

タイ国高速道路  
営業管理及び交通管理  
総合報告書

昭和56年1月

国際協力事業団

|       |
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| 派 一   |
| J R   |
| 80-42 |



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| 受入<br>月日 | 84. 3. 23 | 122   |
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## は し が き

現在タイ国はバンコック市内において、タイ国最初の有料都市高速道路建設を進めておりますが、その開通に先立ち、高速道路管理及び運営面における技術協力をわが国に要請してまいりました。

これに対しわが国は、日本道路公団の村上龍一及び門田信一両氏を各々高速道路営業管理、交通管理専門家として、昭和55年8月28日から同年9月29日までタイ国へ派遣いたしました。

本報告書は、村上・門田両専門家がタイ国高速道路システムを検討し、タイ関係機関との討論を経て、その貴重な成果をまとめられたものであって、今後の技術協力に大いに活かされんことを願うものであります。

末筆ながら両氏及び両氏所属機関に深甚なる謝意を表します。

昭和56年1月

国際協力事業団

派遣事業部長

河 西 明



# 目 次

|     |  |     |
|-----|--|-----|
| 1   | 派遣の背景 .....  | 1   |
| 2   | 実際の業務内容 .....  | 8   |
|     | (1)料金收受業務 .....  | 8   |
|     | (2)交通管理業務 .....  | 12  |
|     | (3)維持修繕業務 .....  | 12  |
|     | (4)E. T. A 組織 .....  | 13  |
|     | (5)会計制度 .....  | 14  |
|     | (6)職員の研修計画 .....   | 14  |
|     | (7)交通事故防止 .....  | 14  |
|     | (8)P. R. ....  | 15  |
|     | (9)沿道の環境に与える影響及びその対策 .....   | 15  |
| 3   | 業務の評価と今後の協力のあり方に対する助言 .....  | 16  |
| 4   | 専門家の感想 .....   | 17  |
| 資 料 |  |     |
| 1.  | Announcement of the Revolutionary Party .....  | 29  |
| 2.  | Minutes of Meeting on expressway operation system<br>between the Japanese experts and ETA officials held<br>at 403 ETA meeting room on September 8, 1980,<br>9:00 am. – 11.00 pm. .... | 42  |
| 3.  | Report on the Management of the Expressway<br>– Suggestion on toll collection, traffic operation &<br>maintenance and repair works – .....   | 45  |
| 4.  | Toll systems .....   | 168 |





## 1 派遣の背景

### (1) 要請背景

我々はタイ国政府から日本政府への要請にもとづく短期専門家として、タイ国の E.T.A ( Expressway & Rapid Transit Authority of Thailand ) という機関に赴いた。

E.T.A はバンコク市内に高速道路システムと高速鉄道システムを建設し管理することを目的とした機関で、タイ国内務省の所轄下にある。

現在タイ国において初めての有料の都市内高速道路の建設を進めており、その一部区間が 1981 年 7～8 月頃開通の予定である。そのため E.T.A は早急に当該高速道路の管理運営全般についてアドバイスを取得するための専門家を必要としていた。我々は、この E.T.A の要望に答えるために 1980 年 8 月 28 日から同年 9 月 29 日までの 1 ヶ月間、E.T.A に派遣された。

### (2) 勤務機関の概要

#### (i) E.T.A の根拠法

E.T.A の設立目的、権限等を定めた根拠法は ANNOUNCEMENT OF THE EVOLUTIONARY PARTY No.290 ( 1972 年 11 月 27 日 ) である。

同アナウンスメント第 2 条によると、E.T.A は

- (a) Exclusive Roadway の建設、システムの策定、及び維持補修
  - (b) モノレール又は地下鉄による輸送に関する業務の運営監督
  - (c) 高速道路及び高速鉄道システムの運営に関する全ての業務
- を行うことの出来る法人である。

#### (ii) E.T.A の組織

E.T.A の現行組織は図-1 のとおりで職員数は約 250 人である。

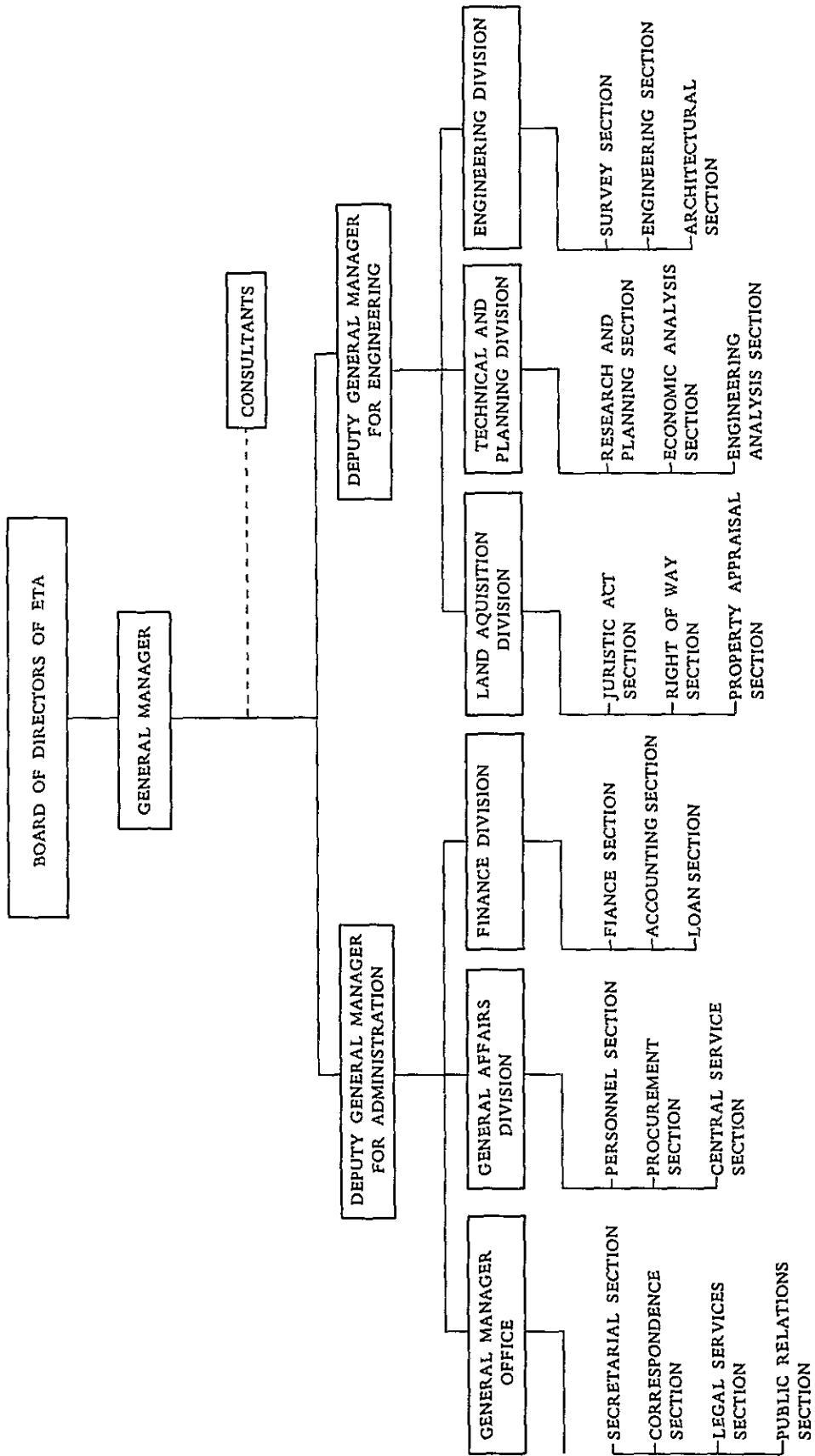
#### (iii) E.T.A の予算

E.T.A 設立以来の支出額は次のとおりである。

|      | 一般管理費 | 建設費    | 計      | (百万バーツ) |
|------|-------|--------|--------|---------|
| 1973 | —     | —      | 5      |         |
| 1974 | —     | —      | 12     |         |
| 1975 | 11.0  | 14.5   | 25.5   |         |
| 1976 | 13.0  | 100.5  | 113.5  |         |
| 1977 | 7.5   | 80.0   | 87.5   |         |
| 1978 | 9.6   | 311.8  | 321.4  |         |
| 1979 | 13.0  | 1166.7 | 1179.7 |         |

又 E.T.A の高速道路等の建設費の資金構成は大略次のとおりである。

ORGANIZATION CHART OF ETA



ディンデン～ポート間の高速道路

|             |     |            |
|-------------|-----|------------|
| 国費（補助金的性格）  | 50% | （金利 0%）    |
| O.E.C.Fのローン | 40% | （金利 3.25%） |
| ローカル・ローン    | 10% | （金利 約10%）  |

バンナ～ポート間の高速道路

|             |     |
|-------------|-----|
| 国費（補助金的性格）  | 40% |
| O.E.C.Fのローン | 50% |
| ローカル・ローン    | 10% |

ダオカナン～ポート間の高速道路については情報を得られなかったが、バンナ～ポート間と同じようなものとなる。又、マストランジ、トについては国費の投入比率は20%程度に低下するものと観測を述べていた。

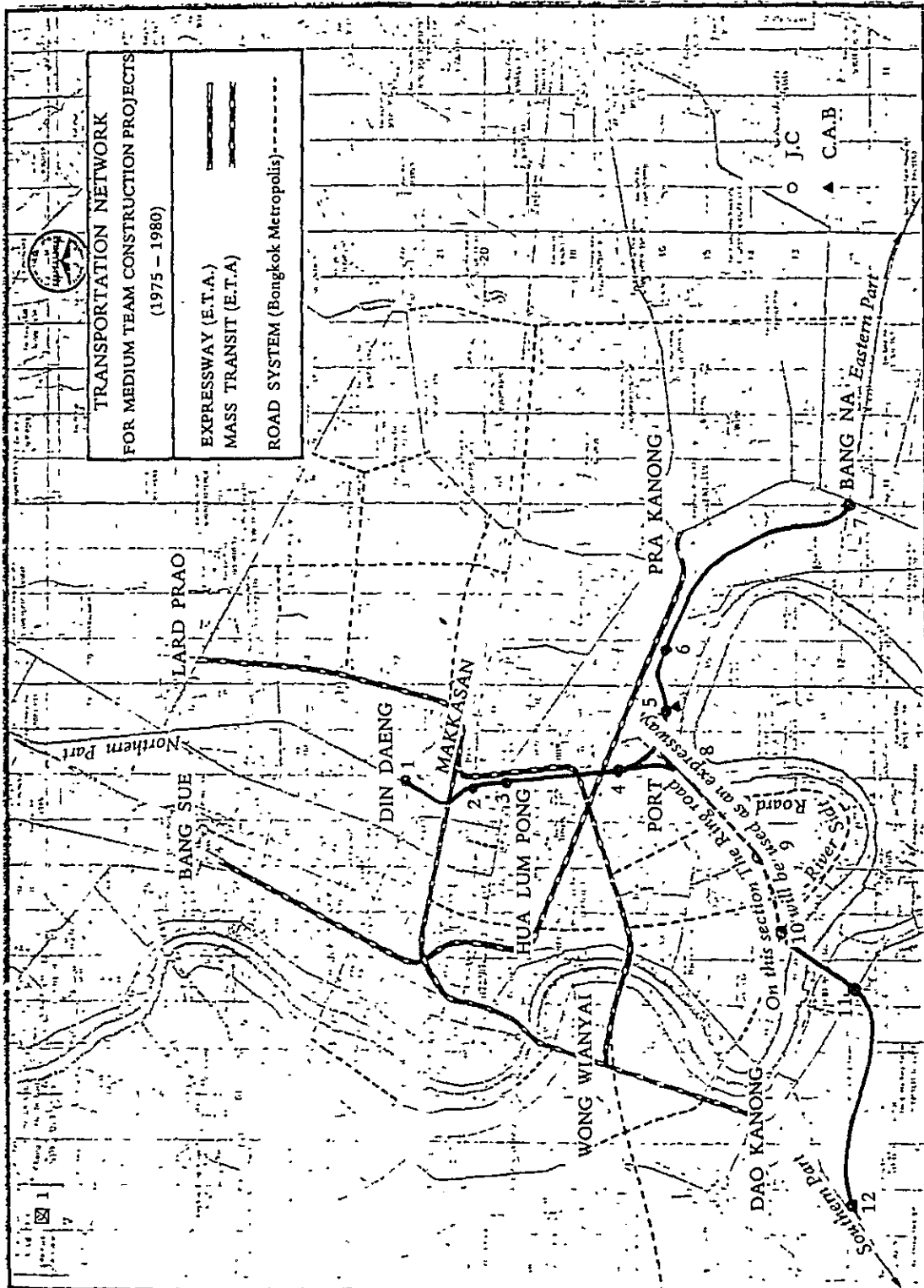
なお国費については一部償還を要するものが含まれているが原則としては、償還の必要性はないことになっている。

