors in Southern part and Northern part of France with the inland (600km) will be built free of charge, and half of the remaining roads (3,000km) will be shared by Societe d'Economic Mixtes and the four licensed companies. The four licensed companies will be responsible for roads of better profits, while Societe d'Economic Mixtes will be responsible for other roads and extension of connecting roads.

4-1-4. Toll road system in Japan

(1) History and outline of the toll road system

The toll road system of Japan originates from the legislation of the Emergency Measure for Highway Construction Law

The Japanese economy that became remarkably impoverished during World War II showed an upturn in 1950s, and the demand for road improvements which are the foundation of the society become increasingly larger. In 1953 the revenue from the gasoline tax was reserved as the special financial resources for road construction work. Fifty to one hundred percent of construction cost of the national roads were fianced from the national treasury. In addition to them, the construction of toll roads increased due to the demand for the increasing automobile traffic.

The initial toll roads were financed by the national treasury loans and investment, and therefore the government and local public bodies were the main constituents for the management of the initial toll roads. However, in 1964 when the inter-city highway plans including Meishin Expressway and Tomei Expressway became concrete, the Emergency Measure for Highway Construction Law was totally revised so as to seek financing from private sources, and Japan Highway Public Corporation financed in full amount by the government was allowed to undertake the toll road operations. With the establishment of the Japan Highway Public Corporation the toll roads under construction and management and in use by the government and local public bodies have been transferred.

Additionally, in 1959 the Metropolitan Expressway Public Corporation was set up while in 1962 Hanshin Expressway Public Corporation was set up to cope with the traffic demand in the metropolitan area and Osaka and Kobe area. These movements led to the construction of toll roads at a high pitch. The rapid development of such toll roads was backed by the high growth rate of the Japanese economy and the wide-spread motorization (number of automobiles in 1950: 350,000; in 1970; 18,920,000; in 1975: 28,410,000). Of today's toll roads in Japan inter-city expressways extend to about 2,200km; intracity expressways extend to about 220km; and ordinary toll roads extend to about 2700 km.

The funds for the construction and operation of the toll raods of the Japan Highway Public Corporation are financed by the government-guaranteed bonds, government-underwritten boands, funds of Fund operating department, fund of postal insurance and government-invested funds and interest subsidizing fund (subsidy) consisting of gasoline tax. Of these funds the government-invested fund and interest subsidy are for the purpose of lowering the cost of financing (interest rate). Because these funds are appropriated to the Japan Highway Public Corporation, the cost of financing of the Japan Highway Public Corporation is reported to be 6% to 6.5%. The construction of Meishin Expressway and Tomei Expressway was financed by the borrowed money from the World Bank.

The bonds were underwritten by syndicate groups consisting of 36 companies including banks and security companies. They are to be repaid in ten years after three years of grace.

The toll of the ordinary toll roads should be, it is ruled out, determined in consideration of the benefit by vehicle type(benefit for saving in travel time and benefit from saving in operating cost)and the construction cost and operation cost (including interest) must be repay able with the toll. In this case the period of repayment is within 30 years. The period of repayment is decided by working out a repayment schedule with profit and loss statement consisting of four condition, i. e. construction cost, estimated yearly revenue (toll x estimated traffic volume), yearly operation cost, and interest (6% of the cost of financing).

The toll per km of the inter-city highways is the same nation-wide (increased by 20% in the vicinity of large cities). In determining the toll, the repayment schedule is worked out by pooling the nation-wide accounts. At present, 4,800km-long toll roads under firm construction plans

are pooled for the determination of the toll.

The toll of the intra-city highways is determined by pooling the accounts including those of the sections under construction.

Thus, the toll roads are, in principle, based on repayment policy. In addition, principle of benefit is added to ordinary toll roads on the assumption of offering alternative roads.

(2) Authorization, approval and supervisory procedure

As mentioned above, the toll roads in Japan are based on the Emergency Measure for Highway Construction Law. In contrast with the road law which is the basic law of the system of laws pertaining to roads, this law is a special legislation stipulating the procedures about planning, construction, management, operation (including toll collection) of toll roads. Details of these individual items are additionally ruled out in government ordinances and ministerial ordinances etc.

Meanwhile, establishment, management and supervision of the public corporations and government corporations which are the main constituents that operate the toll roads are ruled out in the individual legislations relating to public and government corporations including the Japan Highway Public Corporation Law.

As described above, the authorization, approval and supervision of the toll roads in Japan are all ruled out in laws, government ordinances, ministerial ordinances, notifications, etc. Individual procedures are outlined below.

1) Legal procedure pertaining to National Expressway.

a) Approval to planning of implementing construction work

As shown in Table 4-1, Minister of Transport and Minister of Construction decide an improvement plan by way of debates in the Diet and councils. From among the routes decided in the improvement plan, Minister of Construction

gives an implementation order to Japan Highway Public Corporation to improve a toll road. Thus, the toll road is authorized to be improved. In accordance with the implementation order, Japan Highway Public Corporation submits to Minister of Construction the construction work implementing plan with specification of the construction w work implementing plan, plan views, crosssection views, etc., gets it authorized and then sets to the construction work.

b) approval of to toll rate and period for toll collection

Japan Highway Public Corporation submits to Minister of Construction and Minister of Transportation and application wit with description of the following items and gets it authorized.

i) name of route and toll-collecting sections.

ii) when the toll is determined by distance, toll rate per km and method of application, and when the toll is determined by uniform rate system, amount of uniform toll.

iii) vehicle type to which discount of rate is applied and discount rate.

iv) period for toll collection

The application must go with (1) breakdown of construction cost and maintenance and operation cost, (2) basis on which toll and period for toll collection were calculated (documents showing basis on which tolls by vehicle types were determined, repayment schedule, etc.) and (3) estimated traffic volume and estimating methods which become the basis for calculation of revenue and expenses, etc.

(c) other procedure

Japan Highway Public Corporation notifies the start and completion of the construction work in the Offical Gazette. During the construction work, Japan Highway Public Corporation has Minister of Construction perform the interim inspection of the construction work and inspection of the completion of the construction work.

Before the toll road is opened to traffic, Minister of Construction notifies the start of the service of the toll road in the Official Gazette while Japan Highway Public Corporation notifies the amount of the toll and period for the toll collection in the same Official Gazette.

Table 4-1. Legal procedure until the opening of National Expressway to traffic

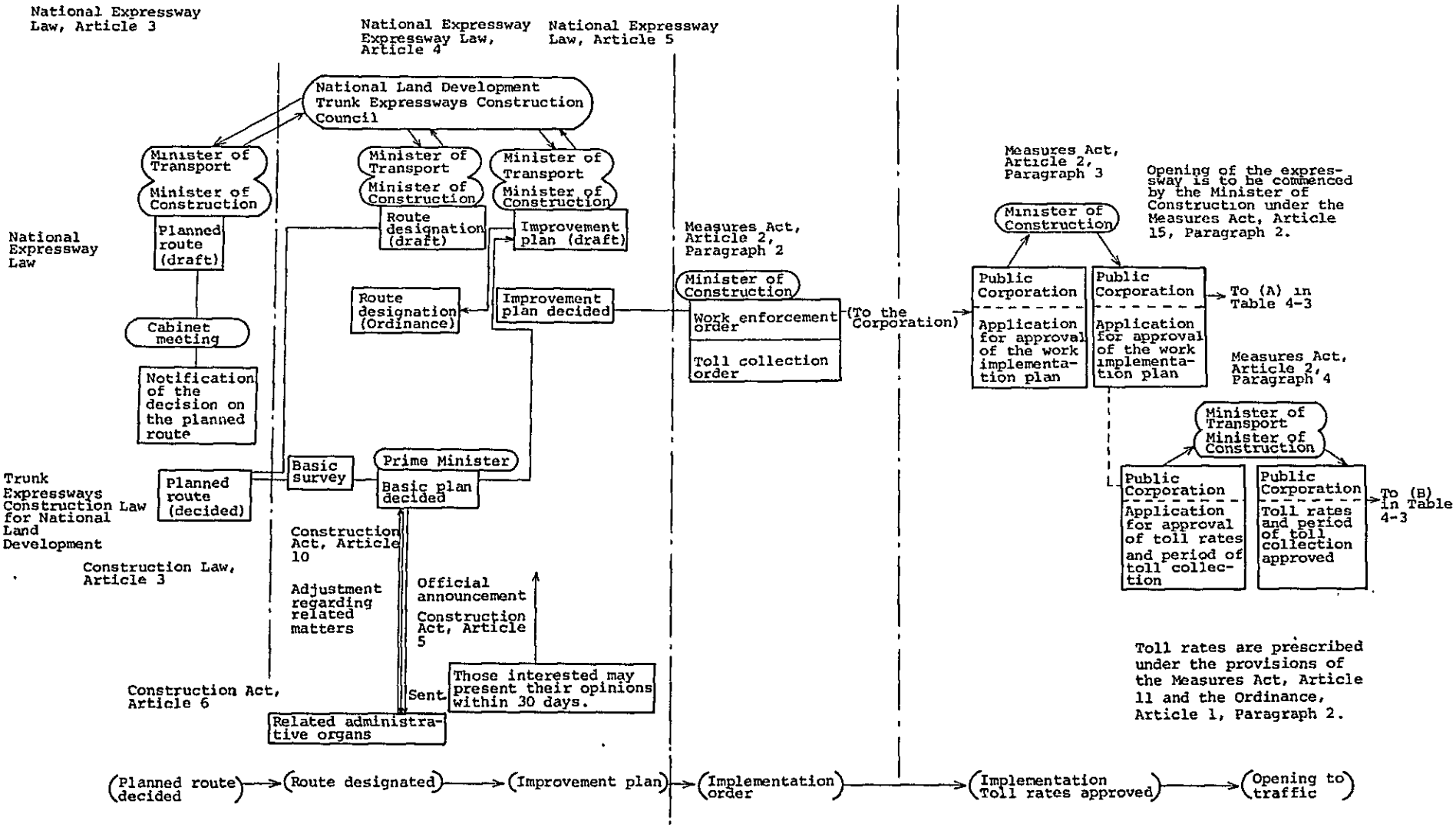


Table 4-2.. Legal procedure until the opening of Metropolitan Expressway and Hanshin Expressway

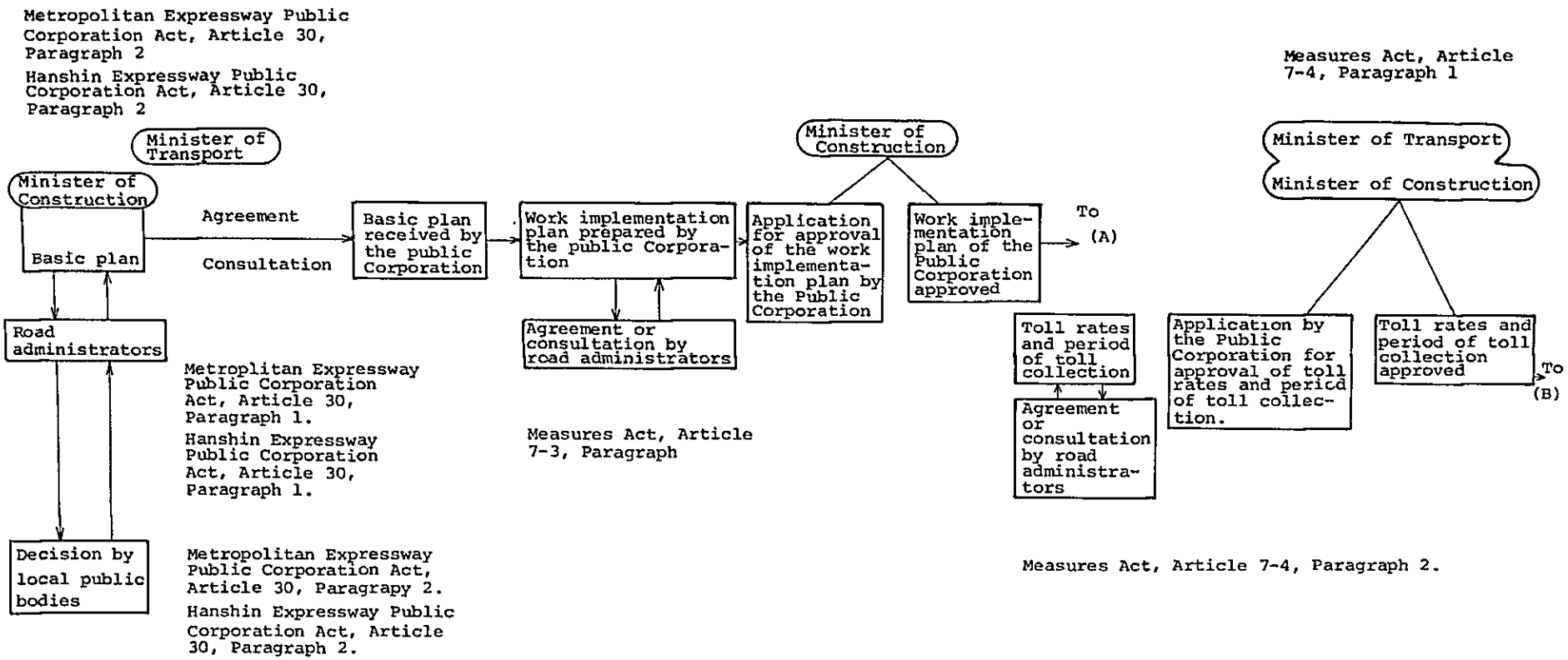
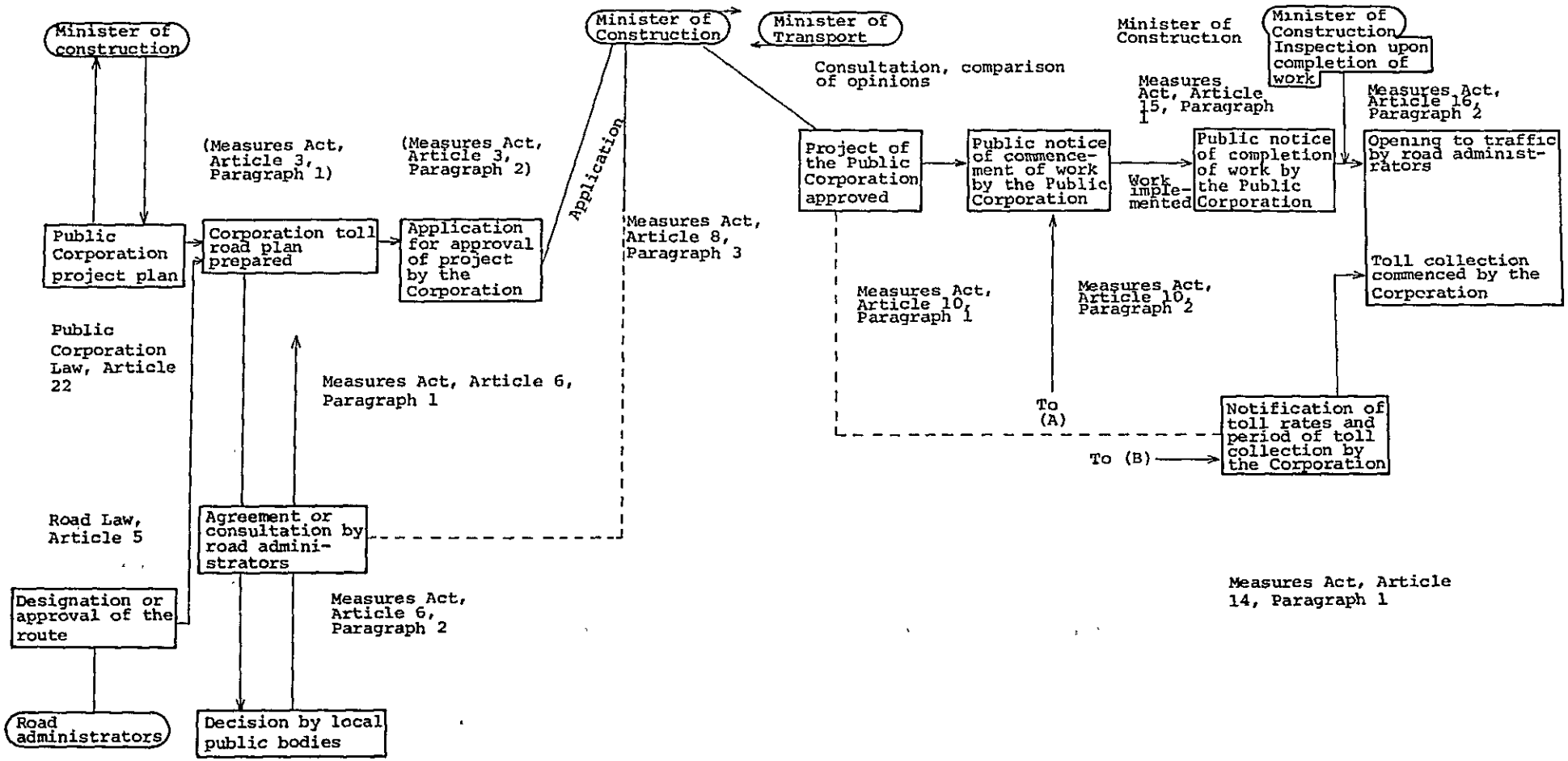


Table 4-3. Legal procedure until the opening of the ordinary toll road of Japan Highway Public Corporation



2) legal procedure pertaining to Metropolitan Expressway and Hanshin Expressway

As shown in Table 4-2 the legal procedure is almost the same as with the National Expressway. But the difference is that the toll roads are built with the basic plan by the Minister of Construction after the resolution by local public bodies.