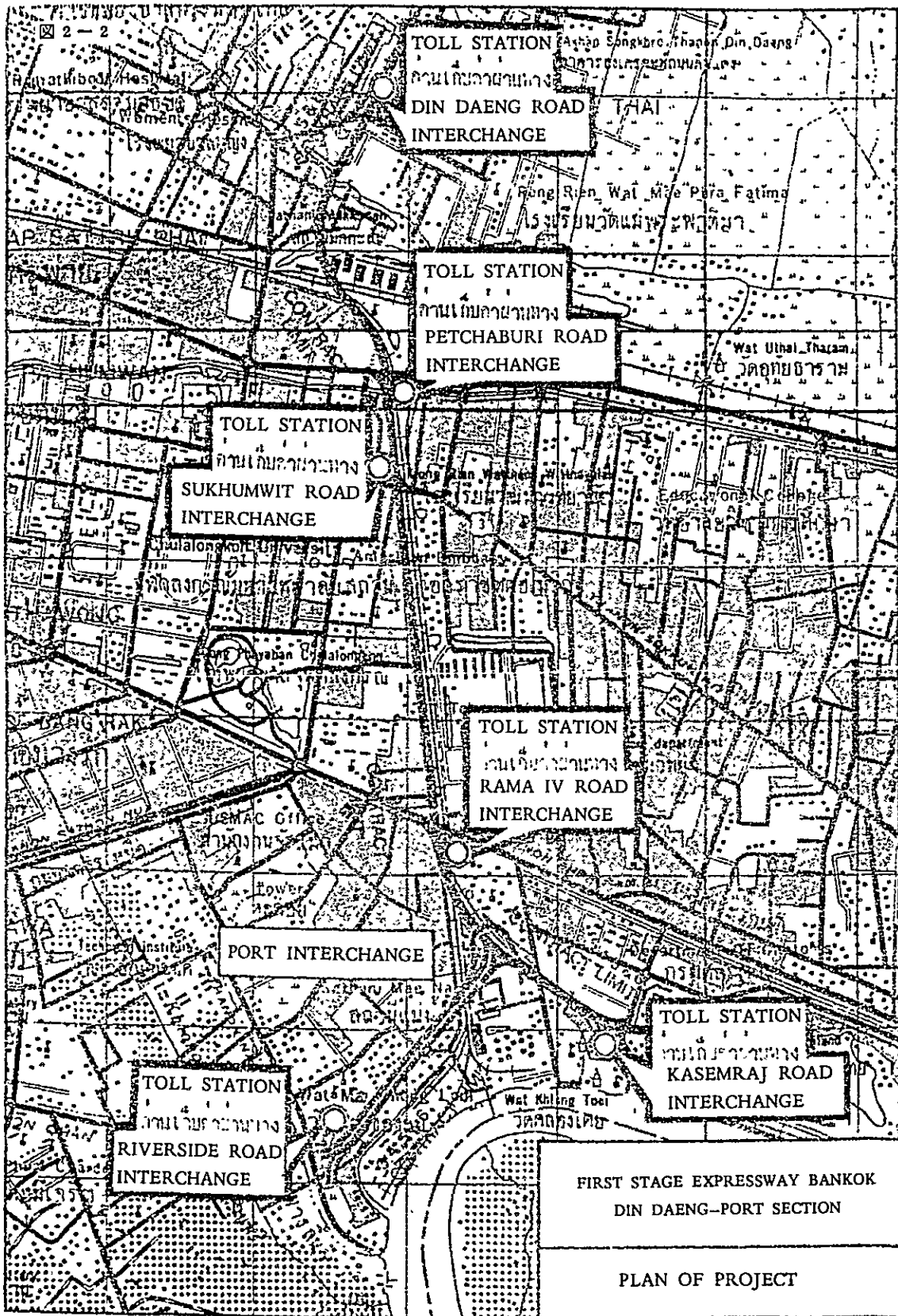
(iv) E.T.Aの高速道路の概要

イ概 要 現在、建設が進められている第1次高速道路システムは、The Office of Metropolitan Traffic Planning によって提案されたものであり、当該高速道路はバンコク市の北部では国道31号に、南東部では国道34号に、南西部においては国道35号に接続する。そして3つの区間は、クロントイ地区のポートセクションで連結されるかたちになる。（図-2-1, 2-2）

このプロジェクトを実施するために、E.T.Aは1975年2月に Freeman Fox社と契約を締結し、本高速道路に関する技術・経済調査の実施、および第1区間であるディンデン～ポート間の詳細設計を依頼し、両業務は1976年に完了した。

技術、経済調査の結果策定された高速道路システムは概略次のとおりである。高速道路システムは総延長27.1Kmで3つのセクションからなる。すなわちディンデン～ポート（8.9Km）、バンナ～ポート（7.9Km）、ダオカナン～ポート（10.3Km）である。高速道路は6車線、上下線分離で完全にアクセスコントロールされる。出入口はディンデンロードI.C、ベェチャブリロード、スクンビットロード、ラマ4世ロード、カセムラジロード、ニューポートI.C、バンナI.C、ナンリンノロード、サチュブラディットロード、リバーサイドロード、スクサワノットロードおよびトンブリバクノール国道のところに設置される。





この高速道路システムは、既存の道路の交通から次のような目的をもったトリップを減らすことによってGreat Bangkok 地域における交通渋滞を解消するのに役立つ。

(イ) タイ国の北部又は北東部と南東部又は南西部間のトラック、又は乗用車のスルー交通を高速道路に転換させることによって既存道路の混雑を緩和する。

(ロ) 都市内から郊外、郊外から都市内に向う本高速道路沿線の交通が時間の短縮を理由に高速道路に転換することによって既存道路の交通量が減少する。

ロ 徴収システム 料金を徴収するために、各インターチェンジに料金徴収施設（ブース、及び事務所）が設置される。料金徴収ゲートは高速道路の入口部分に設置され徴収システムは半自動的（実際の徴収行為は人力であるが機械により台数や車種が確認しうる）である。料金の額は、乗用車 5 バーン（約 50 円）、トラック 10 バーン（約 100 円）になる予定である。各インターチェンジのブース数、C.C.T.V、ラジオ放送設備、非常電話、電光標示板等の設置計画は表-1 及び図 3-1、3-2、3-3 のとおりである。

ハ 交通量 前記経路調査の結果によると 1980 年の高速道路の交通量は、乗用車 355 百万台、トラック 24 百万台で交通量の増加率は 7.5 % / 年である。したがって 1990 年には乗用車 741 百万台、トラック 5.1 百万台となる。

ニ 建設計画 ディンデン～ポート間およびバンナ～ポート間は現在建設中で、当初前者は 1980 年末、後者は 1981 年末にそれぞれ完成の予定であったが工事が相当遅れており、前者は早くとも 1981 年 7 月～8 月頃完成の見込みである。後者については、はっきりした情報は得られなかったが多分 1982 年末以降になるものと思われる。なお、ディンデン～ポート間については最後になっていた照明工事の契約が我々の滞在中の 9 月 18 日に締結された。また、現地の新聞には、照明工事が出来なくても 1981 年 3 月頃開通させるとの記事が掲載されたことがある。E.T.A 副総裁、Mr. Siva は出来れば 1981 年 7 月頃には開通させたいと言っていた。

ダオカナン～ポート区間については、チャオブラヤ河を渡るための橋、又はトンネルの詳細設計についての研究が終了しだい多分 1982 年の初頃に建設に入る予定になっている。チャオブラヤ河の渡河方法の検討は現在、Peter Frankel and Partners と Parsons Brinckerhoff

International Inc. のジョイントベンチャー及び Dr. Ing. Hellmut Homberg と National Engineering Consultants. によって実施されている。最終的には橋が採用されることになりそうである。

以上述べた諸点を中心に E.T.A の高速道路の概要をまとめると表-2のとおりである。

(3) 要請書の業務内容

我々に要請された業務内容は次のとおりである。

(i) 高速道路の交通管理

- ① 高速道路運営管理面の組織編成
- ② 部内組織規程の整備
- ③ 事務処理上の規程整備
- ④ 交通事故処理方法

(ii) 高速道路の営業管理

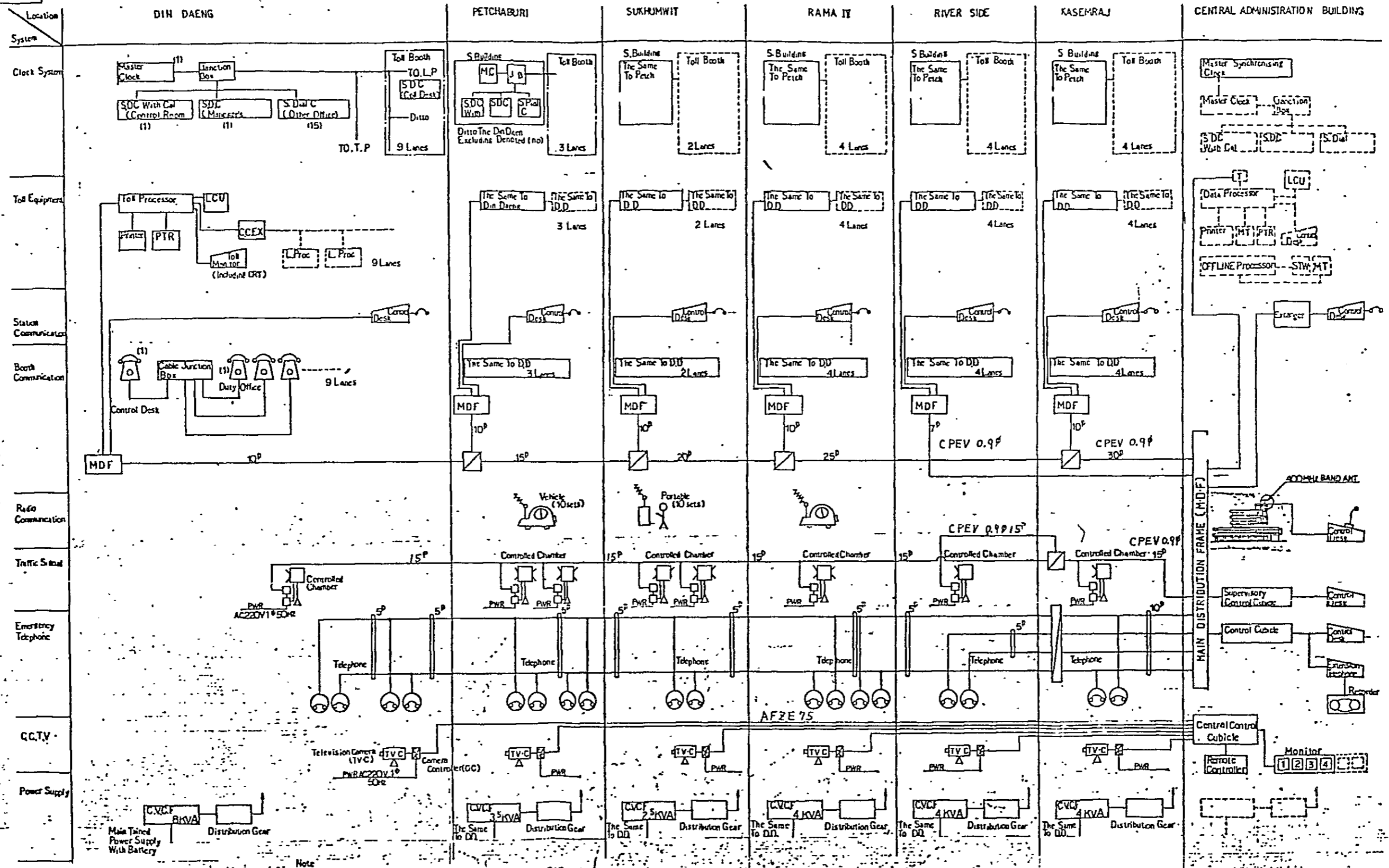
- ① 高速道路の料金徴収方法，会計処理，会計監督制度
- ② 事務処理上の規程整備
- ③ 部内組織の規程整備

BANGKOKU TOLL-SYSTEM

| 道 路 名                         | DIN DAENG-PORT ( 6 インターチェンジ ) |                 |                 |               |               |               | BANGNA-PORT ( 4 インターチェンジ ) |               |               |               |                          |
|-------------------------------|-------------------------------|-----------------|-----------------|---------------|---------------|---------------|----------------------------|---------------|---------------|---------------|--------------------------|
|                               | 1) DIN DAENG                  | 2) PETCHABURI   | 3) SOKHUMWIT    | 4) RAMA IV    | 5) RIVER SIDE | 6) KASEMRAJ   | 1) KASEMRAJ                | 2) NARONG     | 3) SOI 62     | 4) BANGNA     | 中央監視機<br>C. A B          |
| 1. 料金収受機                      | 9 レーン<br>1 式                  | 3 レーン<br>1 式    | 4 レーン<br>1 式    | 4 レーン<br>1 式  | 4 レーン<br>1 式  | 4 レーン<br>1 式  | 3 レーン<br>1 式               | 4 レーン<br>1 式  | 4 レーン<br>1 式  | 4 レーン<br>1 式  | 中央監視機<br>C. A B          |
| 2. 料金機械用コンピュータ<br>(Processor) | 1 式                           | 1 式             | 1 式             | 1 式           | 1 式           | 1 式           | 1 式                        | 1 式           | 1 式           | 1 式           | データプロセッサ<br>(オンライン方式)    |
| 3. Clock system               | 1 式                           | 1 式             | 1 式             | 1 式           | 1 式           | 1 式           | 1 式                        | 1 式           | 1 式           | 1 式           | Master-Clock             |
| 4. Booth 間連絡電動                | 10 set                        | 4 set           | 3 set           | 5 set         | 5 set         | 5 set         | 4 set                      | 5 set         | 10 set        | 10 set        |                          |
| 5. 各インターチェンジ間<br>連絡電話         | 1 set                         | 1 set           | 1 set           | 1 set         | 1 set         | 1 set         | 1 set                      | 1 set         | 1 set         | 1 set         | コントロールデスク                |
| 6. Power Supply<br>( バッテリー )  | 9 KVA<br>CVCF                 | 3.5 KVA<br>CVCF | 2.5 KVA<br>CVCF | 4 KVA<br>CVCF | 4 KVA<br>CVCF | 4 KVA<br>CVCF | 3.5 KVA<br>CVCF            | 4 KVA<br>CVCF | 4 KVA<br>CVCF | 8 KVA<br>CVCF | 4.5 KVA<br>CVCF          |
| 7. 道路上交通信号                    | 1 set                         | 2 set           | 2 set           | 1 set         | 1 set         | 1 set         | 1 set                      | 2 set         | 2 set         | 2 set         | コントロールデスク                |
| 8. インターチェンジ監視用テレビ<br>(C.T.V.) | 1 set                         | 1 set           | 1 set           | 1 set         | 1 set         | 1 set         | 1 set                      | 1 set         | 1 set         | 1 set         | コントロールデスク<br>(モニター5 set) |
| 9. 監視自動車用無線電話                 |                               |                 |                 | 10 set        |               |               |                            |               |               |               | コントロールデスク                |
| 10. 道路設置非常用電話                 | 4 set                         | 4 set           | 2 set           | 4 set         | 2 set         | 2 set         | 4 set                      | 4 set         | 4 set         | 4 set         | コントロールデスク                |

(注) 内は同一コントロールデスク内に設置



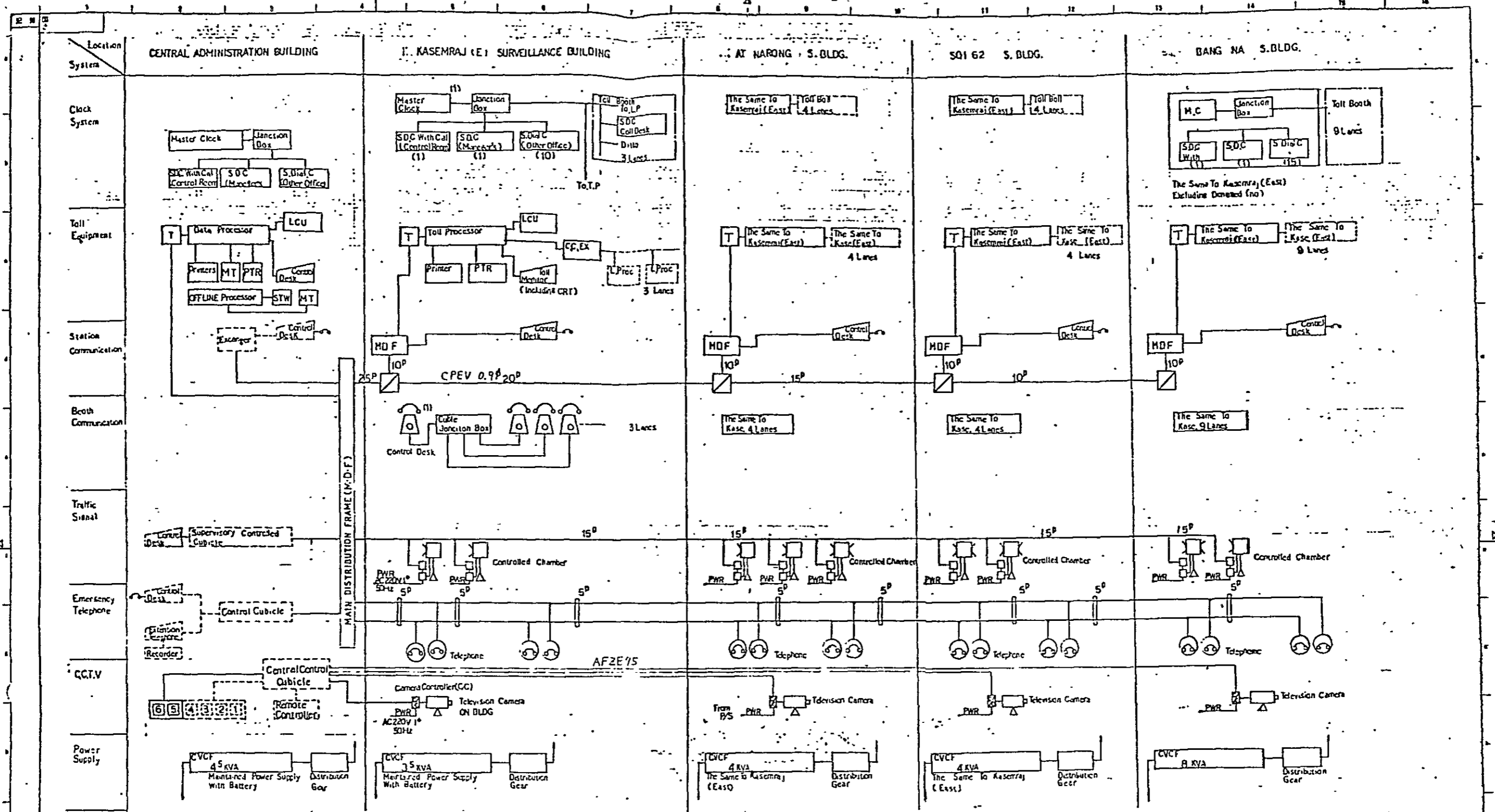


(1) SCHEMATIC DIAGRAM OF DINDAENG-PORT SECTION

Note  
 SDC Slave Dial Clock  
 S.Dial C Slave Dial Clock  
 L.Proc Lane Processor  
 PETCH Petchaburi Clock  
 MC Master  
 S.Building Surveillance Building  
 DD DIN DAENG  
 T Transmitter  
 R Receiver  
 CVCF Constant Voltage Constant Frequency  
 J.B Junction Box

|          |     |      |             |
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| REVISION | NO. | DATE | DESCRIPTION |
|          |     |      |             |
|          |     |      |             |
|          |     |      |             |

MITSUBISHI ELECTRIC CORPORATION  
 Schematic diagram of electrical parts for first stage expressway system in Bangkok (DIN-DAENG-PORT SECTION)  
 RH306755



Note  
 SDC Slave Digital Clock  
 T Transmitter  
 R Receiver  
 S. Dial. C Slave Dial Clock  
 S. Bldg. Surveillance Building  
 T.P Toll Processor  
 CVCF Constant Voltage Constant Frequency

(2) SCHEMATIC DIAGRAM OF BANGNA PORT SECTION

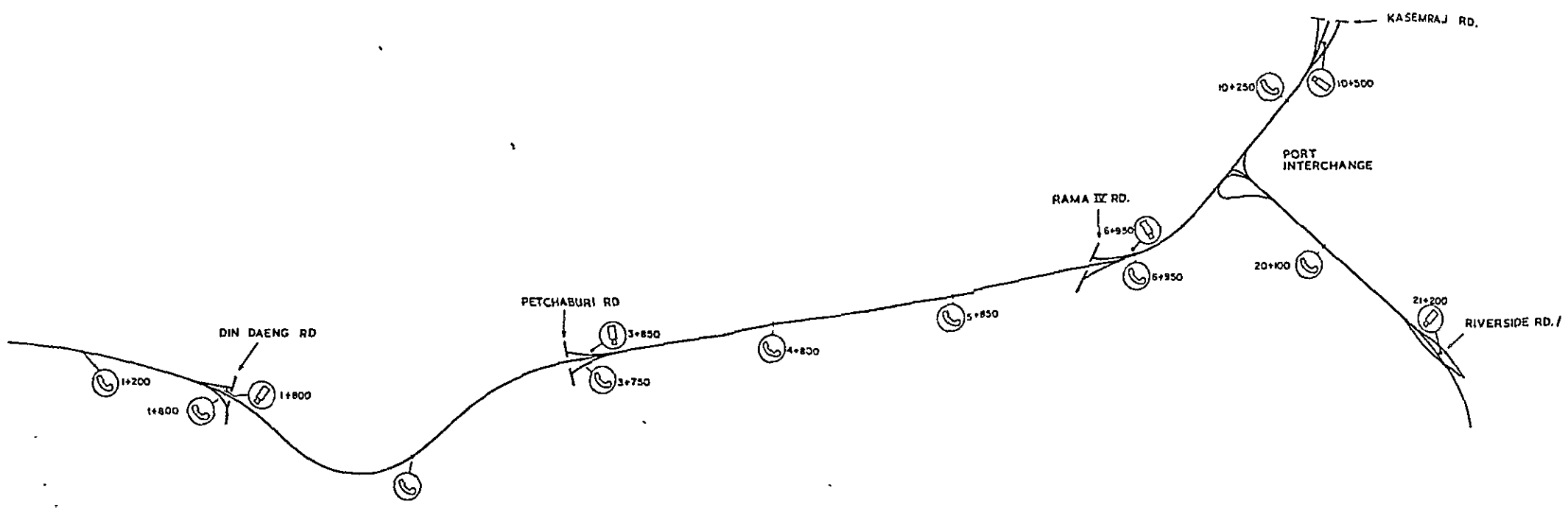
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|     |          |      |    |         |             |         |
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| NO. | REVISION | DATE | BY | CHKD BY | APPROVED BY | REMARKS |
| 1   |          |      |    |         |             |         |
| 2   |          |      |    |         |             |         |
| 3   |          |      |    |         |             |         |
| 4   |          |      |    |         |             |         |
| 5   |          |      |    |         |             |         |