3) legal procedure pertaining to ordinary toll roads

In contrast with the National Expressways whose construction work starts with the implementing order by Minister of Construction and Metropolitan Expressway and Hanshin Expressway whose construction work starts with the basic plan of Minister of Construction, Japan Highway Public Corporation must, as shown in Table 4-3 as to the ordinary toll roads, work out is construction work plan for toll roads and submit it to Minister of Construction for application of authorization.

In this application form, the implementing methods of construction work, amount of toll, period for toll, collection etc. are described.

4) Supervisory procedure for public corporations

In accordance with individual laws of public corporations, the competent authorities and related authorities supervise the public corporations.

The main supervisory acts are as follows.

a) appointment and dismissal of officers (president, supervisor, etc.)
b) approval to budget, etc. (budget, project planning, financing planning, etc.)
c) submission and approval to financial statements
d) approval to issuance of bonds and short-term and long-term borrowed money
e) approval to salaries of emploees
f) orders, reports, inspection required for activities

4-2. Arrangements for approval procedure

As is evident in 4-1, the planning, construction, raising of funds, determination of toll, management of toll roads and how much the government intervenes with them vary from country to country.

In the case of the public corporations of Japan whose capitals are invested in full amount by the government and local public bodies, there are a number of controls, as mentioned above, from the government.

In the case of the licensed companies of France which are purely private enterprises, the French government seldom intervenes with them except the financing planning and issuance of the French government-guaranteed bonds. The advantages of entrusting with the purely private enterprises are that reasonable management becomes possible including the possibility of bold investment planning, exemption from the restrictions on budget and possibility of raising funds and performing projects under long-term plans. On the other hand, the disadvantages are that there is danger of lacking coordination with other administrative policies, that there is danger of managing only for profit, that there is harm due to monopolization, that risks must be borne by those companies alone when their balance becomes poor, etc.

How much these procedures to authorization and approval should be simplified in supplying the toll roads system of the Republic of Indonesia must be determined on the basis of comparison with and debate on these advantages and disadvantages.

4-3. Study of toll level

4-3-1. Toll level in relation to the utilization ratio

Based on the experience of a large number of toll roads of Japan, the diversion rate (percentage of utilization) accompanying the use of toll roads as bypass is correlated to the difference between the time of travelling an existing road (detour) and the time of travelling a toll road and to the toll of the toll road and is given by the Equation below:

$$P = \frac{K}{1 + \alpha (R/\Delta t)\beta}$$

where P is percentage of utilization from the existing road to the toll road,

R is the toll of the toll road,

Δt is the difference in time required for travelling the existing road and the toll road, and

α, β, k are the empirically determined parameters.

Therefore, $R/\Delta t$(toll/time difference), in other words, evaluation of time per minute (time benefit) decides the size of the diversion rate.

The diversion rate in Jagorawi is, as described in 3-1-4(2), chapter 3, about 35% for passenger cars and about 5% for trucks and buses. Looking over 20 bypassing roads in the vicinity of cities in Japan of almost same size of Jagorawi, the diversion rate ranges from 40% to 60% for passenger cars and trucks as shown in Fig. 4-1.
The Jagorawi toll road which is the first of its kind in the Republic of Indonesia is still three months old after it was opened to traffic, and the drivers are not yet familiar with the toll system, Accordingly, it cannot be compared unconditionally with the example of the toll roads of Japan. And, it must be also taken into account that the toll road is temporarily opened to traffic far as the suburb of Cibinong, which does not help to save the travelling time too much.

However, in supplying future toll roads network, where the toll level should be has much to do with how the revenue should be secured properly in connection with the percentage of utilization of the toll roads, so consideration must be given to the following points.

1) Before and after the opening of the whole Jagorawi Freeway to Bogor and Ciawi, Origin and Destination survey by vehicle type must be made on the Jagorawi toll road, Jakarta-

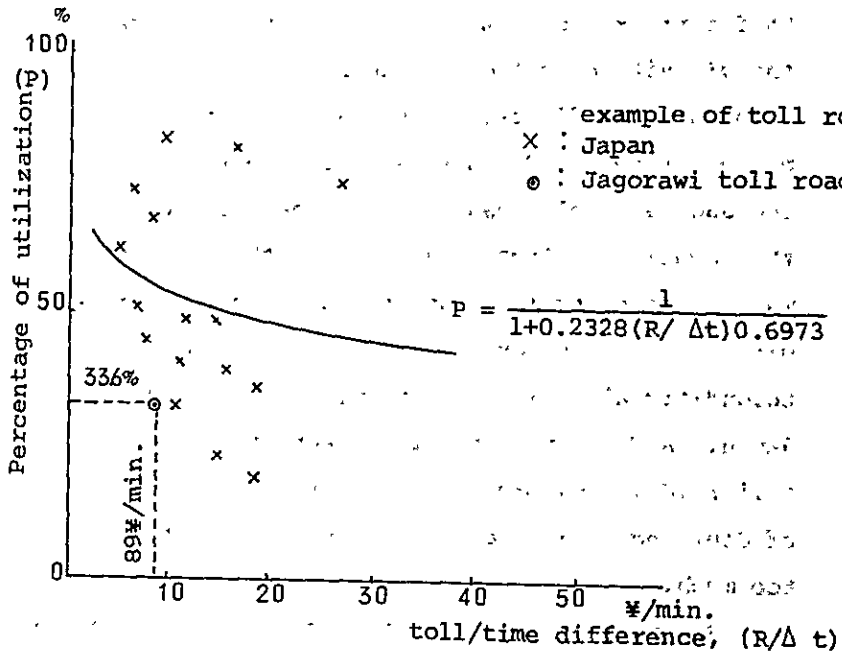
Cibinong-Bogor-Ciawi road, and Jakarta-Parung-Bogor road. Trace surveys must be made at regular intervals after the opening of whole Jagorawi toll road.

2) From the data on toll/time difference obtained in the above 1) for the pair of individual interchanges, the equation of diversion ratio should be found.

3) Simulation of the diversion ratio should be made on the assumption that the toll level was changed or that the income level increased.

Fig. 4-1 Utilization curve by vehicle type.

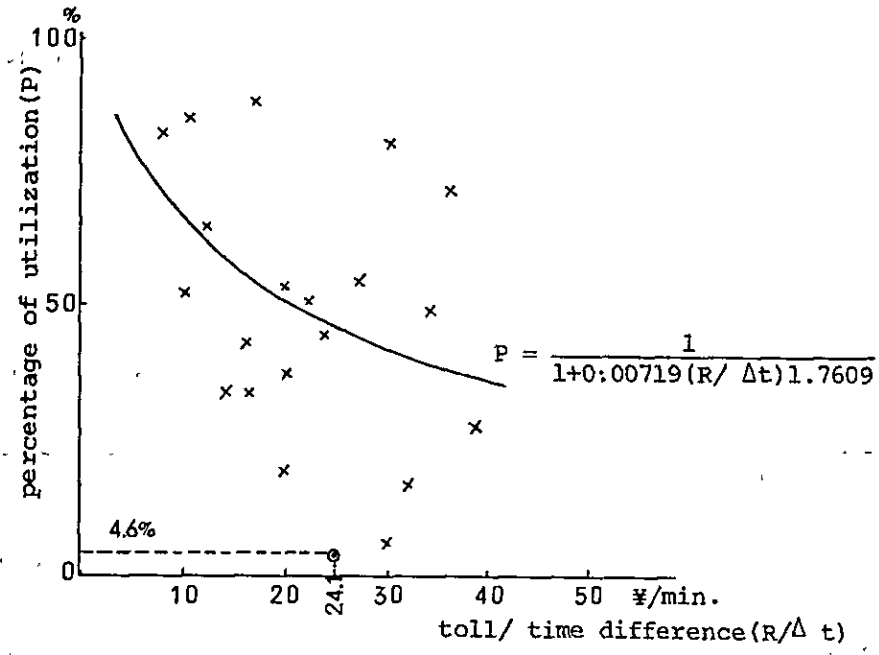
Passenger cars



Note: toll/time difference for the Jagorawi toll road

=300Rp/18min.=16.7R/min.=8.9¥/min.

Trucks



Note: toll/time difference for the Jagorawi toll road

=500Rp/11min.=45.5Rp/min.=24.1¥/min.

4-3-2. Study of toll level through other methods

Other methods of measuring the time value per minute (time benefit) which is the most important factor for the determination of the toll level in Japan are outlined below.

(1) national income method

time benefit per head (¥/head. min)
= (national income) ÷ (number of all employed) ÷ ((working hours per month) x 12 months x 60 minutes)

time benefit by vehicle type (¥/minute)
= (time benefit/head) x (number of mean passengers)

(2) waiting charge method

Time benefit is computed from waiting charge of taxi and retaining charge of truck in an area.

(3) balancing distance

From the railway fare to a distance over which transportation by rail balances with that by automobile, time benefit per minute is computed.

It may be also effective to compute the time benefit per minute from these methods and study their validity of the above-mentioned toll/time difference.

For reference the time value in Japan is given below.

Table 4-4 Time value in Japan

as of February 1, 1977

Vehicle type	time value(¥/min.)	conversion to Rp.(Rp/min.) *
passenger car (beyond 2,000 cc)	27.0	50.9
Passenger car (below 2,000 cc)	19.0	35.8
bus(routing)	76.0	143.4
bus(microbus)	51.0	96.2
bus(others)	101.0	190.5
truck(two axles and below 5 tons)	21.0	39.6
truck(two axles and beyond 5 tons)	34.0	64.1
truck(three axles)	34.6	65.3
Truck(trailer, etc.)	67.0	126.4
light vehicle (below 360 cc)	13.0	24.5
autobicycles	13.0	24.5

* conversion rate: U.S.$1 = 415Rp = ¥220

4-4. Determining the number of open lanes

The change in traffic volume and the service standards form the basis of this determination. How the daily traffic volume changes and how the service time (time that a car blocks the gate for toll collection) is related to the traffic volume and length of waiting queue must be elucidated. If necessary lanes are offered to meet with the elucidated traffic demand and if

proper number of lanes are opened to cope with the traffic change with time, the traffic at the gate can be smoothly handled with improved services offered to the users.

Table 4-2 are given the relation between number of lanes, service time, length of waiting queue and traffic volume at peak hour used now by Japan Highway Public Corporation to calculate the number of required lanes at the gate at the planning stage of toll roads. They may serve as criteria for determining the number of open lanes. However, the service time will vary, depending on the method of toll collection and the nature of roads (state of traffic of the roads) and, therefore, it is necessary to measure the traffic volume and then determine the service time. It may be better to fully investigate into the actual results of the opened Jagorawi toll road and use the results of the investigation for the determination of the service time.

Table 4-5 Traffic volume at peak hour in relation to the number of open lanes, service time per vehicle, and length of waiting queue

traffic volume at peak hour on single side = A.D.T. average daily traffic volume x K(coefficient at peak hours) x D(coefficient for single side)

(number of car on waiting = 1) b: service time, S: number of lanes on single track

s \ b	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	s \ b
1	450	360	300	256	225	200	180	163	150	138	128	120	113	106	100	1
2	1,278	1,022	852	728	638	568	510	464	426	392	364	341	320	301	284	2
3	2,133	1,706	1,422	1,218	1,065	948	852	774	711	651	609	569	533	502	444	3
4	2,988	2,390	1,992	1,704	1,492	1,328	1,196	1,084	996	920	852	797	747	703	664	4
5	3,780	3,096	2,580	2,210	1,935	1,720	1,545	1,405	1,290	1,190	1,105	1,032	968	911	860	5
6	4,752	3,802	3,168	2,712	2,376	2,112	1,902	1,728	1,584	1,458	1,356	1,267	1,188	1,118	1,056	6
7	5,671	4,536	3,780	3,234	2,835	2,520	2,268	2,058	1,890	1,743	1,617	1,512	1,418	1,334	1,260	7
8	6,592	5,242	4,368	3,744	3,272	2,896	2,024	2,376	2,184	2,016	1,872	1,747	1,638	1,542	1,456	8
9	7,371	5,897	4,914	4,212	3,686	3,276	2,948	2,680	2,457	2,268	2,106	1,966	1,843	1,734	1,638	9
10	8,190	6,552	5,460	4,680	4,005	3,640	3,276	2,978	2,730	2,520	2,340	2,184	2,048	1,927	1,820	10
11	9,108	7,286	6,072	5,205	4,554	4,048	3,643	3,312	3,036	2,802	2,602	2,429	2,277	2,143	2,024	11
12	9,936	7,949	6,642	5,678	4,968	4,416	3,974	3,613	3,312	3,057	3,839	2,660	2,484	2,338	2,203	12
13	10,764	8,611	7,176	6,151	5,382	4,784	4,306	3,914	3,588	3,312	3,075	2,870	2,691	2,533	2,392	13
14	11,592	9,274	7,728	6,624	5,796	5,152	4,637	4,215	3,864	3,567	3,312	3,091	2,818	2,728	2,576	14
15	12,420	9,936	8,280	7,097	6,210	5,520	4,968	4,516	4,140	3,822	3,549	3,312	3,105	2,922	2,760	15
16	13,392	10,714	8,928	7,653	6,696	5,920	5,357	4,870	4,464	4,121	3,826	3,571	3,348	3,151	2,976	16
17	14,229	11,383	9,486	8,131	7,115	6,324	5,692	5,174	4,743	4,378	4,065	3,794	3,557	3,348	3,162	17
18	15,066	12,053	10,044	8,609	7,533	6,696	6,026	5,479	5,022	4,636	4,305	4,018	3,767	3,545	3,348	18
19	15,903	12,722	10,602	9,087	7,952	7,068	6,361	5,783	5,304	4,893	4,543	4,241	3,976	3,742	3,534	19
20	16,740	13,392	11,160	9,566	8,370	7,440	6,696	6,087	5,580	5,151	4,783	4,464	4,185	3,939	3,720	20
21	17,766	14,213	11,718	10,044	8,789	7,842	7,031	6,392	5,859	5,408	5,022	4,687	4,394	4,136	3,906	21
22	18,612	14,890	12,276	10,522	9,207	8,184	7,366	6,696	6,138	5,666	5,261	4,910	4,604	4,333	4,092	22
23	19,458	15,566	12,834	11,001	9,626	8,556	7,700	7,000	6,417	5,923	5,500	5,134	4,813	4,530	4,278	23
24	20,304	16,243	13,392	11,479	10,044	8,928	8,035	7,305	6,696	6,181	5,739	5,357	5,022	4,727	4,464	24
25	21,150	16,920	13,950	11,957	10,463	9,300	8,370	7,609	6,975	6,438	5,979	5,580	5,231	4,924	4,650	25

Table 4-5(2)

(number of cars on waiting = 3) b: service time, s: number of lanes on single track

s \ b	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	s \ b
1	684	547	456	390	342	304	273	249	228	211	195	182	171	161	152	1
2	1,584	1,267	1,056	905	792	704	634	576	528	488	452	422	396	373	352	2
3	2,511	2,009	1,674	1,434	1,256	1,116	1,004	912	837	759	717	669	627	591	558	3
4	3,384	2,707	2,256	1,932	1,692	1,504	1,354	1,228	1,128	1,040	966	912	846	797	752	4
5	4,275	3,420	2,850	2,442	2,138	1,900	1,710	1,553	1,425	1,315	1,220	1,140	1,070	1,007	950	5
6	5,184	4,147	3,456	2,961	2,592	2,304	2,074	1,884	1,728	1,596	1,480	1,380	1,296	1,221	1,152	6
7	6,111	4,889	4,074	3,490	3,056	2,716	2,444	2,220	2,037	1,883	1,745	1,631	1,526	1,439	1,358	7
8	6,984	5,587	4,656	3,989	3,492	3,104	2,794	2,538	2,328	2,152	1,994	1,864	1,744	1,645	1,552	8
9	7,938	6,350	5,292	4,533	3,969	3,528	3,177	2,880	2,646	2,439	2,268	2,115	1,989	1,870	1,764	9
10	8,820	7,056	5,880	5,037	4,410	3,920	3,530	3,200	2,940	2,710	2,519	2,350	2,210	2,078	1,960	10
11	9,702	7,762	6,468	5,544	4,851	4,312	3,883	3,520	3,234	2,981	2,770	2,585	2,431	2,285	2,156	11
12	10,584	8,467	7,056	6,048	5,292	4,704	4,236	3,840	3,528	3,252	3,022	2,820	2,652	2,493	2,352	12
13	11,466	9,173	7,644	6,552	5,733	5,196	4,589	4,160	3,822	3,523	3,274	3,056	2,873	2,701	2,548	13
14	12,348	9,878	8,232	7,056	6,174	5,588	4,942	4,480	4,116	3,794	3,526	3,290	3,094	2,909	2,744	14
15	13,230	10,584	8,820	7,560	6,615	5,980	5,295	4,800	4,410	4,065	3,978	3,525	3,315	3,116	2,940	15
16	14,256	11,405	9,504	8,128	7,136	6,336	5,696	5,184	4,752	4,384	4,029	3,808	3,568	3,360	3,168	16
17	15,147	12,118	10,098	8,636	7,582	6,732	6,052	5,508	5,049	4,658	4,281	4,046	3,791	3,570	3,366	17
18	16,038	12,830	10,692	9,144	8,028	7,128	6,408	5,832	5,346	4,932	4,533	4,284	4,014	3,780	3,564	18
19	16,929	13,543	11,286	9,652	8,474	7,524	6,764	6,156	5,643	5,206	4,785	4,522	4,237	3,990	3,762	19
20	17,820	14,256	11,880	10,160	8,920	7,920	7,120	6,480	5,940	5,480	5,037	4,760	4,460	4,200	3,960	20
21	18,711	14,969	12,474	10,668	9,366	8,316	7,476	6,804	6,237	5,754	5,334	4,998	4,683	4,410	4,158	21
22	19,602	15,682	13,068	11,176	9,812	8,712	7,832	7,128	6,534	6,028	5,588	5,236	4,005	4,620	4,356	22
23	20,493	16,394	13,662	11,684	10,258	9,108	8,188	7,452	6,831	6,302	5,842	5,474	5,129	4,830	4,554	23
24	21,384	17,107	14,256	12,192	10,704	9,504	8,544	7,776	7,128	6,576	6,006	5,712	5,352	5,040	4,752	24
25	22,275	17,820	14,850	12,700	11,150	9,900	8,900	8,600	7,425	6,850	6,350	5,950	5,572	5,250	4,950	25

4-5. Provision of various standards and manuals

Little provision has been made to various standards and manuals of the toll roads of the Republic of Indonesia since they are still young in their history. For example, there are many items which need further study, i.e.

(1) What a toll collecting system should be introduced for toll roads with many sections and what work procedure should be followed., etc.

(2) What traffic ristriction should be taken at the time of accidents or maintenance and repair work on the roads, and in those cases how the operators should be protected safely.

(3) Where and on what a scale the ancilary facilities including bus stop, service area, parking area should be arranged.

(4) What information should be given to the users on the roads, at the gate or on the public roads and what system should be introduced to give the required information to the users.

For reference, summary of the standarts and manuals applied by Japan Highway Public Corporation to toll roads, etc. are given below.

[For reference]

1. Manual for toll collecting business on expressway (punch card system)
2. Manual for site work of traffic control.
   Manual for maintenance and repair work.
3. Design standards for toll gate and booths.
4. Design manual for bus stop.
5. Design manual for rest facilites.
6. Manual for installation of variable message signs.
7. Manual for installation of delineator.

"Reference"

Reference - 1

Manual for toll collecting business only expressway (punch card system)

Chapter 1. General Provisions

(Purpose)

Article 1. These articles are to provide necessary details concerning the management of the toll collecting business and to promote the proper and smooth management of the business on the national expressway (following referred to it as "the expressway") with the punch card system toll collecting machine (following referred to it as "the machine") managed by the Japan Highway Public Corporation.

(Application)

Article 2. The management of the toll collecting business on the expressway with the punch card system machine is to follow the provisions of these articles in addition to the regulation of the management of expressway toll collecting bussiness.

Chapter 2. Toll Collecting Bussiness

Section 1. General Rules

(Preparation for the work, etc.)

Article 3. At the beginning of the toll collection, a collector must certify necessaries for the collecting bussiness so that they can carry out the work smoothly.

2. At the beginning of the toll collection, a collector must certify if he carries any private money or other prohibeted ones with him.

(Opening and closing of the lanes)

Article 4. As a collector open or close the lanes, he must certify if it is safe or not and do them quickly.

2. As a collector takes turns in service, he has to make efforts not to cause a traffic jam.

(Operation of the machine, etc.)

Article 5. The collectors have to operate the machines accurately and carefully.

2. As a collector notice the unusual of the machine, he to report it to the manager of the office and take indications from him. But in case that it's slight unusual and a collector can adjust it easily, this is excepted from the rule.

(Matters that demand special attention)

Article 6. Collectors have to handle the passing card of punch card system and reserve passing card of punch card system (following refered to it as "the passing card".) not to bend, stain and wet.

2. While engaging in toll collection, a collector pay in all times attention to the number of sheets of the passing card and the quantity of the prepared money for the change for fear that they should become shortage.

3. While engaging in toll collection, a collector pay in all times attention to the surroundings for fear that a crime and an accident should happen.

(Classication of fares)

Article 7. The classification of fares to be collected and the types of vehicle falls under the classification of fares are shown in the attached Table 1.

(Making slips of receivings)

Article 8. As the service is over, a collector immediately have to make entrance slips of receivings (attached paper Form 1), exit slips of receivings (attached paper Form 2) (following refferred to them as "the slips of receiving"), special managing slips (attached paper Form 3), plate special managing slips (attached paper Form 4), nonpayment managing slips (attached paper Form 5) and managing slips of the U.S forces stationed in Japan (attached paper Form 6) (following referred to them as "managing slips") and present them to the manager of the office.

Section 2. The Bussiness of the Entrance Toll gate

(Delivering the passing card)

Article 9. The collector, at the entrance toll gate, is to issue from the machine to each passer-by the passing cards under the classification of fares as described in Article 7. But in case that a collector can not issue because of the trouble of the machine, electric power failure and so on he is to deriver reserve passing cards.

2. The collector, before handing over the possing card, have to make an effort to confirm whether the written and punched items of the ticket are correct or not.

3. When the collector is presented by the passer-by with the free passing crtificate issued by under the attached rule, he must issue the possing card of a free type of vehicle after confirming the written items on the certificate.

4. In case that the passing of a part of expressway is prohibited or limited because of the accident, calamity and so on he must issue the passing card with informing it.

(Management of the incorrectly issued passing card)

Article 10. In case that the collector issued the incorrect passing cards on the type of vehicle, number of axles, printed items and punched items (following refferred to them as the incorrectly issued passing card") he must reissue the correct one and keep the incorrectly issued passing card at hand. But in case that the collector noticed his issuing incorrect passing card after driver's passing, he immediately have to record the registered number and other charactaristics of the vehicle and report them to the manager of the office.

2. As the collector manages the thing on the proviso of the preceeding clause, he is to put down the registered number and other characteristic of the vehicle on the slips of receiving.

(Management of vehicles which go through the toll gate without receiving-passing cards)

Article 11. In case of passing without receiving passing card at the entrance toll gate, the collector must keep the issued passing card at hand and record the registered number and other charactaristics of the vehicle and report immediately them to the manager of the office.

2. As the collector manages the thing on the preceeding, he is to put down the registered number and other charactaristic of the vehicle on the slips of receiving.

(The measure to unqualified vehicles in passing)

Article 12. The management of matorbikes, light weight vehicles and other vehicles not permitted to pass the expressway by the Vehicle Restriction Ordinance (No.265 Government Ordinance, 1961) is under the attached rules.

(Presentation of the keeping passing cards)

Article 13. In case presenting the slips of receiving to the manager of the office under the Article 8, the collector must attach to it the keeping passing cards under the Article 10 and the Article 11.

Section 3. The Bussiness of the Exit Tollgate

(Management of the passing card)

Article 14. On receiving a passing card from a passer-by at the exit tollgate, a collector is to manage it by the machine after confirming the typed and punched items. But in case that a collector can't manage it owning to the damage of passing cards, trouble of the machine, interruption of the electric current and other reasons, this is excepted from the rule.

(Management of a vehicle with a defferred payment plate)

Article 15. On being presented with a defferred payment plate attached to the ticket from a passer-by at the exit tollgate, a collector must return them to the passer-by after confirming typed items on the plate and managing passing card with the plate.

2. In case that the collector can't manage the plate by machine owning to the damage, transformation and the others, the collector must advise a passer-by to take steps the exchange of plates and return it to one after recording the necessary items.

3. A collector has to fill in the blanks of the special management slip of the plate after managing the preceeding clause.

(Management of vehicles with ferry & highway passes)

Article 16. Upon being presented with a ferry and highway pass with the ticket from a passer-by at the exit toll gate, a collector has to receive the ferry passes and stamp a scale of the bussiness place and attach it to the passing card after affarming the typed items of this ferry pass.

2. After managing the preceeding clause, a collector has to fill in the blanks of the necessary items of the ferry pass.

3. In case that the type of vehicle and passing section differ from the typed items on the ferry passes, a collector has to return this ferry pass to the passer-by and receive the toll for cash.

(Management of vehicles with free charge plates)

Article 18. As the free charge plate is presended (to the collector) by a passer-by at the exit tollgate, the collector is to manage it in accordance with Article 15 and Article 16 clause 3.

(Management of vehicles with free passing certificates)

Article 19. As the free passing certificate is presented (to the collector) by a passer-by at the exit tollgate, the collector is to manage it in accordance with Article 16 clause 1 and clause 3.

(Special management)

Article 20. The collector is to fill in the blanks of the slips of special management (or slips of plate special management when the passer-by uses the plate of defferred payment or free charge plate) in the following case.

1. On receiving the incorrectly issued passing card or damaged passing card.
2. As the passer-by has lost the passing card.
3. And besides if there is the necessity of special management.

(Management of the passer-by unable to pay the toll)

Article 21. In case that the collector treat the passer-by unable to pay the toll (following refferred to it as "the person unable to pay "the toll") he immediately report it to the chief of the business place.

2. In the case that the chief of the bussiness place received the report on the preceeding clause from the collector and then asked this parson unable to pay the toll the circumstances and admit it reasonable, he is to fill in the blanks of the written notice of payment of the amount of unpaid fare of unpaid management slips (attached Paper Form 5-2) and hand it to this passer-by and let him pass.

(The measure against the illegally passing vehicle)

Article 22. If there appeared the passer-by who manage to be free from the toll, the collector has to make an effort to prevent it from passing through the exit tollgate.

2. If there appeared the vehicle, in the above ease, passing in spite of collector's restraint, the collector has to write down the registered number of vehicle and other characteristics of this passing car and report it to the manager of the business place.

3. On taking measures under the preceeding clause, the collector has to fill in the blanks of non-payment slips of management.

(Issuing receipt)

Article 23. When the collector is requested for a receipt from the passer-by at the exit tollgate, he has to issue it by the machine to hand it over the the passer-by.

2. As the collector can't, in the preceeding clause, issue the receipt by the machine owning to the trouble of the machine, interruption of the electric current an soon he is to hand over the receipt written by hand (attached Paper Form 8)

(Presenting the received prossing cards, etc.)

Article 24. 1. As the collector present under Article 8, the slips of receiving and the slip of management he has to present the received passing cards, the certificate of the U.S force's passing vehicles on the toll road, ferry passes, the certificate of the free charge vehicle, the received toll and the prepared money for changes use.

2. When the collector hand over the receipt written by hand under the preceeding Article clouse 2, he has to report it to the manager of the bussiness place and get to his conformation.

Chapter 3. The others

(The collection of an extra charge)

Article 25. When there appeares the vehicle passing through the exit tollgate, the chief of the administration office has to confirm the address etc of this passer-by and notify the payment with appointing the date of payment and the address of the payment. In this case the date of payment should be limited with in ten days of the notification of the payment gave out.

(Delivery of the received passing card etc.)

Article 27. The manager of the business place is to deliver the received passing card, the slips of receiving filled in the blanks, and the slips of management recording paper of the recording machine to the fixed organ of the electric computer.

(Reporting to the manager of the administration offices etc.)

Article 28. 1. As the manager of the business place receives the report from under the Article 22, he has to report it to the manager of the administration office.

2. As the manager of the business place admits some of the necessity in the report under Article 5 clause 2, Article 10, Article 11, Article 21 and Article 24 clause 2, he has quickly to report it to the administration office.

3. The manager of the business place is to present to the manager of the administratin office the slips of receiving and slip of management presented under the Article 8 and the certificate of free charge passing presented under the Article 24 clause 1.

Attached Table 1

Classification Table of Vehicles

Classification of vehicles		Kinds of the car	Number of basic axles	Number of spare axles
Classi-fication	Vehicle type			
1	Ordinary vehicle	a. light weight car b. small size car c. ordinary size passenger car d. ordinary truck (gross vehicle weight not exceeding 8 tons, maximum loading capacity not exceeding 5 tons and 3 axles or less e. bus (passenger capacity over 11 and under 29) f. tractor and trailor-towing ordinary vehicle connected with towed ordinary vehicle (1 axle) total 3 axles or less.	2	+1
2	Large vehicle	g. ordinary truck (gross vehicle weight over 8 tons or maximum loading capacity over 5 tons, under 3 axles and gross vehicle weight 20 tons or less and 4 axles or less h. tractor and trailor-towing vehicle connected with towed vehicle. (total 3 axles) i. bus (scheduled route one, passenger capacity 30 or more)	2	+1 +2
3	Special large vehicles I	j. bus (passenger capacity over 30, excluding scheduled route bus in para i)	2	+1

Classification of vehicles		Kinds of the car	Number of basic axles	Number of spare axles
Classi-fication	Vehicle type			
4	Special large vehicle II	k. special large vehicle (excluding pole trailer) l. ordinary truck (4 axles) m. tractor and trailor-towing vehicle connected with towed vehicle 4 axles or more (4 or more wheel axles)	4	+1 +2
5	Light weight car	(apply only to the expressway connecting to Kitakyushu Doro) n. light weight car o. two wheel small size car	2	+1
0	Free vehicle		2	+1 +2

(Notes:)

1. In case that the bus falls under one of the followings it is regarded as a bus (scheduled route)

   a. When it is regularly operated on the scheduled route with general passengers transportation bussiness license.

   b. When it is operated following the above.

   c. When it gets a temporary license for general passenger transport during festivals or other events and gets operated temporarily.

   d. When the vehicles described the above are being transported.

2. The type of vehicle operating with temporary license plates or transportation license plates (following refferred to them as "the non-registered vehicle") is to be treated as if it were registered. However, if there is difficulty in judging a type of vehicle (a vehicle being in the process of manufacturing or remodelling and lacks the cargo loading platform and other

loading facilities, and without seats except for the driver, following refferred to them as "incomplete vehicles"), this incomplete vehicle is to be judged as the least expensive one of the category of vehicles in the same number of axles. An incomplete vehicle with two axles is to be considered as a ordinary vehicle that with three axles or 4 wheel axles with a single body is to be considered as a large vehicle; and that with 4 axles is to be classified as a special large vehicle.

Attached-Paper Form 1

Entering slips of receiving

No._____

IC number	Name of the collector

	seal of the person confirming in the toll office

message	IC number	lane number	collector's number	d.	mo.	yr.	working hours				number of sheets of the issued passing cards (A-B=C)	number of sheets of the incorrectly issued passing cards (B)
							hr.	min.	hr.	min.		

reserve passing cards													number of sheets of the issued reserve passing cards (D)	number of sheets of the issued passing cards (C + D)
type of vehicle 1	1 + 1	type of vehicle 2	2 + 1	type of vehicle 3	3 + 1	type of vehicle 4	4 + 1	type of vehicle 5	5 + 1	type of vehicle 0	o + 1	0 + 2		

notes	number of passing card issued in the end
	number of passing card issued in the beginning
	number of sheets of the issued (A)

Attached Paper Form 2

Exit slip of receivings

No._____

IC number	Name of the collector

	seal of the person confirming in the toll office

message	IC number	working number	lane number	collector's number	d.	mo.	yr.	working hours				
								hr.	min.	hr.	min.	yen

	received amount of money	U-turns	number of sheets of the total managed passing cards (A+B)	number of platé of the total managed	number of sheets of the issued slips of management			
					number of sheets of free passing cards	plate special	non-payment	vehicles of American forces
yen	yen							

notes	passes for business use	number of passing card issued in the end
amount of excess fares: yen	special passes	number of passing card issued in the beginning
amount of shortage fares: yen	artificates for officials use vehicle	number of sheets of passing cards confirmed by machine (A)
number of sheets of the receipts issued by hand	the others	number of sheets of unconfirmed passing cards (B)

Attached Paper Form 3

Special slips of management

No._____

IC number	name of the collector

	seal of the person confirming in the toll office

message	exit IC	working number	classification	entrance IC	type of vehicle (correct)		type of vehicle (previous)		confirmation management	a toll fare
					spare axles	type of vehicle	spare axles	type of vehicle	yes 1 no 0	yen

No. of vehicle	1	2	3	4	5
classification of vehicle type	ordinary vehicle	large vehicle	special large vehicle I	special large vehicle II	vehicle for business use

lane number	d.	mo.	yr.	time of management

extra charge
Yen

classification no.	0	1	2	3	4	5	6	7	8	9
classification	normal data	passing outside or inside of the appointed section	plate forgotten to manage by the machine	double management with plate by the machine	losing (passing cards)	damage (of passing cards)	error	U-turn	re-classification of type of vehicle	re-classification of the axles

notes

entrance - consecutive number _____

Attached Paper Form 4

Plate special managing slips

No._____

IC number	name of the collector

	seal of the person confirming in the toll office

message	exit IC	working number	classification	entrance IC	type of vehicle (correct)		type of vehicle (previous)		confirmation	plate number
					spare axles	type of vehicle	spare axles	type of vehicle	yes 1 no 0	

No. of vehicle type	1	2	3	4	0
classification of vehicle type	ordinary vehicle	large vehicle	special large vehicle I	special large vehicle II	vehicle for business use

lane number	d. mo. yr.	time of management	
		hr.	min.

classification no.	0	1	2	3	4	5	6	7	8	9
classification	normal data	travelling outside or inside of the appointed area	plate forgotten to manage by the machine	double management with place by the machine	losing (passing cards)	damage (of passing cards)	error	U-turn	re-classification of vehicle type	re-classification of the axles

number of vehicles		notes
name of person (company) making use of defferred payment system	TEL ( )	entrance - consecutive number
driver's name		