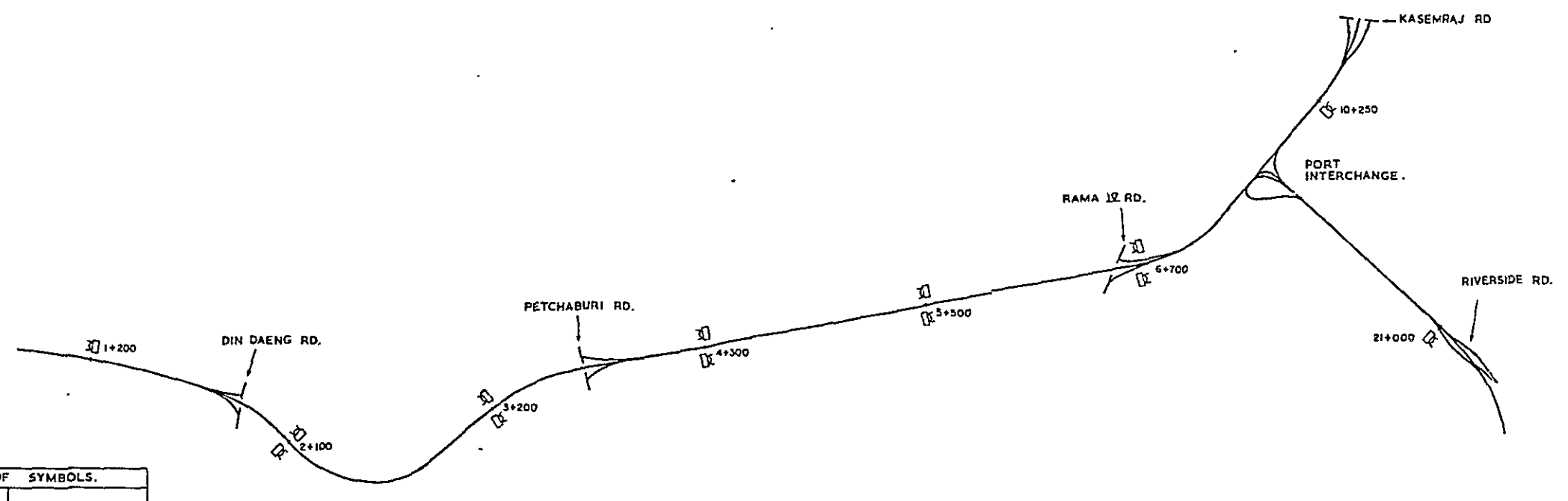
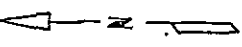
Schematic Diagram Of Electrical Parts For First Stage Expressway System In Bangkok (Bang Na - Port Section)

MITSUBISHI ELECTRIC CORPORATION

306746



C.C.T.V. AND EMERGENCY TELEPHONES.



TRAFFIC SIGNALS.

**SYMBOLS FOR MATRIX TYPE TRAFFIC SIGNALS**

|             |              |
|-------------|--------------|
|             |              |
| STOP        | LANES CLEAR  |
|             |              |
| LANE CLOSED | LANES CLOSED |
|             |              |
| LANE CLOSED | LANES CLOSED |
|             |              |
| TWO WAY     | 15 kph       |
|             |              |
| 50 kph      | 80 kph       |

**LEGEND OF SYMBOLS.**

|  |       |                                 |
|--|-------|---------------------------------|
|  | 31000 | C.C.T.V. CAMERA                 |
|  | 41000 | EMERGENCY TELEPHONE             |
|  | 4+700 | TRAFFIC SIGNALS. (MATRIX TYPE.) |

**KINGDOM OF THAILAND**  
MINISTRY OF INTERIOR  
EXPRESSWAY AND RAPID TRANSIT AUTHORITY OF THAILAND

**FIRST STAGE EXPRESSWAY SYSTEM IN BANGKOK**  
DIN DAENG - PORT SECTION

**SCHEMATIC ARRANGEMENT OF C.C.T.V., EMERGENCY TELEPHONES AND TRAFFIC SIGNALS.**

|  |              |                     |               |   |              |
|--|--------------|---------------------|---------------|---|--------------|
| FREEMAN FOX & PARTNERS<br>CONSULTING ENGINEERS |              | IN ASSOCIATION WITH |               | THAI ENGINEERING CONSULTANTS CO LTD<br>CONSULTING ENGINEERS - BANGKOK |              |
| DESIGNER                                       | G.V. ANDREWS | SCALE               | DIAGRAMMATIC. | DATE  | AUGUST, 1976 |
| DRAWN  | P.W.         |                     |               |   |              |
| CHECKED  | G.V. ANDREWS |                     |               |   |              |
| APPROVED                                       | D.J. MURPHY  | DRG. NO.            | 1536/CEM/1.   | SHEET NO.   | 3            |



表-2 E T A の高速道路の概要

|                        | 全体計画   | 区間                               |                                  | 別  | 備考       |
|------------------------|--|----------------------------------|----------------------------------|--|----------|
|                        |  | ディンデン〜पोर्ट                      | バンナ〜पोर्ट                        |  |          |
| (イ)延長                  | 271 Km   | 89 Km                            | 79 Km                            | 10.8 Km  |          |
| (ロ)車線数                 | 6レーン   | 3.5 m / レーン                      | 路肩 2 m or 2.5 m                  | 巾員 3.0 ~ 5.0 m   |          |
| (ハ)設計速度                | 60 ~ 80 Km/h   | 但し I.C.ランプ部                      | 3.0 ~ 5.0 Km/h                   |  |          |
| (ニ)勾配                  | 最大   | 4 ~ 6 %                          | ランプ部                             | 5 % 以下   |          |
| (ホ)高架のクリアランス<br>(建築限界) | 対道路  | 5 m                              |                                  |  |          |
|                        | 鉄道   | 5.4 m                            |                                  |  |          |
|                        | 運河   | 3.5 m                            |                                  |  |          |
|                        | 計  | 41.8 百万円                         | 10.6 百万円                         | 11.2 百万円   | 20.0 百万円 |
| (ト)インターチェンジ            | 設計   | 99.5                             | 25.5                             | 3.20   | 4.20     |
|                        | 監督   | 767.0                            | 327.0                            | 298.0  | 140.0    |
|                        | 用地   | 376.50                           | 128.80                           | 107.20   | 141.00   |
|                        | 工費その他<br>計   | 467.83                           | 164.61                           | 141.82   | 161.20   |
| (ケ)交通量                 | 12カ所   | ①ディンデン②ベチュ<br>リ ③スクンピット<br>④ラマIV | ⑤カセムラノ<br>⑥ニューポート(アトナロン)<br>⑦バンナ | ⑧リバーサイド(ナリノン)<br>⑨サアチュプラディット ⑩リバーサイド<br>⑪スクサワット ⑫ダオカナン |          |
|                        | 乗用 355 万台/年<br>トラック 24 万台/年<br>(1980年)   | 断面 (1990年)<br>10 ~ 12 万台/日       | 断面 (1990年)<br>11 ~ 12.5 万台/日     | 断面 (1990年)<br>10 ~ 1.8 万台/日                            |          |
| (ク)料金                  | 全線均一   | 乗用車類 5B<br>トラック 10B              |                                  |  | 永久徴収     |
| (ク)開通予定                |  | 1981年6月頃                         | 1982年以降                          | ?  |          |
| (カ)本高速道路の<br>社会経済的評価   | 1980年に開通したとして初年度便益6億パーツ。1990年には84億パーツ/年に達する。なおバンコク市内の関連道路がトイノンプロ<br>ジェクトチームの勧告どおり実施されれば便益は上記の2倍に達する。便益/コスト=1.2~1.5 |                                  |                                  |  |          |
| (カ)同 財務的評価             | 全費用を料金収入でまかなうのは無理。そのため半額を政府が援助(1977年1月決定)  |                                  |                                  |  |          |

## 2 実際の業務内容

我々は、E.T.Aに着任以来、高速道路システムの内容、E.T.Aの組織、関連法令等について一般的な説明を受けたのち、担当の副総裁Mr. Siva及び担当職員をまじえてE.T.A側の要望を再確認するための会議を行った。

その結果は議事録(資料-2)のとおりである。この議事録、及び先述の要請書に従って、我々は高速道路の管理運営に関する次の各項目について意見を述べることにした。

- ① 料金徴収業務
- ② 交通管理
- ③ 維持補修
- ④ E.T.Aの組織
- ⑤ 会計制度
- ⑥ 職員研修
- ⑦ 事故防止
- ⑧ 広 報
- ⑨ 環境問題

我々は上記9項目についての意見を英文報告書(資料3)のとおりとりまとめ、日本より携帯した参考資料を添えて1980年9月26日に開催した説明会の席上でE.T.A総裁に提出した。説明会にはE.T.A側からは総裁、副総裁(Mr. Siva)ほか関係の幹部4人、及び日本人専門家沖野氏が出席した。なお、交通管理については、9月19日に日本より携帯した「ハイウェイ25時」を上映した。

英文報告書(資料3)の各項目について補足し、我々の説明内容及びE.T.A側の反応を略記すれば次のとおりである。

### (1) 料金收受業務について

料金徴収業務については次の10項目にわけて意見を述べてある。

- ① 料金收受システム
- ② 料金收受の組織
- ③ 料金の額
- ④ 交通量
- ⑤ 収受員の勤務割
- ⑥ 料金收受業務処理要領
- ⑦ 料金收受業務審査監査要領
- ⑧ 料金收受機械の保守
- ⑨ 収受員の研修

## ⑩ その他

### ① 料金收受システム

現在のところ、まだ料金收受関係の施設は建設が進んでおらず、本システムについてはE.T.Aの電気関係の職員からの仕様書にもとずく説明にたよるほかなかった。当該説明及び仕様書によるならば、ゲート手前にはトラフィックカウンター、及び軸数判別器が設置され、進入してくる車両の台数及び車軸数が検知されることになっている。又、ブース内には料金收受機械(車種設定器)が設置され、当該機械には、車種設定ボタン(0~9の10種類)、「Cash」、「Voucher」というボタンが設けられている。

収受員は進入してくる車両の車種に応じた車種ボタンを押すとともに現金で料金を収受した場合には「Cash」ボタンを、回数券、無料通行証等による場合には「Voucher」ボタンを押す。当該ボタンが押されると自動的にブース後方に設けられたバーが上がり通行が可能となる。