Attached Paper Form 5

non-payment management

IC number	name of the collector

seal of the person confirming in the toll office

classification number	0	1	2	3	4	5	6	7	8	9
classification	normal data	travelling outside or inside of the appointed area	plate forgotten to manage by the machine	too many plates double management with plates by the machine	losing passing cards, damaging of passing cards.	losing passing cards, damaging of passing cards	error	U-turn	re-classification of vehicle type	re-classification of the axles

message	exit IC	working number	classification	entrance IC	type of vehicle (correct)		type of vehicle (previous)		confirmation
					spare axles	type of vehicle	spare axles	type of vehicle	yes 1 no 0

a toll fare	amount of paid fare	amount of unpaid fare	consecutive number
yen	yen	yen	

lane number	d. mo. yr.	time of management
		hr. min.

extra charge	amount of paid extra charge	amount of unpaid extra charge	way of payment: Bureau / interchange / bringing with one mail
yen	yen	yen	

total	total	amount of unpaid fare	expected date of payment: d. mo yr.
yen	yen	yen	

number of vehicles		
driver	address	
	name	
owner	address	seal TEL ( )
	name	
		TEL ( )

remarks
driver's license number
name of witness

notes (payment guarantee)

Attached Paper Form 5-2

a written notice of payment of the amount of unpaid fare

IC number	name of the collector

seal of a person confirming in the toll office

number of vehicle's type	1	2	3	4	0
classification of vehicle's type	ordinary vehicle	large vehicle	special large vehicle I	special large vehicle II	vehicle for the business use

message	exit IC	working number	classification	entrance IC	type of vehicle (correct)		type of vehicle (previous)		confirmation
					spare axles	type of vehicle	spare axles	type of vehicle	yes 1 no 0

passing fare	a toll of paid fare	amount of unpaid	consecutive number
yen	yen	yen	

lane number	d. mo. yr.	time of management
		hr. min.

extra charge	amount of paid extra charge	amount of unpaid extra charge	way of payment: Bureau / interchange / bringing with one mail
yen	yen	yen	

total	total	amount of unpaid fare	expected date of payment: d. mo. yr.
yen	yen	yen	

number of vehicles		
driver	address	
	name	seal TEL ( )
owner	address	
	name	TEL ( )

The above-described unpaid amount of money should be paid this administration bureau or the nearest interchange toll office with this notification within 10 days.

yr. mo. d.

notes (payment guarantee)

Attached Paper Form 6

slips of managing of U.S. forces stationed in Japan

No. _____

IC number	name of the collector

	seal of the person confirms in the toll office

message	exit IC	working number	classification	entrance IC	type of vehicle (correct)		type of vehicle (previous)		confirmation
					spare axles	type of vehicle	spare axles	type of vehicle	yes 1 no 0

number of vehicle type	1	2	3	4	0
classification of vehicle type	ordinary vehicle	large vehicle	special large vehicle I	special large vehicle II	vehicles for the business use

lane number	d. mo. yr.	time of management	
		hr.	min.

classification number	0	1	2	3	4	5	6	7	8	9
classification	normal data	travelling outside or inside of the appointed area	plate forgotten to manage by the machine	double management with plate by the machine	losing passing cards	damage of passing cards	error	U-turn	re-classification of vehicle type	re-classification of the axles

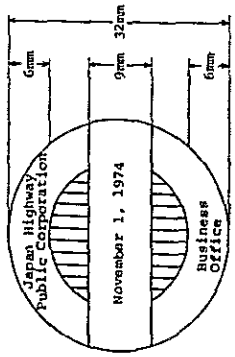
note

entrance - consecutive number _____

type of vehicle _____

number of vehicles _____

Attached Paper Form 7



Notes: In the business place "... business place" instead of "..... administration office" is to be used.

Attached Paper Form 8

number of sheets of the receipts issued by hand

Receipt No. _____

Cash _____ Yen

type of vehicle

reason for issuing

loss
damage
change in type of vehicle
machine trouble
later claim
others

Japan Highway Public Corporation

Bureau _____ Person in charge _____

Attached Paper Form 9

number

day month year

a written notice of payment of the toll etc.

address

To:

Japan Highway Public Corporation

Pay a fixed toll and an extra charge as follows into the bussiness place with suggesting this written notice by day month year as you passed through the expressway managed by this corporation without paying the toll day month year.

narrative

toll	extra charge	total

Attached Paper Form 10

Application for compensation of toll road losses

day month year

To:

applicant's address

name

We make an application for compensation of lasses the U.S forces gives by using the toll roads.

Notes

1. applicant's address
2. applicant's name
3. the period of compensation
   from day month year to day month year
4. location of toll gate of the expressway asfollows the attached paper.
5. applicated amount of money yen

(contents)

	month		month		month		Total		Remarks
	number of vehicles	amount of money	number of vehicles	amount of money	number of vehicles	amount of money	number of vehicles	amount of money	
ordinary vehicle									regardless of empty cars and full cars
large vehicle									"
special large vehicle									"
Total									

6. attached document
   a. Detailed table of monthly unpaid tolls
   b. map showing location of toll road
   c. copy of the permit of tolls (permission)
   d. passing certificates

Reference - 2

Manual for site work of traffic control

Table of Contents

① General Concerns

A. Health management, etc.

1. Be fully concerned about daily management of health and in case of any signs of ill health, report to the superior for his suggestions.

2. When starting work, do callisthenics and cultivate an attitude of readiness, to make an effort to maintain good health.

3. Be concerned about the equipment, order, cleanliness, etc., of the office, the vehicles, the vehicles equipment, etc., and also keep a neat uniform, bed linen, etc.

B. Clothes, etc.

1. The items to be worn are described as follow, and are to always be clean and worn correctly with buttons fastened properly, the helmet strap in position, etc.

(1) uniform
(2) helmet
(3) safety belt
(4) container for safety flares
(5) traffic arm band
(6) leather gloves
(7) boots
(8) security vest

2. Articles to be carried are as follows:

(1) whistle
(2) identification as road supervision staff
(3) road administration book
(4) writing equipment

C. Reports, etc.

1. A report to the supervisor is to be made when beginning road patrol to receive any suggestions.

2. When returning from road patrol, the situation during work is to be reported to the superior.

3. At the time of departing from the office, the wireless is to be turned on and at the time of arrival it is to be turned off.

② Inspection and Equipment for Vehicles and Itemization of Necessary Equipment

A. Inspection and equipping of vehicles

In addition to the inspection and the equipment necessary by law, inspection and equipment concerning the following items is to be carried out, and in case any abnormalities in the vehicle are recognized during work, they are to be reported to the superior.

1. Inspection at the change in work shift

At every change in shift (morning, evening) of work, inspection is to be made according to the attached table for inspection report.

2. Inspection before departure from the office

Inspection is to be made of the following items before beginning road patrol, etc.

(1) The amount of water in the radiator and the fan belt tension

(2) The condition of the working brakes and steering equipment

(3) The condition and air pressure of the tires

(4) The condition of the rearview mirror

(5) Amounts of fuel and oil

(6) Sensitivity of wireless

3. Inspection at return

The following items are to be inspected following each return from road patrol, etc.

(1) amount of fuel

(2) Presence of any leaks of fuel, oil or radiator water

(3) The condition and air pressure of the tires

(4) Other items which are recognized as abnormal during duty

4. Special inspection

In addition to the inspection items at the change in shift, the following items are to be inspected every Monday.

(1) Condition of the engine

(2) Condition of the contacts and amount of liquid in the battery terminals.

(3) Tightness of the vehicle grip bolt

(4) The working condition of the gauges

(5) Other places which may be inspected externally

5. Periodic inspection and equipping

The patrol car should be inspected and equipped by trained mechanics once a month.

6. Occasional inspection and equipping

In addition to the inspection and equipping described in 1 to 5, occasional inspection and equipping by mechanics is to be carried out as need arises.

B. Vehicle equipment and its inspection

1. Itemization of the equipment for patrol cars, crane vehicles and traffic signalling vehicles is shown in the attached table.

2. At the time of the inspection at the change in work shift, verification of the amount of vehicle equipment is to be made, and any shortages are to be informed to the superior and immediately replaced.

③ Safety Concerns in Traffic Control

A. Concerning driving

1. Before setting out, the safety belt is to be put in place and the door locked.

2. In a tunnel, the headlights and taillights are to be lit.

3. Speed is to be reduced when vision is impaired such as at dusk or during bad weather, etc., or when the street is slippery.

4. If travelling at speeds different from the other vehicles during patrol, the yellow rotating overhead light is to be turned on.

5. When going to a place of accident by patrol car, the red rotating overhead light, the yellow rotating light and the headlights, as well as the siren, are to be turned on.

6. When going to a place of accident, by a traffic directing vehicle or two truck, the yellow rotating light and the headlights are to be turned on.

B. Concerning parking and stopping

1. When parking or stopping, the yellow rotating light and the flashing light are to be turned on.

2. In order to prevent a rear-end collision, the turn signal and the driver's arm are to signal cars from behind to pass.

3. When an accident or a disabled car is located on the shoulder of the road, the patrol car is to be stopped and parked on the shoulder, and when the location is in the travelling lane, the patrol car is to be stopped and parked in the lane closest to the shoulder, and when the location is a passing lane, the patrol car is to be stopped in the passing lane closest to the median.

4. In case an obstacle on the road is to be removed, and when it is necessary to control the traffic, the patrol car is to be stopped and parked corresponding to the above 3 instructions, for an accident or a disabled car.
When the obstacle may be removed easily and quickly, the patrol car is to be stopped and parked in a place which doesn't hinder the removal of the obstacle after safety is confirmed.

5. When stopping and parking, the emergency brake should be set and the front wheels should be turned toward the side

of the road shoulder when the car is parked on the shoulder and towards the median divider when the vehicle is parked on the side of the median.

6. When emerging from the vehicle, safety is to be confirmed and exit is to be from the left side when the car is stopped and parked on the shoulder and from the right when the car is stopped and parked on the median side.

C. Concerning use of the openings in the median

1. The openings in the median (hereinafter referred to as the openings) are in principle not to be used. However, when all of the following occur, they may be used.

(1) A traffic accident, disabled car, or an obstacle on the road on the opposite side, when an emergency situation is recognized such as the possibility of a new traffic accident being caused.

(2) Great difficulty in reaching the location of the traffic accident, etc., by going to the next interchange.

(3) There is little traffic near the opening, and moreover, use may be considered safe considering geography and weather.

2. When the opening is used, the following measures for caution should be taken.

(1) When crossing the lanes on foot, confirm the safety, and use the signal flag or a powerful flashlight, crossing by running and as much as possible at a right angle to the road.

(2) The person guiding the patrol car at the opening is to stand where the flow of traffic may be fully seen.

(3) Guiding the patrol car is to be done with the use of signals to the driver by an alarm-whistle according to prescribed signals.

(4) The driver of the patrol car, when crossing to the opposite lane, is to make a stop at the opening.

D. Concerning traffic control on the highway

1. Any tasks are to be carried out quickly and safety is always to be confirmed.

2. Be sure to place a person on guard.

3. Any traffic control in the road by the patrol car crew is to be divided in principle with the person driving to be the person on guard and the person handling the wireless communication to be the person in charge of the situation. However, after the person in charge completes any necessary tasks such as the placing of the rubber cones, etc., he is also to be a person on guard if necessary.

4. The person on guard stands at a safe place in view of the passing cars on the shoulder or on the median divider, or at the line of rubber cones, etc., and is to signal the passing cars with a red safety flag or using a powerful flashlight in order to indicate the need for caution and to direct the passing cars (this activity is hereinafter referred to as "standing guard") and in case of recognizing danger is to signal the person in charge using a whistle or the voice to immediately escape.

5. The person on guard is to stand guard until the completion of the work.

6. The person in charge is in principle to carry out the necessary work facing the flow of traffic and when realizing danger because of an approaching vehicle is to immediately escape to the shoulder or the median divider.

7. When walking along the road, one should in principle walk on the shoulder or on the median divider.

8. When crossing the road on foot, safety is to be confirmed by looking to the right and the left and crossing is to be done by running at a right angle as much as possible using the safety flag or the powerful flashlight.

④ Road Patrol

A. The crew

The crew of the patrol car is to consist of two persons.

B. Measures for a disabled car

1. If a disabled car is located on the shoulder of the road, the patrol car is to stop and park 20 meters behind the disabled car and on the shoulder, with its red rotating light, and yellow rotating light as well as flashing light all turned on.

2. If the disabled car is being removed from a lane to the shoulder, and when traffic control is necessary, traffic control similar to that for a traffic accident, section ⑤ is to be applied.

3. When a disabled car is located within a tunnel or on an overpass or bridge with a narrow shoulder and is being removed to the shoulder outside the tunnel or leading to the overpass or bridge or to a service station, traffic control measures to be applied are to correspond to those for a traffic accident in section ⑤.

4. The details of the situation as described by the driver of the the disabled care are to be heard at a safe place in front of the disabled car.

C. Removal of obstacles from the road

(refer to attached Diagram 1)

An obstacle in the road which may hinder traffic is to be removed to the shoulder or other place where it will no longer interfere with traffic upon consideration of the amount of traffic, geography, weather, etc., using the following procedure.

1. Easy and quick removal

(1) Safe and immediate removal

a. The persons on guard and in charge upon recognizing the danger to traffic posed by the obstacle on the concerned road, are to place safety flares in the same lane in which the obstacle is located, and are to caution the passing cars while standing either at the shoulder or on the median divider or behind the concerned location, in order to ensure the safety of the passing vehicles.

b. The person on guard is to immediately stand guard on the shoulder or the median divider 30 meters behind the concerned location.

c. The person in charge is to caution the passing cars from the shoulder or from the median divider 150 meters behind the concerned spot by placing safety flares in the same lane in which the obstacle is located to prevent passing cars from travelling in that lane.

d. The persons on guard and in charge are to begin the removal work applying the corresponding provisions from the previous paragraph (1)

2. For cases other than those described in the preceding paragraphs of ④ C. 1., the method of traffic control is to correspond to that for traffic accidents in section ⑤.

⑤ Traffic accidents

A. Basic concerns

1. The rubber cones, the rubber cones with attached rotating light and the arrow sign boards (hereinafter referred to as the "rubber cones, etc.") which are to be lined up obliquely, at an acute angle to the road, are to be placed one every 10 meters.

2. The rubber cones, etc., which are to be lined up parallel to the lane, are to be placed one every 30 meters.

3. The rubber cones, etc., which are to be lined up at a right angle to the lane, are to be placed one nearly every 1.5 meters.

4. The rubber cones, etc., are to be placed in order from the point of control (shown in the attached diagrams) and if necessary while being transferred from the patrol car to the point of control, may be temporarily left at the shoulder or the median divider.

5. The rubber cones with attached rotating light are to be placed in an oblique line in the place most easily visible to the approaching vehicles near the point of control.

6. In case of poor visibility, such as at night or in bad weather, a delineator is to be attached to the rubber cone and safety flares added.

7. Patrol cars other than the first and second patrol cars, for which correct parking positions are described in the following paragraphs ⑤ (2) - (5), are to park in suitable locations between the place of accident and the point of control.

8. If the location is at a place of poor visibility, on a curve or on a slope, the point of control must be where approaching cars may see it from a distance of 150 meters.

B. Iraffic Control in 4- and 6-Lane Roads

1. Control of the shoulder of the road (refer to the attached Diagram 2)

(Includes those cases where the area of the control extends from the shoulder to part of the travelling lane and where passing cars do not need to change lanes to pass, but may continue to travel in the travelling lane.)

(1) The patrol car which is the first to arrive (hereinafter referred to as "the first patrol car") is to park 20 meters behind the place of accident.

(2) The person on guard is to stand guard at the shoulder of the road 30 meters behind the first patrol car.

(3) The person in charge is to place rubber cones, etc., in an oblique line from the shoulder of the road beginning 20 meters behind the first patrol car.

(4) The person in charge is to place rubber cones etc. parallel to the lane up to the accident location.

(5) The person in charge is to return to the to the first patrol car and report to headquarters the condition of the accident.

(6) After completing the above, the person in charge is to await the arrival at a safe place of the second patrol car to arrive (hereinafter referred to as "the second patrol car").

(7) If the traffic directing vehicle arrives, it is to park 20 meters behind the point of control. In this case, the person on guard is to stand 30 meters behind the traffic directing vehicle.

2. The control of a single lane in the road (excluding a tunnel) (refer to attached Diagram 3)

(1) The first step for control

a. The first patrol car is to park 50 meters behind the location of the accident.

b. The person on guard is to stand at the should or on the median divider 30 meters behind the patrol car.

c. The person in charge, cautioning passing cars, is to place safety flares obliquely from the shoulder or the median divider to the location of the rubber cones, etc.

d. The person in charge is to line up the rubber cones parallel with the lane up to the location of the accident.

e. The person in charge is to place an arrow sign board near the rubber cone with attached rotating light.

f. The person in charge is to report to headquarters the situation of the accident.

(2) The second step for control

a. The second patrol car is to park 300 meters behind the place of accident.

b. The crew of the second patrol car are to carry out the instructions as in the above paragraphs 5. B. 2 (1) a - f corresponding to the first step of control.

c. The person in charge from the second patrol car is to place the sign indicating an accident at the point of control.

d. The person on guard from the first patrol car is to stand guard within the line of the rubber cones.

e. The personsin charge from the first and second patrol cars are to move the rubber cones which had

been placed in an oblique line during the first step for control, to be reformed in a parallel line.

f. The persons in charge from the first and second patrol cars, after completing the placement of the rubber cones, are to stand guard within the line of rubber cones.

g. The person on guard from the second patrol car, after completing the placement of the rubber cones, etc., is to move a further 30 meters away to stand guard.

h. In case the traffic directing vehicle arrives after the second patrol car, it is to be parked behind the second patrol car.

i. If the traffic directing vehicle arrives before the second patrol car, it is to be parked 300 meters behind the accident location. In this case the second patrol car is to park in front of the traffic directing vehicle.