なお、収受員が車種設定ボタンを押した時点でブースのキャノピに設置された車種区分(料金区分)ランプが点灯し、収受員が適正なボタンを押したかどうかを事務所内から確認しうるようになっている。

また、事務所内にはコントロールデスクが設置されており軸数判別器により検知された軸数と、車種設定器による軸数とが食い違う場合にはブザーがなり、コントロールデスクのところに配置された者(彼らはこれをトールコントローラーと称していた)がブースへの電話を用いて収受員に注意しうるようになっている。

また、中央管理事務所及び各I.Cの事務所内には、コンピューターとその端末器が設置され、収受員の車種設定操作を全て記憶し、収受終了と同時に各収受員ごとに勤務記録等がアウトプットされることになっている。収受システムの詳細は、別添資料4のとおりである。

本システムは、収受員の不正防止、収受金の監査、利用者の不法通行防止の観点からみて、非常によく検討されたシステムであると思われる。

ただコンピューターによってアウトプットされるデータについては、現在予定されているものがかならずしも最適とは思えない。しかし、これは将来業務の実態をみながら必要に応じて漸進的に変更改善が可能であり、業務の実態を十分把握した上でないと適切な意見を述べるのが難しいと考えたので、今回は特にコメントしなかった。

### ② 料金收受の組織

これについては「E.T.Aの組織に関する意見」のところで述べてある。

### ③ 料金の額

料金は乗用車 5 バーン (約 50 円), トラック 10 バーン (約 100 円) となる予定である。ただし, E.T.A 法に定められている所管大臣による官報告示が済んでいるのかどうかは確認出来なかった。また車種区分の詳細 (乗用車に含まれるのはどの車種か等) については情報をうる事が出来なかった。彼らは将来料金区分を細かくして, 増収をはかることを考えている。料金の徴収期間については定めがないが, E.T.A の話では, 原則的には永久に料金を徴収し続け, 償還後の余剰財源でもって新規路線や, Rapid Transit の建設を進めたいとしている。償還期間はおおむね 10 年ぐらいを目途にしたいとしている。しかし, 実際にはそれは多分不可能であろうとの印象を受けた。

回数券の制度については, 現在のところタイ国にはそのような制度がないらしく, 又日本の制度の説明がかならずしも充分でなかったために彼らとしてはかなり興味を示したが, あまりよく理解されなかった感じである。しかし, 料金機械に「Voucher」ボタンを設けているので回数券制度の導入は可能である。今回は制度の目的, 及び概要を説明したにとどまった。回数券の様式, 発注, 保管, 発売等, 制度のより詳しい説明が望まれる。

#### (4) 交通量

交通量については, 先述したようにフリーマンフォックス社が契約にもとずいて実施した研究があり, それにもとずき 1990 年における本線区間交通量が得られた。我々は, ディンデン～ポート間について, 当該区間交通量から I.C 別の出入交通量を算出し, それを年増加率 7.5% を用いて割もどすかたちで 1981 年の各 I.C 別の出入交通量を算出して示した。

しかし, この交通量には, 全線 (27.1 Km) 開通時の北部又は東北部～西南部又は南東部相互間のスルー交通が含まれおり, 第一区間 (ディンデン～ポート間) のみの部分供用時の交通量としては過大なものとなっている。我々としては, 詳細なデータを分析する機会がなかったのでこの交通量を一応の目安として説明したところ, E.T.A 側は早急に独自に部分供用時の I.C 別交通量を算定するとの意向を示した。

なお, E.T.A はサービスタイムを 10 秒程度と考えており我々としてもその前提で開放レーン数等を計算したが料金機械のシステムを考慮するとサービスタイムはより長くなるものと考えられる。しかし, これは料金機械が設置されたあとで実地に検討すればたりの問題であるので今回はコメントしなかった。

#### (5) 収受員の勤務割

我々はタイ国の労働法, 及び E.T.A の就業規則の英語の抄訳 (労働時間, 有給休暇日数等ごく一部である) を得たうえで, E.T.A の高速道路における収受員の勤務割について概説的な意見を述べた。

彼らの通勤に関する当初の考え方は, 適当な地点に集合場所を 3ヶ所程度設け, 職員は



そこに集り、そこから各料金所へは E.T.A のマイクロバスで運ぶというものであった。また収受員の勤務場所（事務所）については、かなりフレキシブルに考え、交通量の変動に伴う開放レーン数の変化に応じて応援体制をとることとし、その調整は中央管理事務所の料金徴収部が行うとの考え方をもっていた。また、勤務は一応現行の守衛職員の勤務形態を前提とした 3 交替制を考えていた。我々としては、各職員はあらかじめ定められた勤務場所へ各自公共交通機関等を利用して出勤すべきこと、したがって勤務割の作成にあたっては公共交通機関の利用可能性を配慮すべきであり、真夜中に大交替が生じるような勤務割は望ましくないとの前提にたって日本道路公団において実施されている日勤、夜勤制度を図に示して説明した。

これについては、E.T.A としてはタイ国の法制等をチェックし検討したいとしていた。

#### ⑥ 料金收受業務処理要領

E.T.A は料金收受業務についてのマニュアルを欲していた。我々は日本道路公団の要領を参考に、E.T.A のシステムを考慮したうえでマニュアル案を作成し、提示した。このドラフトは、時間の制約もあり、用語も不統一なところがあり、かならずしもこのまま E.T.A の使用にたえうとは思えないが、彼らが独自にマニュアルを作成する場合の参考になると考える。

本件については、立入った議論をする機会はなかった。E.T.A 当局者よりこのドラフトが E.T.A のシステムを考案した上で作成されたものであるかとの質問があったのみで彼らの感触はよく解らない。

#### ⑦ 料金收受業務審査監査要領

これについても一応日本道路公団のものを前提に E.T.A のシステムを考慮してマニュアル案を作成提示した。先述したように E.T.A はコンピューターによって収受員の勤務記録等を即時にアウトプット出来るシステムを導入している。本ドラフトは、かならずしも当該システムを充分活用しているとは言えないかもしれない。

監査システムは、我々の経験からするとどの程度まで機械の精度を信頼するかによって相当異なったものとなる。現時点においては、その点について十分な情報がなかったため、かならずしも機械に重点をおいた監査要領にしなかったためである。

我々としては、本ドラフトは E.T.A が独自に監査マニュアルを作成する場合の参考になるものとする。

#### ⑧ 料金收受機械の保守

これについては、我々としても十分な資料を用意していなかったため、一般論を述べるにとどめた。E.T.A としては、最初の 1～2 年は、料金機械を納入する会社（英国 A.R.C 社）と E.T.A の職員が協力して保守点検にあたる計画であると説明していた。しかし長期

的なビジョンについては、はっきりしていないとの印象を受けた。

(9) 収受員の研修

収受員にとって必要な研修項目、及び日本道路公団における事例を概略的に説明した。我々の日本道路公団においては高速道路が新規開通する場合には約1カ月前に管理事務所を設置し、2週間程度収受員の研修を行うとの説明に対して、E.T.A.の場合にはどうすればよいかとの質問があった。

E.T.A.においては、現在のところ高速道路の開通準備業務を行う専門的部局ないし人員は特に配置されておらずMr.サストラ（彼は将来中央管理事務所が設置されれば、その所長になるものと目されている）が他の業務のかたわら、行っている現状であった。

このような現状を考慮したうえで我々としては出来るだけ早急に開業準備課的なものを設置することが望ましく出来れば開通の6カ月ぐらい前から準備を初めるのがよいとの意見を述べておいた。

(10) その他

制服の制定、収受金をゲートから事務所まで運ぶためのカバンの用意について意見を述べた。後者については、E.T.A.は既にトラックのようなものを考えているとの同等があった。

料金収受業務関係について総括するならば、現時点においては、E.T.A.の高速道路に導入される料金収受機械のシステム等についてよく熟知しているのは副総裁のジバ氏のほかは電気関係の担当技師等ごくかぎられた人達であるとの印象をうけた。

そういう意味からも、今回のアドバイスはごく一般的なものにならざるを得なかったと思う。今後より具体的なかたちでの協力が必要であろう。

(2) 交通管理業務について

交通管理に関するE.T.A.への提言は以下の内容について行った。

- ① 関係機関との業務分担と協力体制
  - a 交通警察
  - b 消防署
  - c 救急
- ② 日本道路公団の交通管理員作業要領の紹介
- ③ 交通管理のための車両、機械配置
- ④ 利用規制
- ⑤ 日本道路公団における交通管理の実態

(3) 維持修繕業務について

維持修繕に関するE.T.A.への提言は以下の内容について行った。

- ① 道路巡回について
- ② 道路清掃について

- ③ 舗装修繕について
  - ④ 日本道路公団の維持修繕作業要領の紹介
  - ⑤ 維持修繕作業に伴う交通規制について
  - ⑥ 維持修繕のための車両，機械配置
  - ⑦ 維持作業を行うための施設の検討事項
- (4) E.T.Aの組織について

E.T.Aの希望は高速道路の運営管理のための現場組織の確立についてアドバイスを得たいということであった。本社組織については諸般の事情からあまりタッチせず現場組織との関係からやむを得ない場合のみ言究する程度にとどめてもらいたいということであった。

現場組織については，一応E.T.A案といったものを作成し，我々に提示してくれた。当該案はE.T.Aに赴任している日本人専門家沖野氏の意見を参考に作成されたものである。沖野氏はE.T.A当局者に高速道路の管理運営の内容を「組織」を通して認識させようとの教育的見地から，業務内容を極めて細かく分類し，それに従って組織をつくるという方針で指導されていた。従って，E.T.Aの示した組織は我々からみるとあまりにもセクションが細分化されすぎており，不効率でありある程度の整理統合が必要であると思われた。

それで我々としては，日本道路公団，首都高速道路公団等の実例を参考にし，我々の案を作成し提示した。

この場合E.T.Aの原案と大きく異なる点を略記すれば次のとおりである。

- (イ)中央管理事務所の庶務を担当するために総務部門を設けること。
  - (ロ)I.Cのところ料徴収事務所(Toll Office)を設け料徴収所長を配置すること。
- これに伴って中央管理事務所内の料徴収部の組織を縮小すること。

なお，E.T.A原案は部制を前提しており我々としては部制は必要ないと考えたが，E.T.A側の事情を考慮して部制をとることにした。

我々の案に対する彼らの反応を略記すれば次のとおりである。

- (イ)総務部門の必要性について疑問がある。本社が非常に近いこと，又E.T.Aの組織がまだあまり大きくないこと等を考慮すれば管理事務所に総務部門は必要でなく本社でかたがわりが出来る。
- (ロ)中央管理事務所の料徴収部が弱体である。

これらの疑問は我々が部，課別の職務分担業務内容を時間の都合等で完全なかたちで示し得なかったこと，また料徴収システム，收受金の監査システム等についてのE.T.A側の理解がまだ充分進んでいないこと等によるものと考えられる。彼らとしては，全般的に我々の示した組織については否定的な意見であった。

日本国とタイ国とでは，意思決定機構，仕事の仕方，組織一般に関する考え方に多少の相違

もあり、特定機関の組織を策定するためには、当該国の制度的前提、習慣等について充分配慮する必要があると思う。我々としては、今回はそういう点について充分知識があったとは言えず主に組織の効率性という観点に立って我国の事例を示したという結果になった。

なお、E.T.Aとしては、1980年2月6日外国のコンサルタントに対して、E.T.Aの高速道路運営のための組織の定立、職員研修計画について提案を出すよう公告しており、それに対して18社が資格審査に応募し、審査の結果そのうちの5社（英、米、フィリピン、仏？）に対し8月8日付けで9月10日までに具体的提案を提出するよう通知していた。そして実際に、我々の滞在中の9月10日までに各社からは提案が出された模様である。