3. The control of two lanes of a road (excluding a tunnel) (refer to attached Diagram 4)

(1) In case the passing cars must pass using the shoulder of the road, guard is to be stood and the instructions corresponding to ⑤ B. 2.(1) and (2) for control of one lane are to be carried out.

(2) The traffic directing vehicle is to be parked evenly beside the second patrol car.

4. Stopping the flow of traffic (roads other than at a tunnel) (refer to attached Diagram 5)

(1) The first patrol car is to park 100 meters behind the location of the accident.

(2) The person on guard is to direct traffic from the shoulder of the road or the median divider, 150 meters behind the first patrol car.

(3) The person in charge is to place the safety flares across the lane from the shoulder of the road or from the median divider 30 meters behind the first patrol car and is to stop fully any approaching traffic.

(4) The person in charge, after stopping any approaching cars is to place the rubber cones at a right angle across the lanes from the shoulder or from the median divider.

(5) Report is to be made to headquarters reparding the condition of the accident.

(6) The traffic directing vehicle is to be parked immediately beside the first patrol car.

5. Control of an emergency

(Emergency in the opposite lanes) (Refer to attached Diagram 6)

(1) If the first patrol car arrives from the direction opposite to where emergency measures such as traffic control are urgently necessary, the following procedure is to be carried out (excluding locations which allow the patrol car to cross through the opening of the median divider).

a. After parking on the shoulder and upon fully confirming the safety, the persons in charge and on guard are to cross the road and caution the traffic from the shoulder or from the median divider 150 m behind the traffic accident location, placing safety flares in the lane where the accident has occurred and are to stand guard on the shoulder or the median divider 200 m behind the location of the accident.

b. The persons on guard and in charge are to await the arrival of a patrol car to the concerned location and are to assist the person in charge who arrive with the patrol car.

(2) If the above described case (paragraph (1) occurs, and under the following conditions, the patrol car upon confirming the immediate safety, may turn at the next interchange and return to the accident location to carry out traffic control as previously described.

a. When instrumental traffic control is necessary and if there is the possibility of succeeding patrol cars arriving too slowly.

b. When the interchange is very close.

c. When it is recognized that traffic control may be handled by one person on guard.

C. Closing of the road between interchanges
(Refer to attached Diagram 7)

1. If the first patrol car enters using the lane which is to be closed, it is to be parked in the passing lane 300 meters behind the point where the lane divides to the off-ramp.
2. If the first patrol car enters from the interchange to the road which is to be closed, it is to be parked using the following procedure.

(1) To enter the on-ramp to the road which will be closed.
(2) The entrance to the on-ramp of paragraph (1) is to be closed by the rubber cones.
(3) The patrol car is to be temporarily parked near the juncture of the on-ramp.
(4) The person in charge is to get out and walking against the flow of traffic always on the shoulder 5 meters behind the patrol car and using the prescribed signal by whistle, etc., is to guide the patrol car to back up along the shoulder to the point where the off-ramp divides from the travelling lane.

3. The person on guard is to stand guard at the median divider 330 meters from the point where the off-ramp divides from the road.
4. The person in charge is to place the safety flares at the scheduled places and the rubber cones from the median divider.
5. The person in charge is to put the rubber cones from the median divider 10 meters in front of the person on guard in an oblique line to the point where the road divides to the off-ramp.
6. After the rubber cones have been placed in line and if the first patrol car has been parked at the off-ramp as described in paragraph C.2. above, the first patrol car is next to be moved to the passing lane 300 meters behind the point where the off-ramp divides from the road.

7. The person on guard is to move a further 50 meters away after the person in charge has lined up the rubber cones (case cited in paragraph 1) or after the patrol car has been moved into final position (case cited in paragraph 2).

8. The person in charge is to direct the traffic approaching the patrol car and at the same time is to communicate with headquarters as needed.

9. The traffic directing vehicle is to park near the center of the road.

D. Traffic control on a ramp

For traffic control on a ramp, guard is to be stood and the work carried out applying the tems of paragraph⑤ B.2.(1) a-g which correspond to traffic control in 4- and 5-lane roads or applying items from ⑤ B (1) - (6) corresponding to stopping the flow of traffic.

E. Removal of a car involved in an accident

1. The lifting is to done by three or more persons.

2. Lifting is to be done on signal with one person giving the signal.

3. The person giving the signal is to make the prescribed signal using the whistle from a location where he can see the work being done.

4. The person signalling is to check the security of the chain after it has been put in place.

5. At the time the car is being towed, the patrol car is to follow.

6. The patrol car is to turn on the red rotating light and yellow rotating light and is to travel 30 meters behind the tow truck.

7. The crew of the patrol car is to watch the towing operating and if aware of any abnormalities are to stop the tow truck immeiately.

F. Completion of traffic control

1. Upon completion of traffic control, the rubber cones,

etc. are to be removed in the order opposite to that used for putting them in place.

2. The traffic directing vehicle is to leave upon completion of traffic control and after all other vehicles have left from the location of the accident.

3. When the patrol cars or traffic directing vehicle begin the leave from the accident location, they are to take special caution with the oncoming traffic and to turn on the red rotating light, the yellow rotating light and the electric sign until reaching speed similar to the rest of the traffic.

4. In case one lane traffic control is completed in a two lane road which has no divider, removal of the rubber cones, etc. is to be made after stopping the cars travelling in both directions.

Itemization of Vehicle Equipment Attached Table

1. The Patrol Car

Name of item	Size	Quantity	Notes
Rubber cone with rotating light	0.5 m x 1.1 m	2	Scotch light attached
Rubber cone		5	Scotch light attached
Delineator		5	
Safety flare		20	
Accident warning sign		1	Arrow attached scotch light attached
Powerful flash light		2	
Flash light (red)	0.5 m x 1.1 m	2	
Traffic baton		2	
First-aid kit		1	
Fire extinguisher	Large	1	
Measuring tape		1	
Shovel		1	
Bamboo broom		2	
Two-use rope	5 m	1	
Lime		1 bag	To be carried in a small can
Vinyl cloth or white cloth		2	
Spare oxygen		1	
Portable gas measuring device		1	
Arrow sign board		3	Scotch light attached

Attached Table

2. Crane

Name of item	Standard size	Quantity	Notes
Delineator		3-5	For a 4.5 ton crane only
Rubber cone		3-5	Fora 4.5 ton crane only
Shovel		2	
Hammer		1	
Bamboo broom		2	
Large Size jack	Oil pressure system	1	
Crowbar			
Metal lever		1	
Basket		1	
Safety flag	0.9 x 1.1 m	2	
Fire extinguisher		1	
Safety flare		20	
Powerful flash light		1	
Wire (Chain)		15	5m, 4m, 3m, 2m, 1m, 3 each
Shackles		5	
Lime		1 bag	To be carried in a plastic bucket

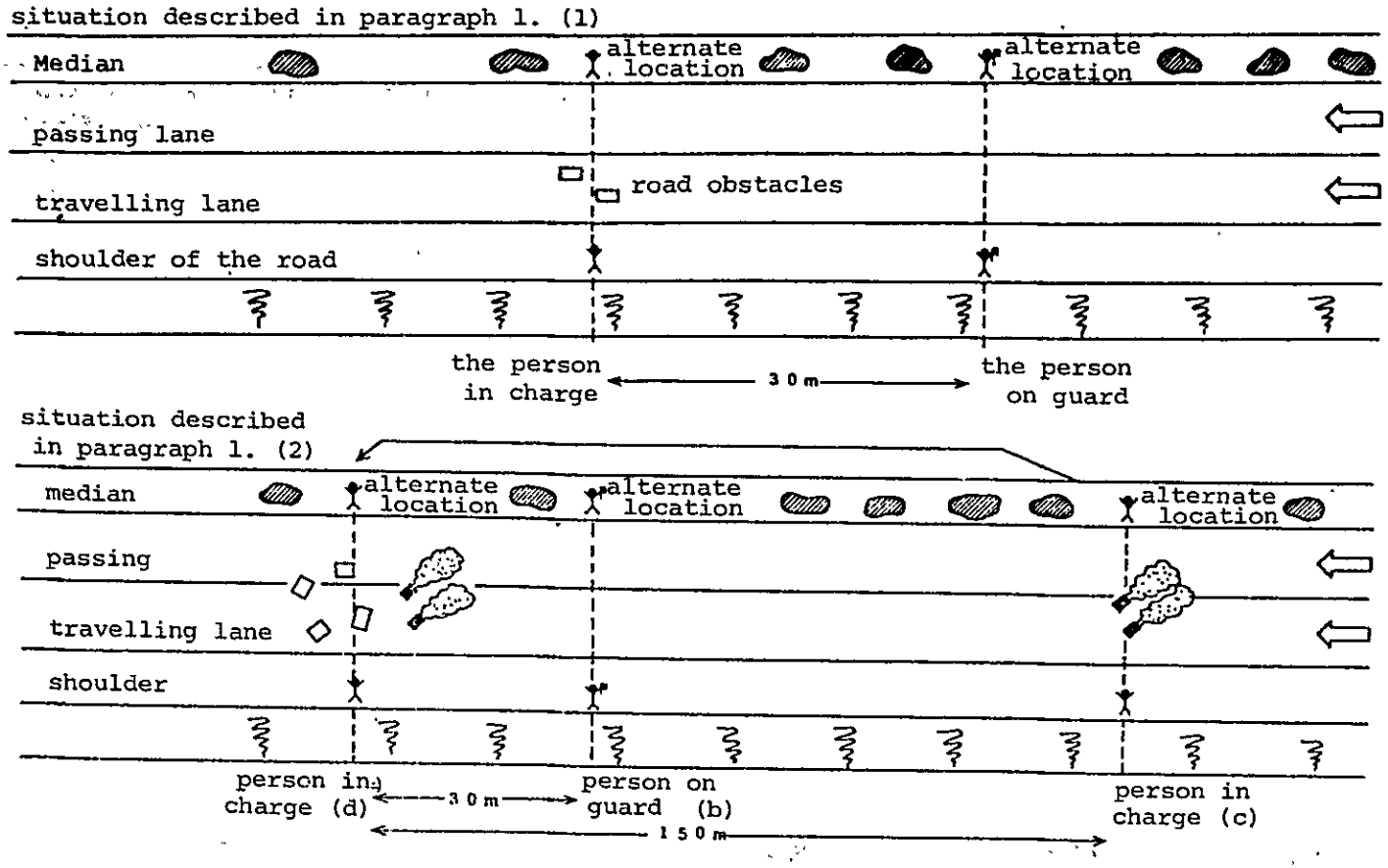
Attached Table

3. Traffic Directing Vehicles

Name of item	Size	Quantity	Notes
Rubber cone		10	Scotch light attached
Delineator		10	
Safety flare		20	
Safety flag	0.9 m x 1.1 m	2	
Fire extinguisher	Large size	1	
Bamboo broom		2	
Shovel		2	
towing rope	5 m	1	
Powerful flash light		1	
Accidient warning sign		5	Arrow, scotch light attached