彼らとしては、5社の提案内容をチェックしたうえで10月下旬には最適と思われる会社とコンサルタント契約を締結したいとの意見を述べていた。彼らは、各社の提案を検討するうえで我々の意見を参考にしたいとの考えを持っていたようである。

なお、5社提案の内容はE.T.A側が秘密扱いとしたため知ることは出来なかった。

#### (5) 会計制度について

E.T.Aは現在収入金を取扱うケースがまったくなく料金収入が入ってきた場合に、どのように処理すべきであるかについてアドバイスを希望していた。

現在E.T.Aの経理部門は経理課（Finance Section）、会計課（Accounting Section）、借入課（Loan Section）の3課からなっている。将来は、現在の課を部に格上げするとともに新たに収入部（Revenue Division）を設ける予定であるとしている。

我々は、E.T.Aの会計規程、経理部門の職務分担、会計書類の様式等について説明を求めたが適当な英文の資料がなく満足いく説明を得ることが出来なかった。（なお、この点については我々の語学力にも問題があったと思われる）。したがって我々はE.T.Aの現行の会計制度についての極めて概略的、断片的な知識しか得ることが出来なかった。

したがって今回は、料金収入金の会計処理についての特則を定めるべきことを明示し、日本道路公団において実施している料金収入の会計処理方法を紹介するとどめた。

日本道路公団の事例がそのままE.T.Aに適用可能とは考えられないが参考になると考える。

#### (6) 職員の研修計画について

E.T.Aの高速道路の運営は、初めての経験でもあり十分な研修を行う必要があること、幹部職員の研修は国外で現場職員の研修は国内で行うこととし、そのカリキュラムについての提言を行った。

#### (7) 交通事故防止について

事故防止対策については、次のように提言を行った。

①事故解析による一般的に事故率の高い箇所の把握

②本線バリア付近での対策、小半径の区間での防眩スクリーンの設置、高速運転マナーのP.

R, 事故解析の必要性

(8) P.R.について

広報をする必要のある項目についての提言及び日本道路公団におけるパンフレット等の資料をE.T.A.に手渡した。

(9) 沿道の環境に与える影響及びその対策について

簡単なコメントと共に日本道路公団における環境関係のパンフレットを参考資料として手渡した。

### 3 業務の評価と今後の協力のあり方に対する助言

今回の業務は、E.T.A側の要望が非常に広範囲にわたるものであり、極めて難しいものであったと思う。

今回は、高速道路の管理運営業務について全体像を示すかたちになり、細部にわたって具体的に意見を述べそれについて充分討議をするというところまでは出来なかった。

今後現地の事情、状況をふまえて今回示した各項目についてより具体的にアドバイスしていくことが望ましいと考える。それには、E.T.Aのサイドにおいても、受入れ体制をととのえるとともにその要望をより具体的にし、論点をしぼっていく必要があると考える。

将来高速道路の管理運営にあたると思われる者を日本によんである程度日本の制度を理解させた上で彼らの疑問点に答えていくという方法が良いと思われる。

なお、E.T.A側は高速道路の管理運営業務を適正に実施するために日本からの継続的な協力を強く望んでおり、この面における日本への期待は極めて大きい。我々としても日本がこの分野においては極めて大きな経験をもっており、それを東南アジア地域に活用することは非常に有益なことであると考えられる。

この分野における協力を効果的にするためには、日本道路公団、首都高速道路公団、阪神高速道路公団等において実施されている制度、規程、要領等関連の文献を体系的に整理し英文化しておくことが望ましいと考える。

#### 4 感 想

##### ( 村上の感想 )

今回の業務は、大変難かしいものであるうえ私(村上)としては、語学力の問題もあり、十分に責任を遂行しえたという自信はないが、多少なりとも E.T.A の役に立ち、日本の対外技術協力に貢献しえたとしたら幸いである。

外国に対する協力にあたっては、相手国の制度、習慣、ものの考え方等についての知識が必要であり、相手国についてもっと勉強する必要性を感じた。

E.T.A における毎日の仕事、E.T.A 職員との接触については沖野氏の御協力で非常にスムーズに行き楽しく過すことが出来た。E.T.A の各職員も非常に親切であったし、組織としても活力にみちた機関であると感じた。

国際協力のあり方については、各方面で云々される機会も多いわけであるが、やはり実際にそういう機会にめぐまれることによって、はじめて実態や問題点がわかるものと思う。私としては、国際協力の必要性や意義をあらためて痛感した次第である。

非常に良い機会を与えていただいたことを有難く思っている。今後ともなんらかのかたちで御協力出来れば幸いと思う。

( 門田の感想 )

まず一般的な感想から始めさせてもらおうと、我々の派遣期間1ヶ月は非常に短かったことが言える。一方短い期間に対してE.T.Aの求める項目は多岐に渡っており、我々も全部をカバーすることはできなかったということは事実である。

反面、もし3ヶ月の派遣期間であったら、どうだったであろうか。我々の提言はより具体的に、詳細な指導までできたかも知れない。しかしながら、私の率直な感じでは、1ヶ月でも3ヶ月でもそれほど変わりはない気がしている。

これは、E.T.A自体維持管理についての経験を持たないこと、知識を吸収しはじめているが、まだ具体的な質問事項の形をとるまで成熟したレベルに至っていない点による。

したがって、今回我々の提出したレポートにより、「維持管理についてどんな事項に注意を払わなければならないのか」知識をもち、次のステップとして具体論が展開してくるものであり、E.T.Aとしても成熟させるための時間が必要と考えられる。

次に具体的な感想について述べさせていたとくと、

(1)長期派遣専門家との関係

短期間の我々の派遣期間であったが、沖野真氏の存在は我々の仕事に大いに役立ったと言える。それは沖野氏がE.T.Aの職員と非常に良い関係を保っており、我々も短期間にE.T.Aの職員に融けこむことができたことによる。

(2)高速道路の運営に対するE.T.Aの熱意

E.T.Aの志向する高速道路の運営方針は非常にレベルの高い印象をうけた。E.T.A幹部はタイ国初の有料高速道路の供用に対して、その運営上対外的な批判を受けたくない意志を持っており、幹部レベルは真剣に考えはじめている。

反面、来年供用を目途のわりには、維持管理の準備作業は取組が遅れている印象をうけた。これはタイと日本の国情の差なのかも知れないが。

(3)E.T.Aにおける待遇

我々2名に対してオフィスを与えられ、通勤の運転手付自動車も与えられた。職員等も暖かく我々を迎え入れてくれ、感謝している。

(4)今後の技術派遣

今後共、今回テーマについての専門家派遣は必要と思われる。これはE.T.Aの要望でもあると思う。

次回は来年度なるべく早くが望まれる。

以 上



資 料



ANNOUNCEMENT OF THE REVOLUTIONARY PARTY  
No. 290

Whereas the Revolutionary Party has considered that the present communication routes in the country are insufficient to accommodate convenience and speed of traffic and transportation, which hinders national progress and development, it is deemed expedient to establish Expressway and Rapid Transit Authority of Thailand with power and authority to construct expressway and rapid transit systems. In order to deal with said obstacles with greater speed, the Leader of the Revolutionary Party hereby issues and order as follows:

Article 1. The Announcement of the Revolutionary Party:

“Exclusive Roadway” means the way or road which is being constructed either at the ground level, underground, above ground or above the water ways for the specific purpose of providing convenience to traffic, and includes the roadway which is used for the mono-rail or the subway trains, bridges, tunnels ferry boats, landing piers, pathways, parking areas, right of way, embankments, dikes, drainage, retaining walls, boundary fences, distance marks, traffic signs, traffic signals, and buildings or other facilities which are accessories to the Exclusive Roadway.

“Vehicle” refers to all kinds of carriage including wheel carts.

“Board” refers to the Board of Directors of the Expressway and Rapid Transit Authority of Thailand.

“General Manager” refers to the general manager of the Expressway and Rapid Transit Authority of Thailand.

“Officer” refers to officers of the Expressway and Rapid Transit Authority of Thailand including the General Manager.

“Employee” refers to workers of the Expressway and Rapid Transit Authority of Thailand.

“Minister” means the Minister who is in charge and control of the execution of this Announcement of the Revolutionary Party.

Article 2. This organization is established under the name of “Expressway and Rapid Transit Authority of Thailand”, hereinafter referred to as the “ETA” and shall be as a juristic person with the following objectives:

- (1) To construct or organize the systems, as well as to maintain this Exclusive Roadway.
- (2) To carry out the operation or supervision of the business undertaking concerning

transportation either by mono-rail or subway train.

- (3) To carry out all business concerns in relation with operation of the expressway and rapid transit system.

Article 3. The ETA shall have its head office in Bangkok Metropolitan Area and may have branch offices anywhere in Thailand.

Article 4. The Capital fund of the ETA shall consist of:

- (1) An amount of money or other properties received from the Government or other persons.
- (2) A sum of money received according to Article 6 (5) or (6).

Article 5. The Reserve Fund of the ETA shall consist of Reserve fund for contingency and other Reserve as deemed appropriate by the Board.

Article 6. In order to achieve the objective according to Article 2, the ETA shall have the authority as follows:

- (1) To construct, purchase, procure, transfer, dispose of, rent, lease, hire-purchase, exchange, borrow, lend, and operate equipment, services and facilities of the ETA.
- (2) To purchase, procure, dispose of, rent, hire-purchase, exchange, own, possess, or operate any property.
- (3) To plan, survey, design in relations to the construction or expansion of the Exclusive Roadway.
- (4) To collect toll for the use of expressway and to collect service fee for the use of the mono-rail or the subway train.
- (5) To borrow or make investment.
- (6) To issue bond or other documents for the purpose of investment.

Article 7. There shall be a committee called "Board of Directors of the Expressway and Rapid Transit Authority of Thailand" consisting of a Chairman and not less than seven but not more than nine other members. This shall not include the General Manager who shall be an ex-officio member of the Board.

The Council of Ministers shall appoint the Chairman and other members of the Board, who are not ex-officio members.

Article 8. Persons who shall be appointed to be Chairman, members of the Board and

General Manager shall be of Thai nationality and shall have sufficient knowledge and experience in the field of administration, science, engineering, architecture, town planning, economics, finance or law.

Article 9. A person having the following character shall not become the Chairman or member of the Board:

- (1) Having an interest in a contract made with the ETA or in activities performed for the ETA, whether directly or indirectly, except in the case where he is only a shareholder for the purpose of bona fide investment of a limited company having such interest;
- (2) Being an officer other than the General Manager;
- (3) Being a bankrupt;
- (4) Being imprisoned by a final judgment of imprisonment except for an offence committed by negligence or petty offence.

Article 10. The Chairman or members of the Board appointed by the Council of Ministers shall be in office for a term of four years. But for the members of the Board, during the initial stage, half of the number shall be retired by drawing lot at the end of two years. But if half of the number of the members of the Board cannot be obtained, the members of the Board remaining in office shall be the greater.

The retiring Chairman or members of the Board may be reappointed.

Article 11. Apart from retirement upon the expiration of the term of office under Article 10, the Chairman or members of the Board appointed by the Council of Ministers shall vacate office upon:

- (1) Death,
- (2) Resignation,
- (3) Being retired by the Council of Ministers,
- (4) Lacking qualifications according to Article 8 or having prohibited characters according to Article 9.

When the Chairman or members of the Board vacate office before the expiration of the term of office, the Council of Ministers may appoint other person as replacing Chairman or members of the Board. But the Chairman or members of the Board so appointed shall be in office only for the remaining term of office of the Chairman or members of the Board they replace.