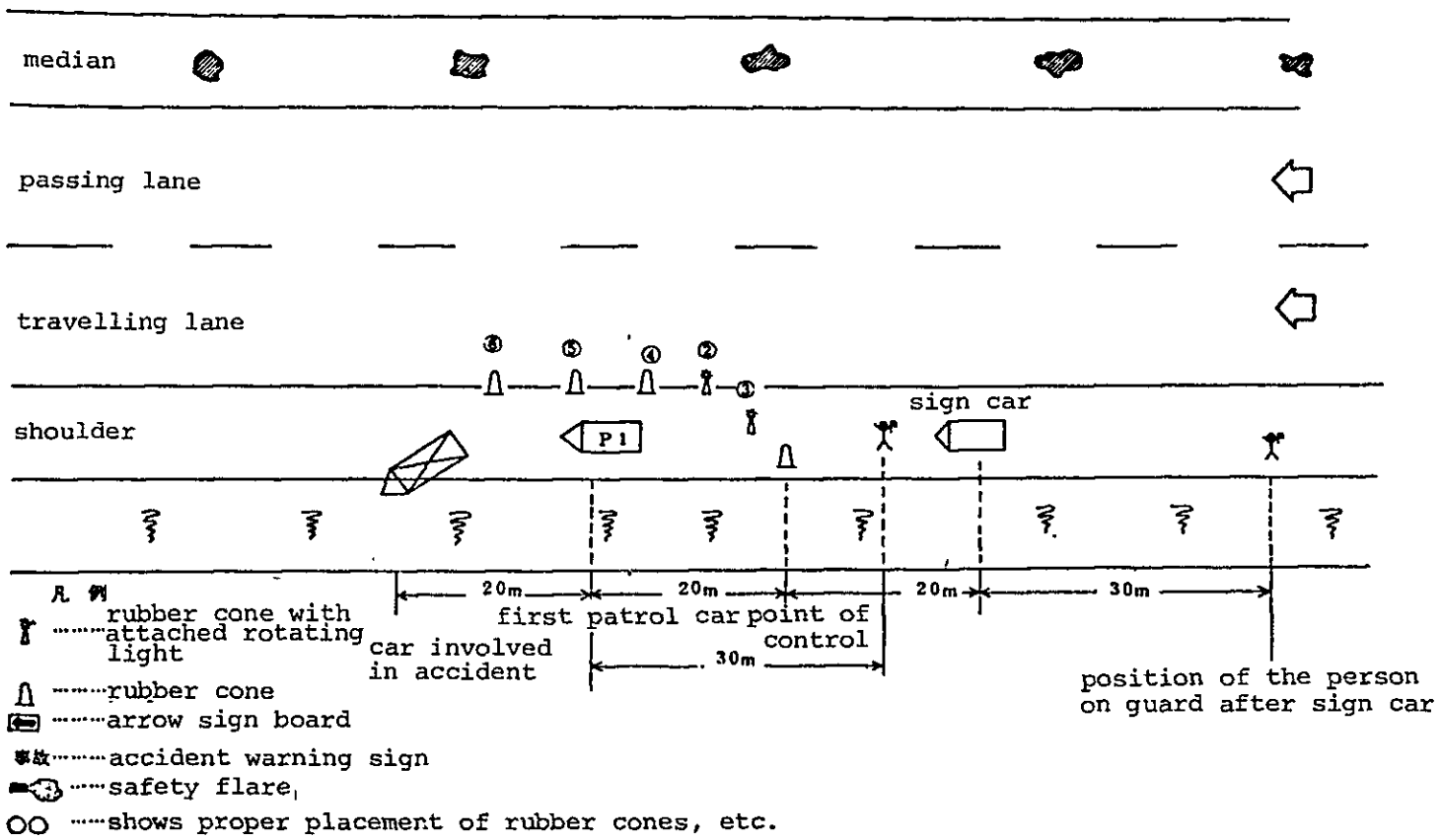
Attached Diagram 1

④ c. The removal of obstacles from the road



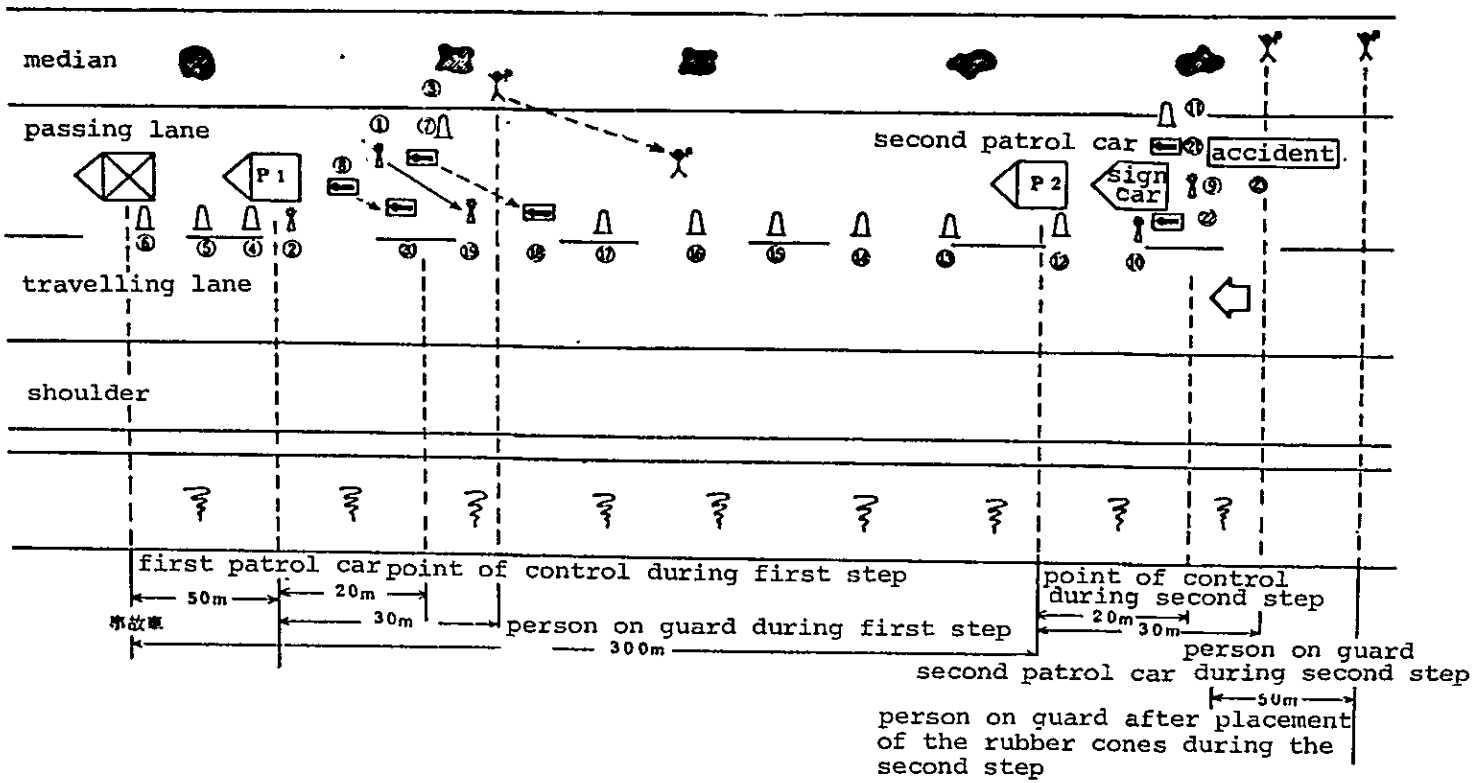
Attached Diagram 2

⑤ B. 1. Control of the shoulder of the road



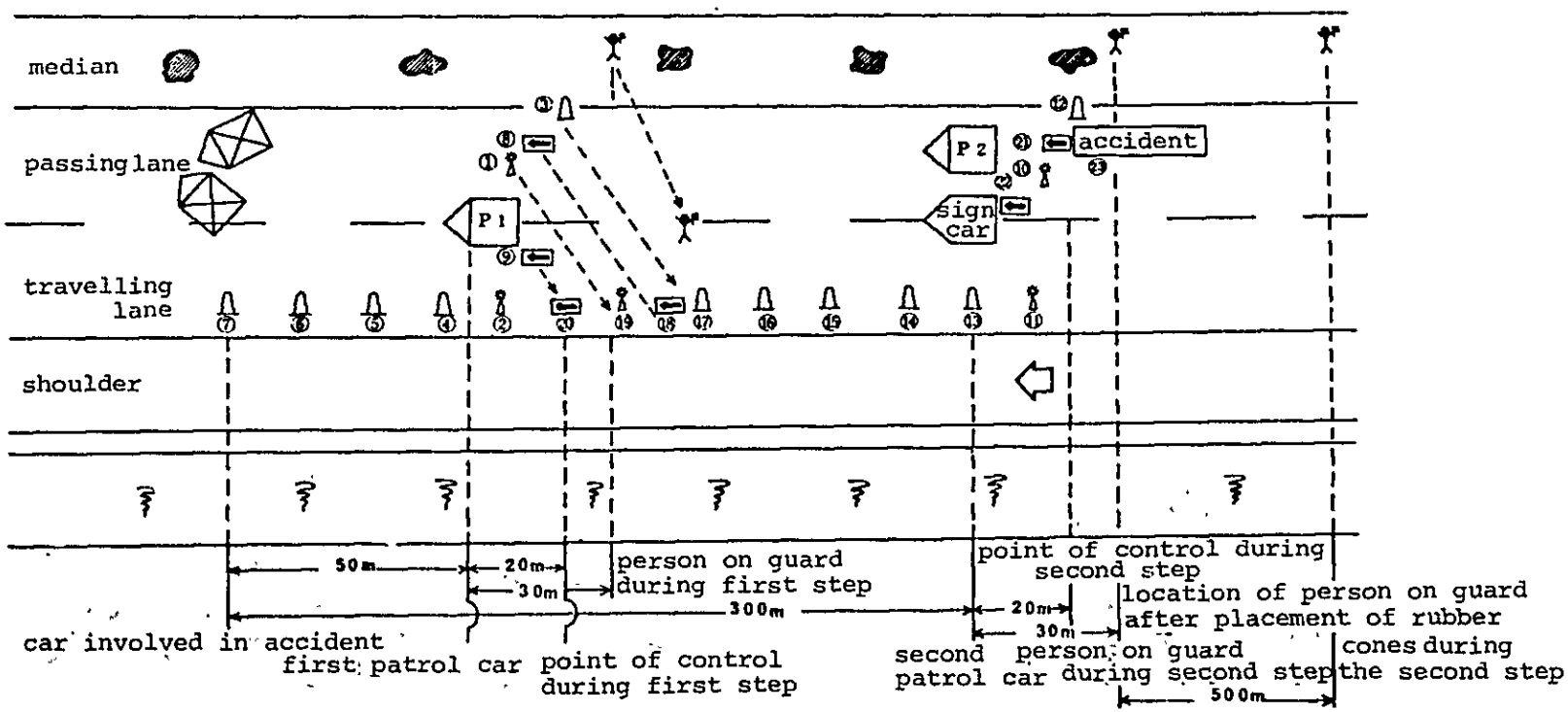
Attached Diagram 3

⑤ B. 2. Control of a single lane in the road



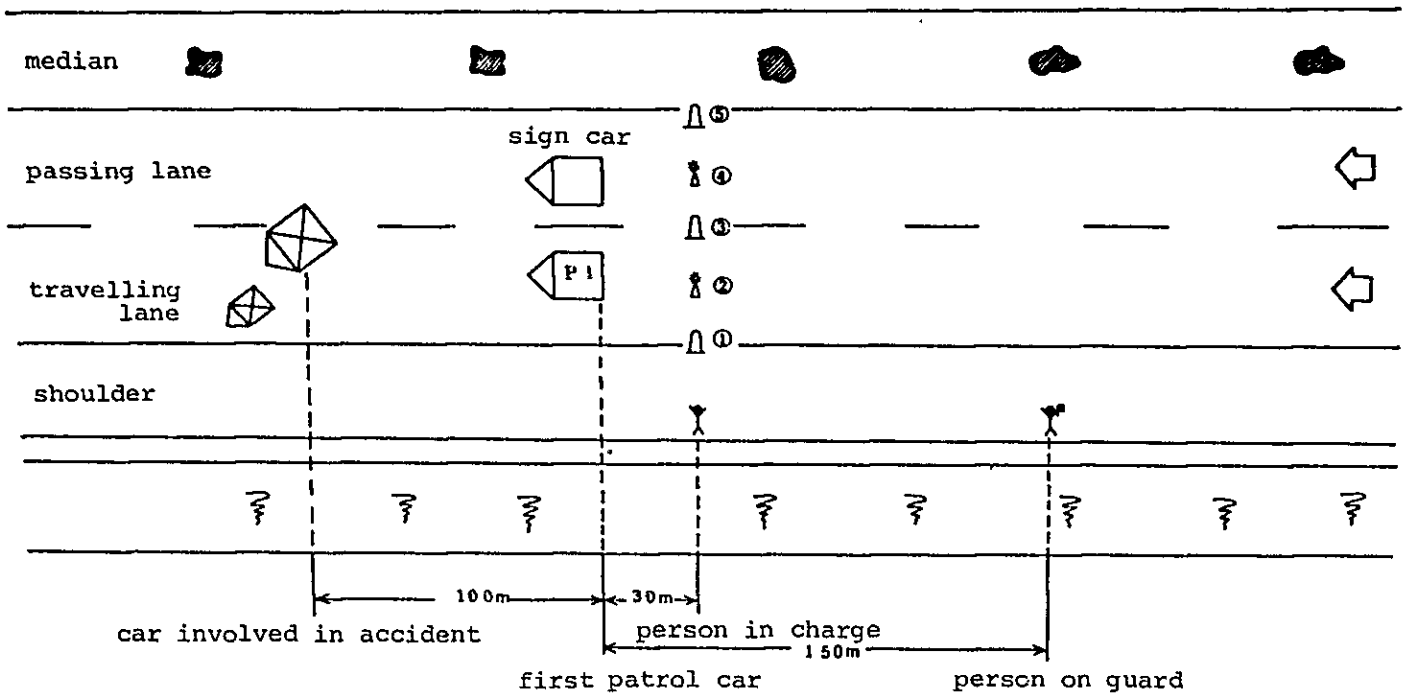
Attached Diagram 4

⑤B. 3. Control of two lanes of a road (excluding a tunnel)



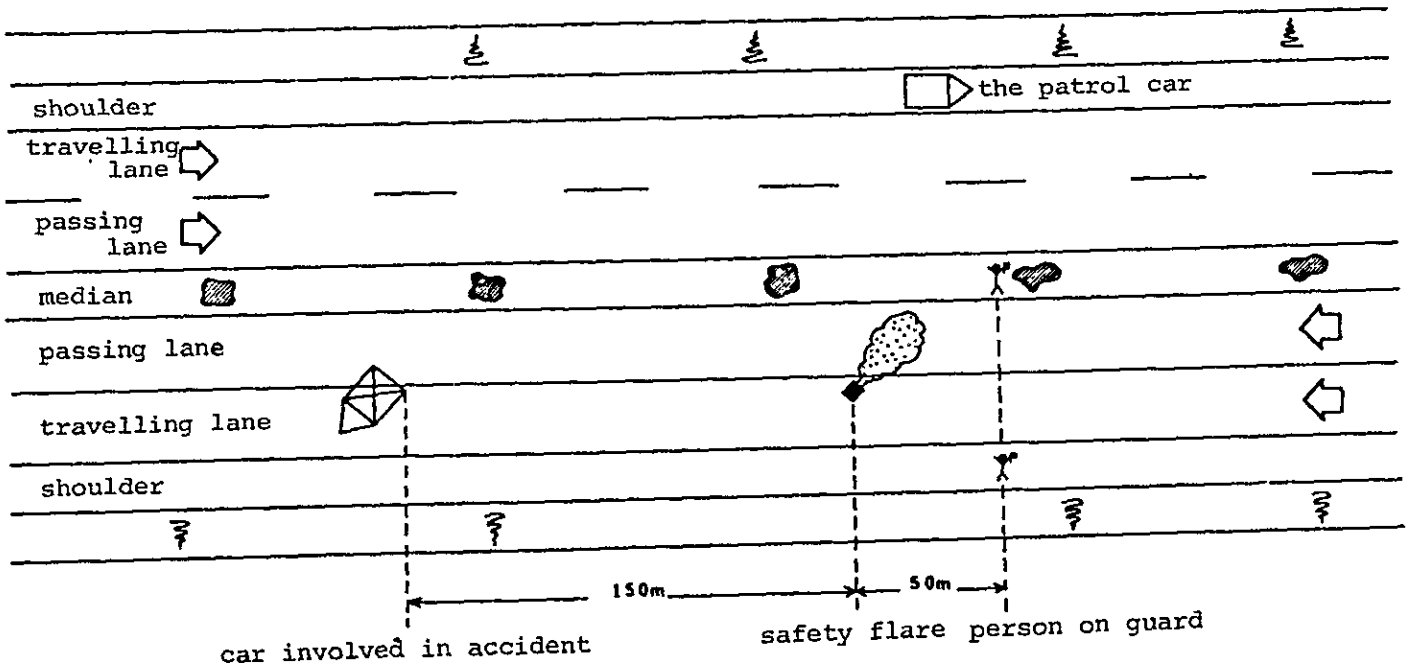
Attached Diagram 5

⑤ B. 6. Stopping the flow of traffic



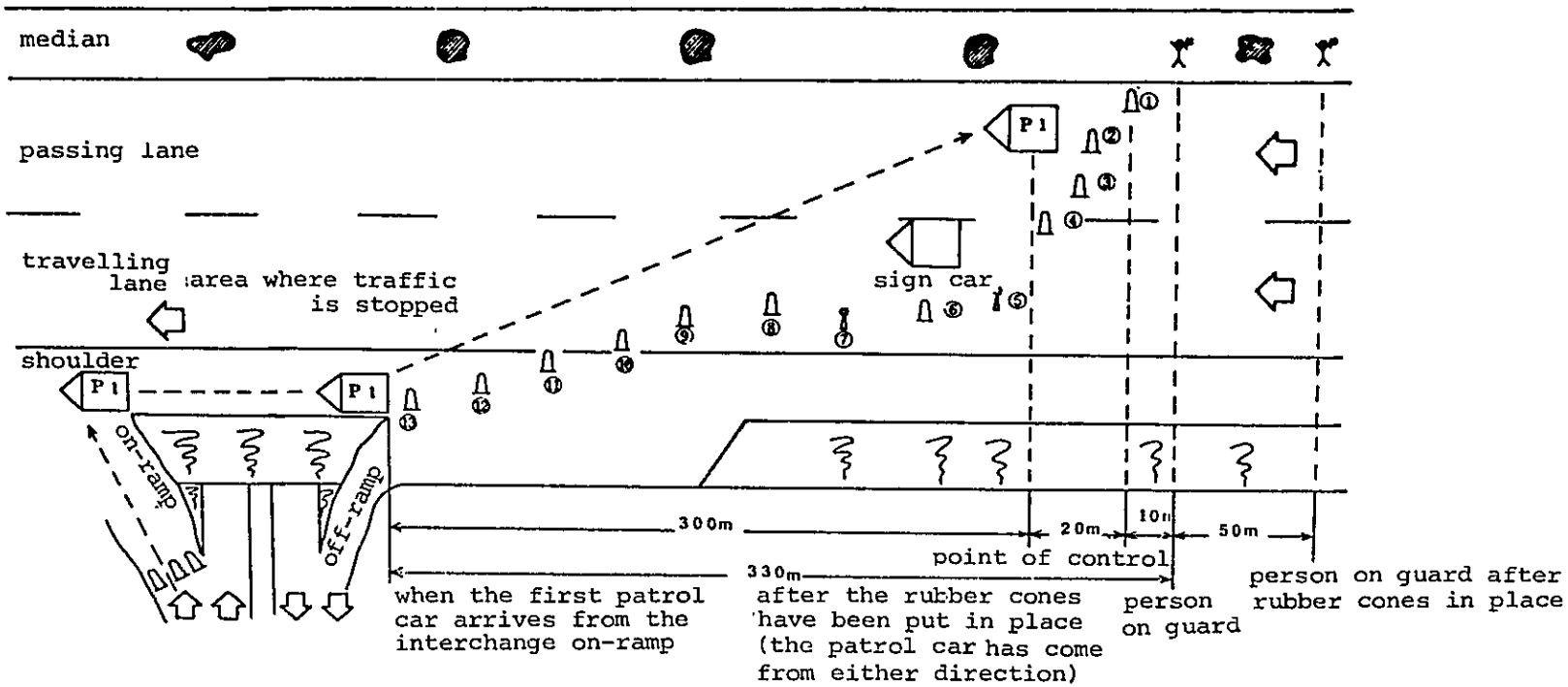
Attached Diagram 6

⑤B. 6. Control of an emergency
(Emergency in the opposite lanes)



Attached Diagram 7

⑤ C. Closing of the road between interchanges



Explanation of symbols

arrow sign board

rubber cone

rubber cone with rotating light attached

person on guard

person in charge

accident warning sign

safety flare

OO shows order of placing rubber cones, etc.

·Manuals for maintenance and repair work

Table of Contents

① General Concerns

I. Health management, etc.

1. Be fully concerned about daily management of health and in case of any sings of ill health, report to the superior for his suggestions.
2. When starting work, do callisthenics and cultivate an attitude of readiness, to make an effort to maintain good health.
3. Be concerned about the equipment, order, cleanliness, etc., of the office, the vehicles, the vehicle equipment, etc., and also keep a neat uniform, bed linen, etc.

II. Clothes, etc.

1. The items to be worn are described as follow, and are to always be clean and worn correctly with buttons fastened properly, the helmet strap in position, etc.
   (1) uniform
   (2) helmet
   (3) safety shoes
   (4) safety vest
   (5) gloves
2. Articles to be carried are as follow:
   (1) whistel
   (2) identification as road supervision staff
   (3) road administration book
   (4) writing equipment

III. Reports, etc.

1. The report

   Before starting work, previous arrangements with the person responsible are to be made concerning the work and methods of traffic control, and to be written down on the blackboard or on the prescirbed paper showing scheduled starting time, name of persons on patrol, scheduled course of patrol, scheduled time of return, etc., and then after the person on patrol reports to the head of the office, he is to start. At the same time as beginning an emergency patrol, the wireless is to be turned on,

with the channels open; for the beginning of an ordinary patrol, the wireless is simply to be switched on.

2. Verbal report

After completing patrol, etc., and immediately upon return, a verbal outline of the situation is to be made to the head of the office.

② Inspection and Equipment for Vehicles and Itemization of Necessary Equipment

I. Inspection and equipping of vehicles

In addition to the inspection and the equipment necessary by law, inspection and equipment concerning the following items is to be carried out, and in case any abnormalities in the vehicle are recognized during work, they are to be reported to the superior.

1. Inspection before departure from the office

Inspection is to be made of the following items before beginning road patrol, etc.

(1) The about of water in the radiator and the fan belt tension.
(2) The condition of the working brakes and steering equipment.
(3) The condition and air pressure of the tires.
(4) The condition of the rearview mirror.
(5) Amounts of fuel and oil
(6) Sensitivity of wireless.

2. Inspection at return

The following items are to be inspected following each return from road patrol, etc.

(1) amount of fuel
(2) presence of any leaks of fuel, oil or radiator water
(3) the condition and air pressure of the tires
(4) other items which are recognized as abnormal during duty

3. Occasional inspection and equipping

In addition to the inspection and equipping described in 1. and 2., occasional inspection and equipping by mechanics is to be carried out as need arises.

II. Vehicle equipment and its inspection

At the time of patrol, the vehicle in principle is to be equipped with the following items. Any shortages found on inspection are to be reported to the superior and immediate replacement is to be made.

hand safety flags, 1 set; first-aid kit, 1 set
rubber cones, 5 or more; safety flares, 2
powerful flashlights 2; megaphone, 1
sand or lime, around 10 kilo;
life rope 50 meters, 1; two use chain, 10 meters, 1
fire extinguisher, 1; water 20 liters; shovel, 1
pickaxe, 1; bamboo broom, 1
camera; dust prevention mask; oxygen rotating system (includes oxygen tank); flashing light

③ Safety Concerns in Traffic Control

I. Concerning driving

1. Before setting out, the safety belt is to be put in place and the door locked.
2. In a tunnel, the headlights and taillights are to be lit.
3. Speed is to be reduced when vision is impaired such as at dusk or during bad weather, etc. or when the street is slippery.
4. If travelling at speeds different from the other vehicles during patrol, the rotating light is to be turned on.

II. Concerning parking

1. When parking or stopping, the rotating light and the flashing light are to be turned on.
2. In order to prevent a rear-end collision, the turn signal and the turn signal and the driver's arm are to signal vehicles from behind to pass.
3. When stopping and parking, the emergency brake should be set and the front wheels should be turned toward the side of the road shoulder when the car is parked on the shoulder and towards the median divider when the vehicle is parked on the side of the median divider.

4. When emerging from the vehicle, safety is to be confirmed and exit is to be from the left side when the car is stopped and parked on the shoulder and from the right when the car is stopped and parked on the median divider side.

III. Concerning traffic control in the middle of a road

1. Any tasks are to be carried out quickly and safety is always to be confirmed.
2. Be sure to place a person on guard.
3. The person on guard stands at a safe place in view of the passing cars on the shoulder or on the median divider, or at the line of rubber cones, etc., and is to signal the passing cars with a hand safety flag or using a powerful flashlight in order to indicate the need for caution and do direct the passing cars (this activity is hereinafter referred to as "standing guard") and in case of recognizing danger is to signal the person in charge using a whistle or the voice to immediately escape.
4. The person on guard is to stand guard until the completion of the work.
5. Walking on the median divider should be avoided as much as possible.
6. When crossing the road on foot, safety is to be confirmed by looking to the right and the left and crossing is to be done by running and as much as possible, at a right angle, using the hand safety flag or the powerful flashlight.

④ Roal Patrol

I. The crew

1. Crew of the patrol is made up in principle of two persons.
2. Patrol is to be driven at a speed which is safe and consistent with the purpose of the patrol.

II. The removal of obstacles from the road

1. A sudden stop in front of the obstacle which needs to be removed is to be avoided.
2. When removing an obstacle, warning is to be given to oncoming

is difficulty in removing the obstacle, emergency traffic control is to be carried out with the equipment on hand, and help is to be requested from the work section.

⑤ Concerning Inspection and Check-up

1. Inspection and check-up is to the utmost to be carried out when full traffic control for maintenance and repair is being taken.
2. When inspection and check-up is being done section by section, the prescribed traffic control is to be carried out for the entire distance to be covered in at least a scheduled half day of work.
3. If inspection and check-up may be done in a short period at one particular location, simple traffic control measures may be taken which ensure the safety of the traffic control itself and the safety of the actual inspection work, such as parking the traffic directing vehicle or a vehicle which carries a warning sign on the shoulder of the road ahead of the working location using the method considered the safest.
4. If there is a compelling reason to stop inside a tunnel for a brief inspection and check-up, the traffic directing vehicle or vehicle carrying a warning sign is in principle to be used.
5. For inspection and check-up in a tunnel which does not necessitate traffic control of a lane, long distances in the gutter are in principle not to be walked. If inspection and check-up necessitate walking on the gutter because of a compelling reason, the provision of the paragraph ⑥ I "General Items, 8. is to be followed, and at the same time, the powerful flashlight is to be used for signalling while walking.
6. Inspection and check-up in a tunnel is to be carried out by 2 or more persons, with one person standing guard.

⑥ Concerning Maintenance and Repair

I. General items

1. The person on guard is not to direct traffic fro a long period.

2. The persons on guard and in charge are to signal special caution to the passing vehicles if moving to a different working location.
3. Entering and exiting from the working vehicles is to be from fixed locations.
4. When using the opening in the median divider, special caution for safety is to be taken.
5. When the working time exceeds the time that had been scheduled, be sure to inform the maintenance office and the traffic administration office by telephone or wireless.
6. The traffic control necessary to carry out the work is to be handled according to the systems shown in the attached Diagrams 1 - 8.
7. The person in charge is not to leave the traffic controlled area.
8. When cleaning using human power, apply the provisions from 4 B. corresponding to "the removal of obstacles from the road".
9. As much as possible, leaving the area under traffic control is to be avoided.

II. Work in a parking lot

1. Care is to be taken concerning the general movement of vehicles around the working location.
2. Be sure to carry the whistle.
3. When worlking in the parking lot in order to make a communicatin, etc., use the footway.

III. Work at night

1. Prepare the lighting equipment which will ensure total visibility in the working location.
2. Be sure to carry spare lighting equipment to the location.
3. Traffic control equipment is to be that which will not decrease in reflective ability at night.
4. Be sure to wear the safety vest.

⑦ Concerning Abnormal Weather and the Occurrence of a Disaster

1. Driving on patrol or standing watch during abnormal weather is

not to be done along.

2. During patrol, the vehicle is not to be stopped where it is dangerous.
3. If, when finding an abnormality such as a crack in the face of the cement cliff or a small landslide, there appears the possibility of a second disaster occurring, the office is to be immediately informed and traffic control carried out as a preventative measure.
4. Emergency repair work at night or under poor weather conditions is to be avoided as much as possible, but if necessary, is to be carried out after safety is assured.

⑧ Concerning Vehicles for Specific Jobs

I. Sweeper, water-sprinking vehicle, guard rail washing vehicle, etc.

1. Work is to be done at a time when the traffic is light. Warning is to be given using the traffic directing vehicle as needed. The vehicle on guard is to use the flashing rotating light to inform that there is a working vehicle ahead.
2. Before entering to the location for work while in transit, the safety of vehicles approaching from the rear is to first be confirmed.
3. The driver of slow speed vehicles, such as sweepers, or water sprinkling vehicles when travelling in a forward motion are always to be aware of traffic to the rear, and if there is a long line of vehicles following, are to move to the shoulder and await the passing of the vehicles which are following.

II. Tow truck, Beam lifter

1. For work at a narrowing of the shoulder, the time is to be scheduled when traffic is at the lightest.
2. Work is to be begun after fully confirming the conditions of the brakes, being especially concerned to park the vehicle with the clutch engaged.
3. When rotating the beam 180 degrees, be sure to rotate it towards the side of the slope.

4. Before lighting the article, the chains and oil pressure are to be rechecked.
5. When moving to a different working location, be sure to lower the beam and platform. When the vehicle is ready to leave, promptly remove the traffic control equipment.

III. Inspection and measurement vehicle

1. During measurement with an inspection vehicle, a warning vehicle is to be located nearly 100 meters to the front and 100 meters to the rear.
   Refer to attach Diagram 1 for example.
2. The inspection and warning vehicles are to be equipped with transceivers to communicate for continuous confirmation of safety.
3. Measuring is to be carried out at the time when traffic is light.
4. When parking the measurement vehicle on the side of the road, follow the instructions in paragraph ⑧ II. 2.
5. Warning is to be given according to the example shown in attached Diagram 1.

⑨ Concerning Working in High Places

1. Work in high places is not to be done when health conditions are bad, at night, or under bad weather.
2. When carrying out work in high places safety of the foundation at the base is to be assured and a safety belt or life rope is to be prepared.

⑩ Traffic Control and Method of Operation

This section is to provide the principles of traffic control to allow traffic safety, the safety of the workers on the street, and the effectiveness to be applied for maintenance and repair work on the expressway and other roads.
Ever if the traffic control method is partially changed because of working conditions, caution for full safety is not to be lowered.

I. When controlling traffic, caution is to be taken according to the following items.

1. Before starting traffic control, turn on the electric light sign in the road.
2. Before beginning and during traffic control, traffic is to be directed by the hand safety flags by two persons on guard if control of a lane is necessary, and by one person on guard if control of the shoulder is used. The person on guard is to take special care for his own safety.
3. When installing or removing a traffic directing sign, etc., the traffic directing vehicle is to be used for the warning to protect the person carrying out the work from oncoming traffic.
4. In a location especially dangerous because of a two lane road, before starting the traffic control the vehicle is to be parked in the travelling lane, and after stopping the flow of traffic completely, the work is to be carried out.
5. Traffic directing sings, etc., are to be installed in order from the direction opposite the flow of traffic, and to be removed in the reverse order.
6. After traffic control has been instituted, and its effectiveness is assured, then the (maintenance) work is to be begun.
7. During traffic control, the approaching vehicles are to be made as aware as posible of the need for caution (For instance, there is the method of using a taperecorder through the megaphone the to repeat the necessary words of caution.
8. After the necessary traffic control is completed, and after removal of the control equipment, be sure the electric street signs are turned off.

II. Systems of traffic control and methods of operation include the following

1. Shoulder Control (A) (attached Diagram 1)

(1) Traffic control of the shoulder (A) is for work to be done primarily outside the guard rail with only a small amount of the work to be done inside the guard rail if safety is assured.

(2) Where visibility is poor, an additional construction-in-progress sign is to be placed 400 m - 500 meters up the road.

2. Shoulder control (B) (attached Diagram 2)

(1) Traffic control of the shoulder (B) is for a two lane road where the width of the shoulder is 1.5 - 2 meters when the working area will take up most of the shoulder and when safety is assued.

(2) A guard vehicle is to be located between the traffic directing vehicle and the construction location.
However, if the guard vehicle is equipped with a warning sign, the traffic directing vehicle may be eliminated.

(3) The traffic control equipment, etc., is not to extend into the lane more than 40 cm.

(4) Where visibility is poor, a construction-in-progress sign is to be located 400 - 500 m up the road.

3. Control of one lane (attached Diagram 3)

(1) Traffic control of one lane is for work being carried out in the road, and when work which may be mainly inside the guard rail is being carried out over a long period.

(2) When setting up traffic control of a travelling lane in a 6-lane road, the sign showing construction-in-progress at the median divider may be eliminated.

(3) Of the persons on guard, the person giving traffic directions may be replaced with the robot guard (hereinafter refered to as "Safety Taro").

(4) If traffic is heavy and in an area with poor visibility, another construction-in-progress sign is to be added, and if necessary, a guard vehicle is to be parked between the traffic directing vehicle and the location of the construction.

4. Traffic control for work on the median

(1) Median traffic control (A) is for work done only on one side of the median guard rail (attached Diagram 4).

(2) Median traffic control (B) is for work on a median driver where there is no guard rail or on both sides of the guard

rail or on both sides of the guard rail on the median. (Attached Diagram 5)

(3) Of the persons on guard, "safety Taro" may replace the person giving traffic directions.

(4) In an area where traffic is heavy and where visibility is poor, an additional construction-in-progress sign is to be added. Also, in case of the necessity of using a guard vehicle, it is to be parked between the traffic directing vehicle and the construction location.

5. Traffic control involving the use of the opposite lane. (attached Diagram 6)

(1) Traffic control involving the use of the opposite lane is to be used when there are not curve in the road, and for large scale construction.

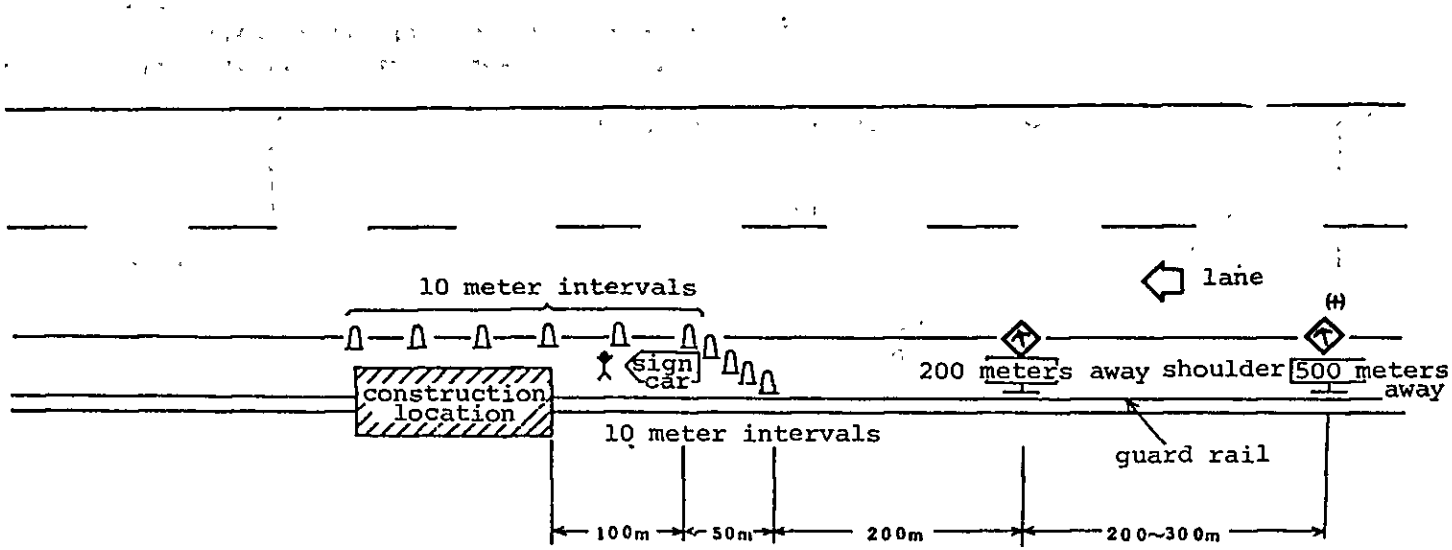
6. Traffic control during night work

(1) Traffic control during night work, in addition to the operation methods for daytime is to include the following items.

(2) With traffic control of one lane, traffic control in both directions is to include the red flashing light between the arrow sign boards and at the tapering area (wehre the lane narrows) and at the traffic control area.

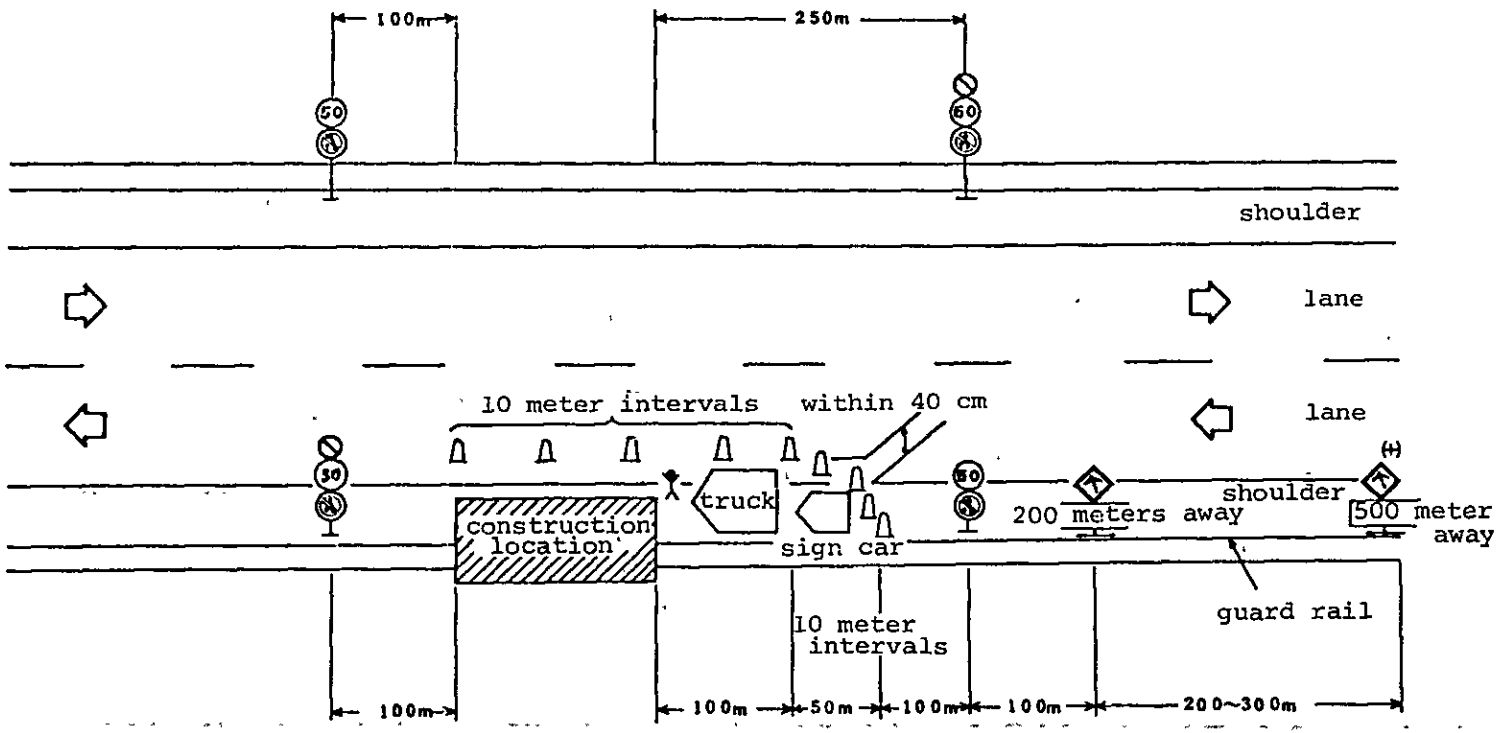
(3) When necessary, traffic control equipment is to be lit at the tapering area by a flood light and a traffic directing vehicle is to be parked on the shoulder where there is construction-in-progress sign 500 meters up the road.