Article 12. The Board shall have the power and duties to lay down policy and supervise

general affairs of the ETA. Such power and duties shall include:

- (1) To issue rules or regulations for carrying out its objectives;
- (2) To issue rules or regulations regarding the meeting;
- (3) To issue rules or regulations in the management of the affairs of the Board;
- (4) To issue rules or regulations regarding the organization or working procedures;
- (5) To determine positions, rate of salaries or wages of the officers or employees;
- (6) To issue rules or regulations regarding recruitment, appointment, promotion in salary or wage, retirement, discipline, punishment and complaint of officer and employee;
- (7) To issue rules or regulations regarding travelling expenses and travelling allowances, hotel bill, over-time and other payments;
- (8) To issue rules or regulations regarding uniforms of officer of the properties of the ETA;
- (10) To issue rules or regulations regarding collection of toll for the expressway;
- (11) To issue rules or regulations regarding collection of service fees for the use of the mono-rail or subway train.

The rules or regulations regarding working procedures under (4), if there is any restriction on the power of the General Manager in performing juristic act, shall be announced by the Minister through the Government Gazette.

Article 13. A general manager shall be appointed by the Board of Directors.

The General Manager shall receive salary as specified by the Board and shall vacate office upon death, resignation or lacking qualification according to Article 8 or having prohibited characters according to Article 14, or being retired by the Board of Directors.

The resolution for retiring the General Manager shall be supported by not less than three-fourths of the votes of all members of the Board, excluding the General Manager.

The appointment, determination of salary rate or retirement from office under this Article shall be subject to the approval of the Council of Ministers.

Article 14. A person having the following characters shall not be the General Manager:

- (1) Having any interest in a contract made with the ETA or in activities performed

for the ETA, whether directly or indirectly, except in the case where he is only a shareholder for the purpose of bona fide investment of a limited company having such interest;

- (2) Being a permanent government official;
- (3) Being a person holding a political post;
- (4) Being unable to work full-time for the EAT;
- (5) Being a bankrupt;
- (6) Being imprisoned by a final judgment of imprisonment except for an offence committed by negligence or petty offence.

Article 15. The General Manager shall administer the affairs in accordance with the power and duties of the ETA and under policy, rules or regulations of the Board, and shall also have power to command officers and employees.

Article 16. The General Manager shall have the power:

- (1) To recruit, appoint, promote, demote, deduct salary or wages, discipline officials and employees, according to the rules or regulations of the Board. In the case where the officer or employee is of the rank of advisor, expert, director, or equivalent, prior approval must be obtained from the Board;
- (2) To issue rules and regulations regarding the working condition of officers and employees of the ETA, which are not contrary to or inconsistent with the rules or regulations of the Board.

Article 17. In respect to the activities concerning outside persons, the General Manager shall act in the name of the ETA. Accordingly the General Manager may delegate a representative or any person to have power to perform any specific work on his behalf, provided that this shall be in compliance with the rules or regulations of the Board.

Juristic acts performed by the General Manager which are in violation of the rules or regulations under Article 12, paragraph two, shall not be binding on the ETA, unless ratified by the Board.

Article 18. When the General Manager is unable to perform his duty, or when there is a vacancy in the post which is not yet appointed, the Board shall appoint an officer to act on behalf of the General Manager or to act for the General Manager, as the case may be, then Article 14 shall apply mutatis mutandis.

The person acting on behalf of the General Manager or acting for the General Manager shall have the same power and responsibilities as the General Manager except the responsibility

as member of the Board.

Article 19. The Chairman and the members of the Board shall receive remuneration as specified by the Council of Ministers.

Article 20. The Chairman, members of the Board, officers and employees shall receive bonus according to the rules as appropriated by the Council of Ministers.

Article 21. The Chairman, members of the Board, and officers shall be officials under the Penal Code.

Article 22. The Minister, by approval of the Council of Ministers, shall issue an announcement in the Government Gazette prescribing the Exclusive Roadway to be constructed or expanded.

Description of the Exclusive Roadway under above paragraph shall be identified including locality which the Exclusive Roadway shall pass, and maps showing the alignment which the Exclusive Roadway shall be constructed or expanded.

Article 23. After the publication of the Minister concerning the construction or expansion of expressway or rapid transit has been announced, and it is found that there is a necessity to acquire the immovable property in any locality, Expropriation Act shall then be issued and enacted.

In expropriating immovable property under above paragraph, the provisions of the law on highways governing expropriation of immovable property for the construction or expansion of highways shall apply mutatis mutandis, unless otherwise provided by this Announcement of the Revolutionary Party.

Article 24. After the Expropriation Act has been issued according to this Announcement of the Revolutionary Party, both parties, the official for expropriation of immovable property and persons entitled to compensation, shall settle the agreement regarding the compensation. If it cannot be agreed upon, then the official for expropriation of immovable property shall specify the amount of compensation whether the persons entitled to compensation may or may not accept payment of such compensation. In case the persons entitled to compensation do not accept payment of compensation, the officer for expropriation of immovable property shall place such money with the court, and the persons so entitled may apply to the court to receive such money at any time.

The fact that the persons entitled to compensation receive such compensation but do not agree upon the amount to be compensated by the official for expropriation of immovable property, or receive or not receive the compensation which has been placed with the court by the official for expropriation of immovable property, shall not debar them from the right to sue for the amount of money which they consider they should receive within a period of one year from the date of receipt of compensation from the official for expropriation of immovable property or from the date the official for expropriation of immovable property has placed com-



compensation with the court, as the case may be. In the case the court has adjudged that official for expropriation of immovable property pay additional amount, the persons entitled to compensation shall receive interest at the rate of seven-and-a-half percent per annum in such amount, commencing from the date of enforcement of such Act on expropriation of immovable property.

Although the persons entitled to compensation has instituted a court case under paragraph two, he shall not suspend the possession, use and demolition of immovable property, the construction or expansion of the Exclusive Roadway.

When there is a payment of compensation to the persons entitled thereto, or when an amount of payment has been placed with the court, the official for expropriation of immovable property shall have the right to possess, use and demolish said immovable property, by informing the owner or possessor thereof in writing at least sixty days in advance. In such case, the owner, possessor or other entitled person shall not have the right to claim for any damage caused by such action.

Article 25. In case Royal Decree specifying the area considered to be expropriated for the construction or expansion of the Exclusive Roadway has been issued, the Minister shall announce through the publication in Government Gazette specifying the urgency of such routes to be constructed or expanded. Then, the official for expropriation of immovable property or the ETA shall have the power to possess, use, demolish such immovable property, construct or expand the Exclusive Roadway by paying compensation on the parts which have been possessed, used or demolished to the owner, possessor or other person entitled to such immovable property, and Article 24 shall apply mutatis mutandis, and an Act on Expropriation Immovable Property shall be enacted within the validity of such Royal Decree.

Article 26. In case there is a construction or expansion of the Exclusive Roadway over the extent of ownership above ground or below ground of the land of other person without expropriation of the immovable property, a Royal Decree specifying such alignment of the Exclusive Roadway shall be issued, and the ETA shall have the power to carry out all necessary steps in connection with such immovable property, but compensation shall be paid to the person entitled before carrying out such action.

In respect to the appropriation and payment of compensation, including the management of such immovable property, Article 24 shall apply mutatis mutandis.

Article 27. In case the owner, possessor or other person entitled to the immovable property cannot be contacted, the official for expropriation of immovable property or the ETA shall put up the notice at the place where the immovable property is located and at the district office where such immovable property is located. However, there shall also be stated the amount of damage or compensation which the owner, possessor or other person entitled thereto shall entitle to receive, including the period of time which the official for expropriation of immovable property or the ETA shall possess, use and demolish, and this shall not be less than sixty days from the date of putting up the notice. After the expiration date, the official for expropriation of immovable property or the ETA shall have the power to possess, use or demolish such immo-

vable property, construct or expand the Exclusive Roadway, without having to deposit a guarantee for the damage or compensation with the court.

Article 28. In case the ETA construct or expand the Exclusive Roadway according to Article 26, any person wishes to construct building or others under or above the Exclusive Roadway whether it is above or below ground, a permission must be obtained in writing from the ETA. The approval shall be in accordance with the conditions specified by the ETA.

The building or other construction which is in violation of above paragraph may be pulled down or demolished by the ETA as the case may be without paying any compensation.

Article 29. No person shall erect buildings or other structures, plant trees or others within the right of way, or obtain an access to the Exclusive Roadway except public utilities services which may erect poles or lay cables or pipe-line over or under the Exclusive Roadway. However, it is a necessity to get an approval and agreement prior the works procede. If agreement cannot be reached due to the nature of the work or the rent, such shall be submitted to the Minister for decision. The decision of the Minister shall be final.

Buildings, structures trees or plants which are in violation of the above paragraph, then Article 28, paragraph two shall apply mutatis mutandis.

Article 30. No person shall do anything to the Exclusive Roadway that will be in the nature of endanger to the traffic.

Article 31. No person shall damage destroy, deteriorate the Exclusive Roadway which could be dangerous to vehicle or person.

Article 32. For the benefit of construction, expansion, maintenance, and safety precaution in preventing any danger or damage to the Exclusive Roadway, the ETA shall have the power to possess or use temporary those immovable properties under possession of anyone, which is not building where people are living or carrying out business, within the conditions as follows:

- (1) To possess or use such immovable property if necessary for the construction, expansion, or maintenance in order to prevent danger or damage to the Exclusive Roadway.
- (2) Having informed the owner or possessor of said immovable property in writing in advance within reasonable time.
- (3) If the possession or use of immovable property necessitates the pulling down or destroying of other structures, which are unoccupied. The ETA shall have the power to pull down or destroy said structures or cut down the trees, as deemed necessary.

Before carrying out any act under (3), the ETA shall inform the owner or possessor of immovable property in writing. The owner or possessor of immovable property may file a com-

plaint to the Board for decision stating the reason why such action should not be carried out, within the period of thirty days from the date of receiving such notice. The decision of the Board shall be final.

If there is a damage to the owner or possessor or other person entitled to immovable property, which is due to the action of the officer and employee, the said person may claim for compensation from the ETA.

Article 33. The Minister shall have power to supervise the general affairs of the ETA. For this purpose the Minister may order the ETA to give a statement of fact, opinion, prepare report or cease to do anything which is against the policy of the Government or against the resolution of the Council of Ministers, inclusive of having the power to order a performance according to the policy of the Government or according to the resolution of the Council of Ministers and also the power to order an investigation into the fact concerning administration of affairs.

Article 34. In case it is a necessity for the ETA to submit any article or any matter to the Council of Ministers in accordance with this Announcement of the Revolutionary Party, it shall be submitted through the Board and the Minister for presentation to the Council of Ministers.

Article 35. The ETA shall maintain an account with the bank according to the rules of the Board which has been approved by the Council of Ministers.

Article 36. The ETA shall obtain an approval from the Council of Ministers before the work is performed in the following activities:

- (1) To construct or expand the Exclusive Roadway;
- (2) To get a loan of more than ten million Baht;
- (3) To issue bond or other documents for the purpose of investment;
- (4) To dispose of immovable property having the value of more than five hundred thousand Baht;
- (5) To clear the property to the value of over one million Baht.

Article 37. The ETA shall prepare an annual budget classified into capital account and operating account. The capital account shall be submitted to the Council of Ministers for approval, while the operating account shall be submitted to the Council of Ministers for information.

Article 38. Any revenue which received from the operation shall accrue to the ETA.

The annual revenue remaining after deducting expenses and reserves, including major

expenses necessary for the expansion of the operation or for the investment for construction of the roadway which has been approved, shall be handed over to the state.

Excluding the reserve fund, if the revenue is insufficient for the expenses, and could not obtain elsewhere, the government shall pay the ETA equal to the amount of deficiency.