Diagram 1 Shoulder control (A)



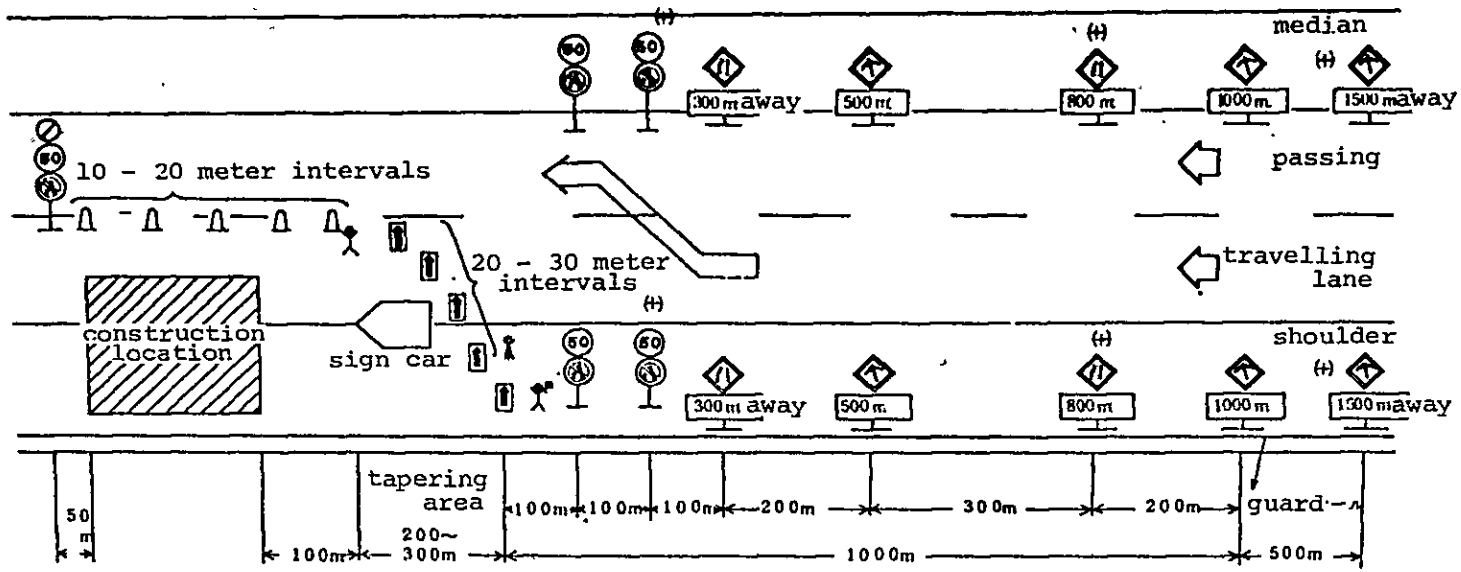
(note:) the sign (+) indicates extras are to be installed if traffic is heavy or visibility poor.

Diagram 2 Should control (B)



(note:) the sign of (+) indicates extras are to be installed if traffic is heavy or visivility poor.

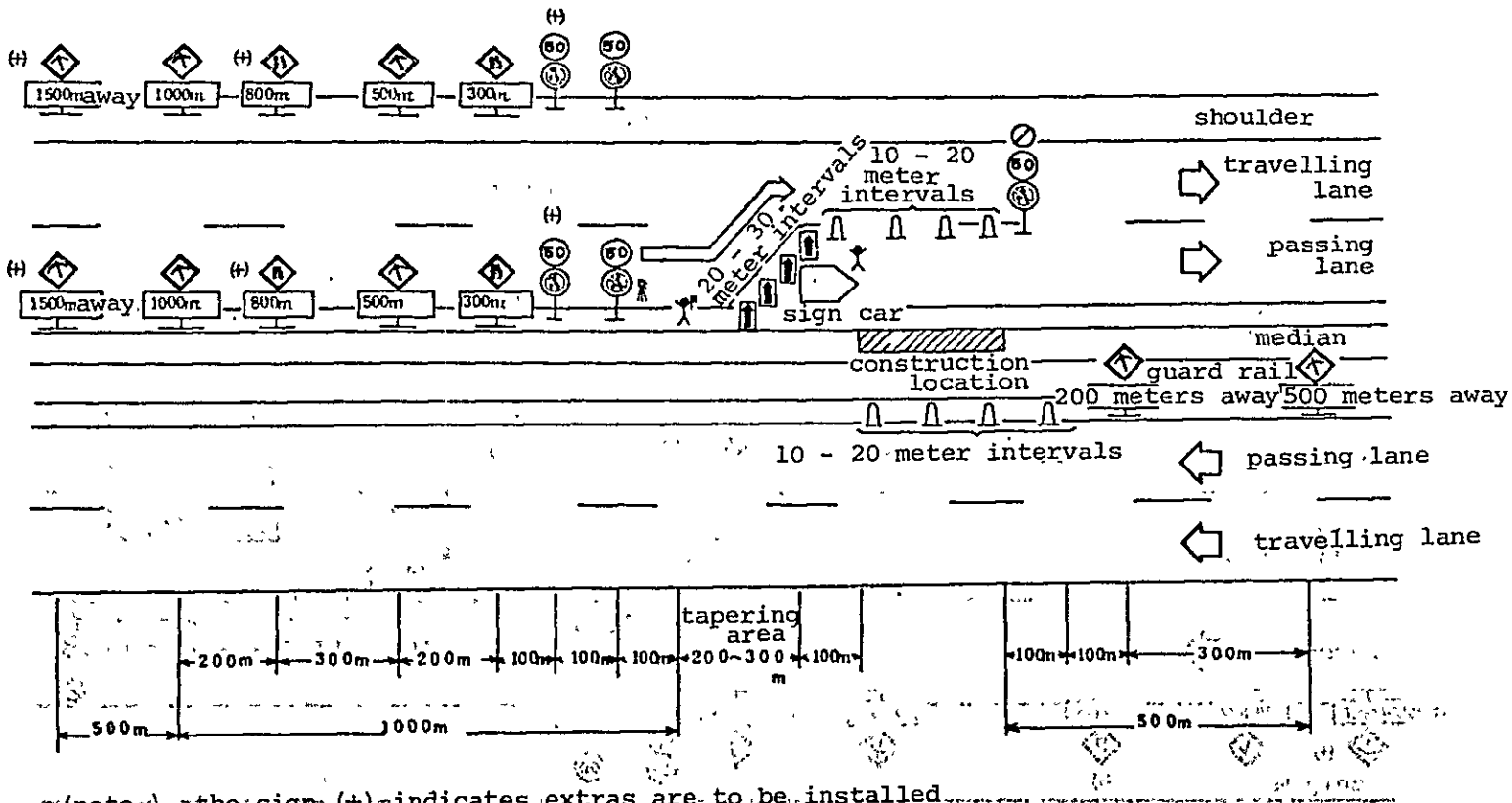
Diagram 3 Control of one lane



(Note:) 1. The sign (+) indicates extras are to be installed if traffic is heavy or visibility poor.

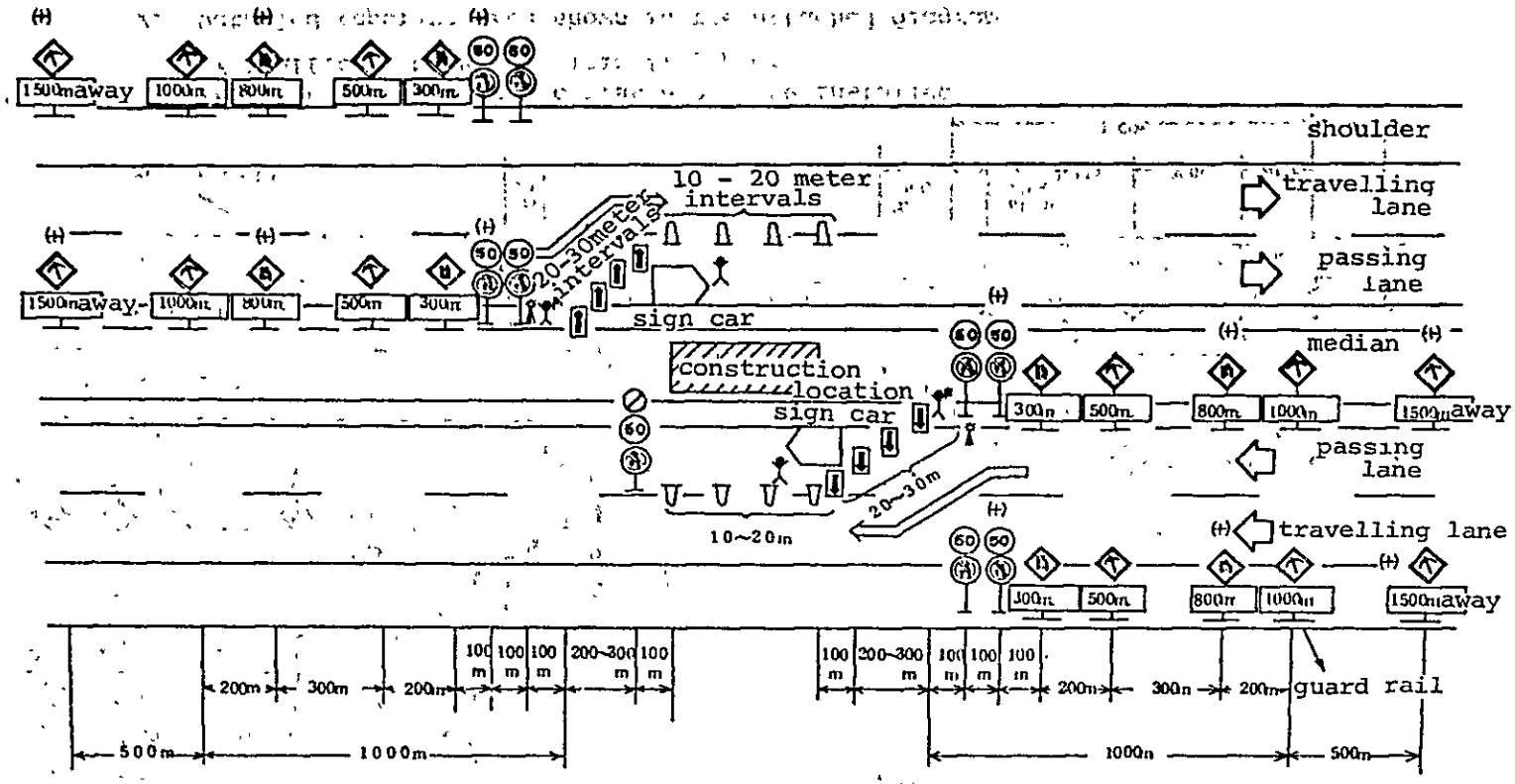
2. Detailed tapering area shown in the attached Diagram.

Diagram 4 Traffic control on the median (A)



(note:) the sign (+) indicates extras are to be installed if traffic is heavy or visibility poor.

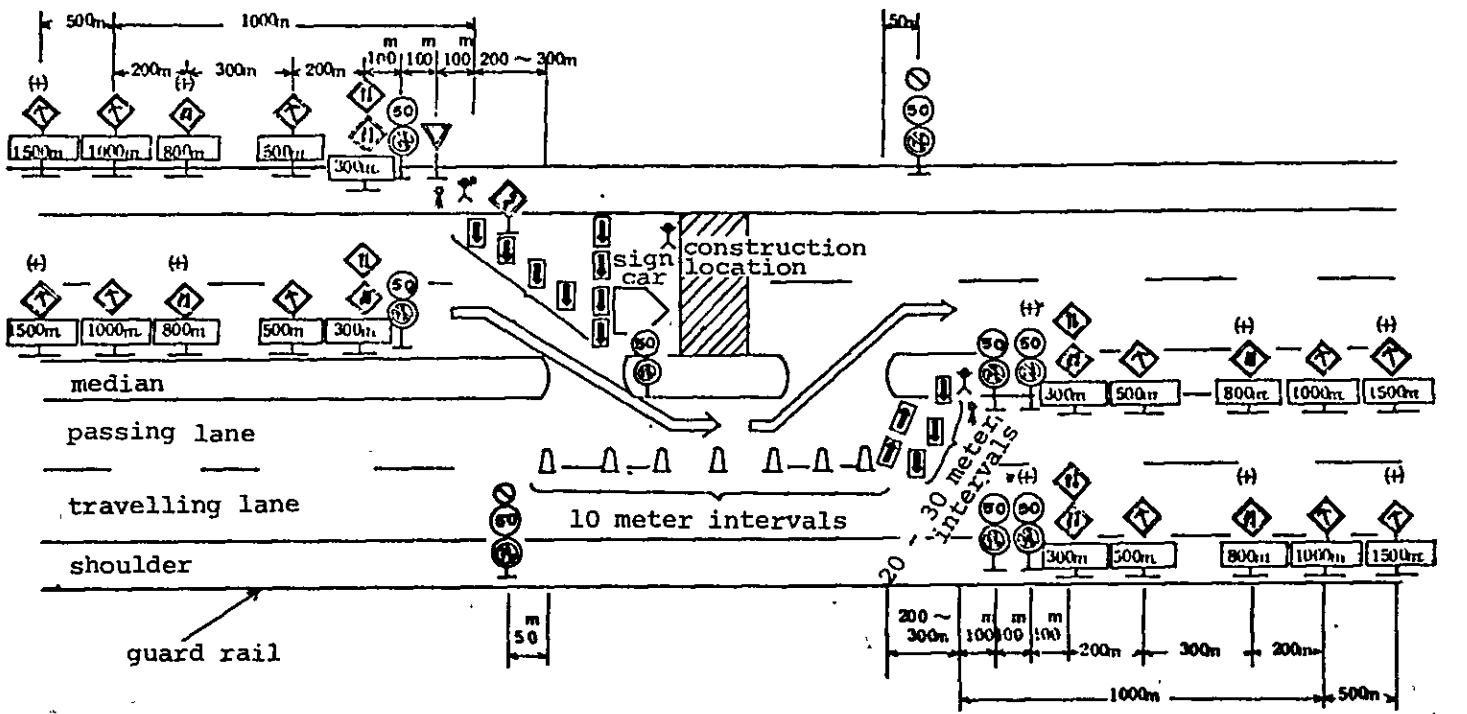
Diagram 5 Traffic control on the median (8)



(note:) 1. the sign (+) indicates extras are to be installed if traffic is heavy or visibility poor.

2. Detailed tapering area shown in attached diagram.

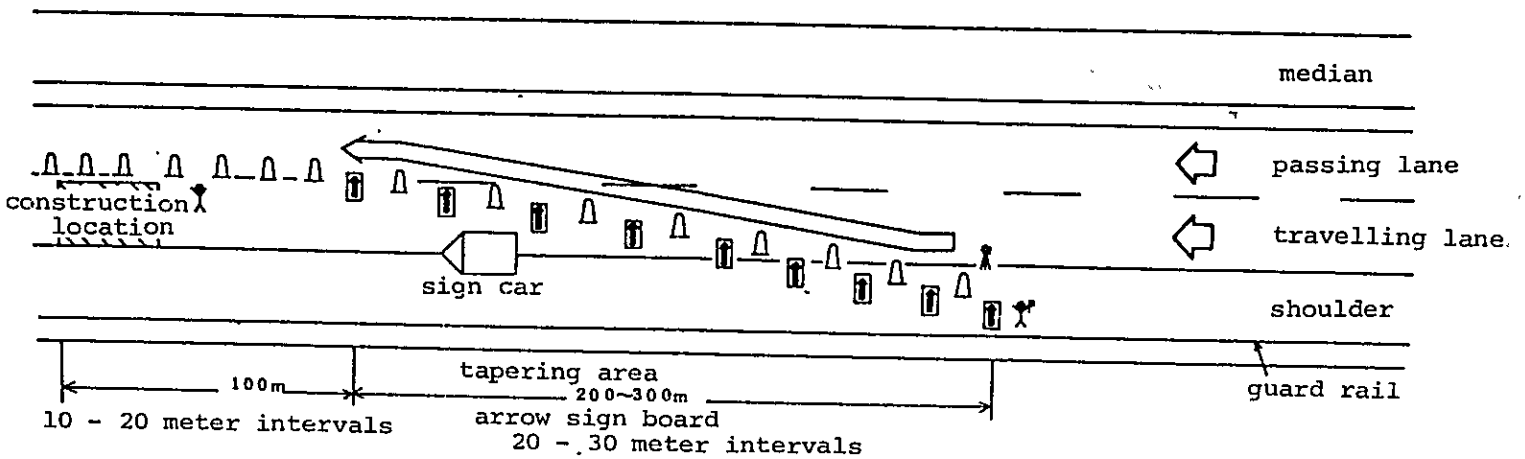
Diagram 6 Traffic control involving the use of the opposite lane



(note:) 1. The sign (+) indicates extras are to be installed if traffic is heavy or visibility poor.

2. Detailed tapering area shown in the attached diagram

Details of Tapering area



Explanation of Symbols

 rotating light (flashing even in day time)

 barricade (includes the arrow sign board)

 rubber ccne

 rubber cone with attached light (flashing even in daytime)

 portable rotating light (flashing even in dayment)

 person on guard (person giving traffic directions)

 person on guard (person keeping watch within the area)

 traffic signalling machine