Article 39. The ETA shall prepare an annual report to be submitted to the Minister. Such report shall specify the progress of the work of the previous year including the policy of the Board, project and plan to be carried out in future.

Article 40. The EAT shall prepare and maintain accounting system suitable to the business operation as of public utility, with classification of major work, and shall keep books of account of receipts and payments, assets and liabilities actually in existence and in accordance with the categories of work, together with supporting information, to be subject to regular internal audit.

Article 41. The ETA shall prepare balance sheet, operating account and profit and loss statement, within ninety days from the date of the end of the accounting year.

Article 42. Every year the Board shall appoint one or more auditors to audit and certify the accounts of the ETA.

It is prohibite to appoint the Chairman, members of the Board, officers, employees, other persons who are representatives of the ETA, or persons having interests in the work carried out by the ETA as an auditor.

Articel 43. The auditor shall have the power to examine all the account books and documents of the ETA. For this purpose, the auditor shall have the power to make enquiry on the Chairman, memebtrs of the Board, officers, employees and other persons who are representatives of the ETA.

Article 44. The auditor shall submit a report on the result of auditing to the Board for presentation to the Council of Ministers, and the ETA shall advertise annual report of the previous year, balance sheet, working accounts, profit and loss statement, which the auditor has certified, within ninety days from the date the auditor has certified.

Article 45. The officers and employees shall have the right to lodge a complaint regarding penalty, according to the rules or regulations of the Board.

Article 46. The ETA shall establish a regulation or pension or fund or other benefits for the welfare of the workers in the ETA and their families, in case of leaving their position, suffering accident, sickness or other cases deserving of aid.

Thee establishment of pension or welfare fund according to above paragraph, the principle of paying pension and subscribing to the welfare fund, the stipulation of the category of person to receive welfare assistance from the welfare fund, and principles of welfare assistance including

management of welfare fund shall be in accordance with the rules or regulations of the Board.

The rules or regulations under paragraph two shall be enforced upon approval of the Council of Ministers.

Article 47. The Minister shall have the power to issue a publication in the Government Gazette prescribing the following:

- (1) Any Exclusive Roadway or part of the roadway which the toll should be collected.
- (2) Type of vehicles which shall pay the toll or be exempted there from.
- (3) Toll rate for the Exclusive Roadway system.

Article 48. The officials who are appointed by the General Manager to be responsible in collecting toll for the Exclusive Roadway shall have the following power:

- (1) To collect toll on the Exclusive Roadway according to the announcement of the Minister;
- (2) To stop any vehicle and check those which are going through the Exclusive Roadway for the benefit of collecting toll.
- (3) To order other persons to explain or show evidence regarding evasion or non-payment of toll for the Exclusive Roadway under this Announcement of the Revolutionary Party.

Article 49. Any person using vehicle on the Exclusive Roadway which is specified to collect toll under Article 47, shall pay toll for the Exclusive Roadway according to the notification of the Minister.

Article 50. Whoever obstructs the performance of duty of the ETA or official for expropriation of immovable property acting under Article 24,, Article 25, Article 26, Article 27, Article 28, Article 29, Article 32, shall be liable to a term of imprisonment not exceeding six months or a fine not exceeding one thousand Baht, or both.

Article 51. Whoever violates Article 30 shall be liable to imprisonment for a term not exceeding five years or a fine not exceeding ten thousand Baht, or both.

Article 52. Whoever violates Article 31 shall be liable to imprisonment for a term not exceeding ten years or a fine not exceeding twenty thousand Baht, or Both.

Article 53. Whoever evades payment of toll for the Exclusive Roadway according to this Announcement of the Revolutionary Party shall be liable to a fine not exceeding five hundred Baht.

Article 54. Whoever fails to comply with the order of the official given under Article 48 (2) or (3) shall be liable to a fine not exceeding five hundred Baht.

Article 55. Within five years from the date of enforcement of this Announcement of the Revolutionary Party, the Minister may order any government officials or municipal officials to perform another duty in the Expressway and Rapid Transit Authority of Thailand, upon approval from the original attachment of the official concerned.

Article 56. The law on land traffic shall apply to traffic in the Exclusive Roadway *mutatis mutandis*, and the Minister shall have the power to issue Ministerial Regulations prescribing measures for maintenance of safety and convenience in traffic in the Exclusive Roadway, other than those provided in the law on land traffic.

Such Ministerial Regulations shall come into force after their publication in the Government Gazette.

Article 57. The official whom the Minister appoints shall have the power and duty in the same manner as the traffic officer of officer under the law on land traffic, only in performance of duty in the Exclusive Roadway, except for power to settle cases.

Article 58. Whoever violates Ministerial Regulations issued under Article 56 shall be liable to a fine not exceeding one thousand Baht.

Article 59. The Minister of Interior shall take charge and control for the execution of this Announcement of the Revolutionary Party.

Article 59. The Minister of Interior shall take charge and control for the execution of this Announcement of the Revolutionary Party.

Article 60. This Announcement of the Revolutionary Party shall come into force as from the day following the date of its publication in the Government Gazette.

Given on the 27th November B.E. 1972  
Field Marshal T. KITTIKACHORN  
Leader of the Revolutionary Party.

Minutes of Meeting on expressway operation System  
between the Japanese experts and ETA officials  
held at 403 ETA meeting room  
on September 8, 1980, 9.00 am. - 11.00 am.

Present:

ETA

1. Mr. Siva Charoenpong
2. Mr. Phaniet Saraithong
3. Mr. Sastra Bhothipaks
4. Miss Buppha Phalavaddhana

Japanese Experts on the Expressway System

1. Mr. Makoto Okino
2. Mr. Shinichi Monda
3. Mr. Ryoichi Murakami

The objective of this meeting was set up in order to know the requirement of ETA. wanted the advise of experts in management of expressway System.

1. First of all, the experts would like to know of the scope of work they would be in charge, for they stayed here in short period.

Mr. Siva informed that the main idea, ETA needed the advise of how to set up the organization and the better way to perform and co-operate with other agencies to operate the expressway system and toll collection and if it's possible ETA would like to get recommendation in form of manual prepared by the experts themselves, orbrought it from Japan and if would be used as guide line to set up the best system for management of expressway system. The management, for instance the process of how to clear when accident occured how it was practiced in Japan what it should be done first and what would be the next step.

2. In order to achieve the need of ETA the experts would have to study the traffic regulation of Thailand.

Mr. Sastra was assigned to get the traffic regualtion in English version and handed to them.

3. The experts had some doubt, if the big fire occured

Mr. Siva ansered that fire police division was located very near to the center building and added that ETA would establishe the regulation of how to get through the traffic when the big fire occured.

4. The experts suggested that ETA should establish regulations before the opening of the expressway.

Mr. Siva emphasized that ETA needed their recommendation.

5. The experts asked whether the main idea of ETA wanted to have own police patrol.

Mr. Siva answered that ETA would like to have own ETA patrol but anyway have to follow traffic regulation.

6. And how it was done in Japan, Mr. Siva asked

The experts answered that the power of Highway Organization was very limited. In Japan there were three participants concerned such as when it was heavy, rain Highway Organization had to contact local police and traffic police to close the road for protection of road structure.

Mr. Sastra was assigned to find out the line of control and the function of the Highway Patrol under the Dept. of Highways Control.

7. Mr. Siva further asked if the road-use didn't pay the toll how it could be done.

The experts answered that it was criminal, first priority had to call the police even when accident occurred.

8. Mr. Siva asked in case of accident what control center should do such as put up sign and who decided what it should be done.

The experts answered that The Expressway Authority and police consulted each other at the control center, police investigated the accident and Expressway Authority would responsible for clearing.

9. Mr. Siva repeated the question who would do it then.

The experts answered that in Japan the authority quite overlap. There were local regulation, traffic regulation but traffic had to be controlled by police.

10. Mr. Siva said, he would like to get the recommendation on one man decision when anything happened.

The Experts said in Japan there were two patrol, maintenance trunk patrol and facilities inspection.

11. Mr. Siva asked who monitored the traffic condition.

The experts answered that, in Japan they had traffic monitoring sign showed the flow of



traffic. Police and the expressway official control the line close together.

If accident took place on local road the local police would in charge, if it occurred on expressway police and expressway-men work together, expressway itself had own equipment for clearing.

12. The experts would like to know who would in charge to look after right-of-way.

Mr. Siva answered that ETA have own separate division to look - after.

13. The experts asked whether ETA wanted to own patrol by itself.

Mr. Siva answered ETA would like to have their own patrol and needed help from the experts to set up the system.

14. The experts said that driving on expressway was very important, so the public relation should be in roll announcing for safety driving. In Japan the advise information would be given at entrance and other methods of public relation were to give instruction by using private radio or by control unit.

Mr. Siva said safety instruction should be set up before starting of operation and he required sample of such instruction and he assigned Mr. Sastra to request all public informations in Japan from the 2 wxperts.

15. The experts reminded about signing system that had to be used to control the traffic at construction site and maintenance area.

Mr. Sastra was assigned to contact the Dept. of Highways and Office of Policy and Planing, Ministry of Interior for further information.

16. The experts said they found out that on south bound of Din Daeng-port Expressway had very few U-turn, they recommended to provide median opening for official use only in case of emergency and another exit for emergency use.

Mr. Sastra was assigned to find out about the law or any regulation for roads and checked up the signs that had to be used on traffic.

17. The experts asked ETA had set up any connection between head-quarter and central operation.

Mr. Siva answered that control center had to have it's own operation, connection with other working unit only when needed servicing from their functions.

18. The experts asked whether ETA had any environment programe which they had it in Japan.

Mr. Siva answered that ETA had such programe they just hired chulalongkorn University to research about those and some had already performed such as put up solid concrete wall at Bon - Kai area for reducing the noisy sound.

Mr. Siva told Mr. Sastra to hand the hiring contract for environment research to the experts.

The experts informed Mr. Siva that any question they might have they would ask Mr. Sastra or Mis Bupph later.

prepared by  
Miss Buppha Phalavaddhana

資料 - 3 )

EXPRESSWAY & RAPID TRANSIT AUTHORITY OF THAILAND  
Phaholyothin Road, Bangkok 9, Thailand. Tel. 5795176  
Cable Address ETA. Bangkok.

September 26, 1980

Mr. Charan Burapharat  
General Manager  
Expressway and Rapid Transit  
Authority of Thailand  
Ministry of Interior

Dear Sir:

It is our honor to submit a report on the management of the expressway in Thailand to you. This report would not have been completed without deep co-operation through General Manager Mr. Charan Burapharat, Deputy General Manager for Engineering Mr. Siva Charoenpong, Chief of Engineering Division, Mr. Phaniet Saraithong, Mr. Sastra Bhothipaks, Miss Bupha Phalavaddhana and ETA's Staff, and also Japanese advisor, Mr. Makoto Okino. Though we have done our best, this report may not cover full part of your requirement because of our short term stay.

If you would like to ask for further Japanese technical cooperation concerning this matter, it is our pleasure to inform the Japanese Government of your request.

Attached herewith are the report and related materials.

Very truly yours,

Ryoichi Murakami  
Expert of Accounting

Shinichi Monda  
Expert of Management & Planning

KINGDOM OF THAILAND  
MINISTRY OF INTERIOR  
EXPRESSWAY AND RAPID TRANSIT AUTHORITY OF THAILAND

REPORT ON THE MANAGEMENT OF THE EXPRESSWAY  
– Suggestion on toll collection, traffic operation & maintenance and repair works –

September , 1980

Japan International Cooperation Agency

Ryoichi Murakami

Shinichi Monda

## I. Preface

In response to the request of the Thai Government, the Japanese Government decided to dispatch us for co-operation with the ETA. In management, planning and in accountancy of the expressway under the Technical Aid Program from Japan.

After the arrival, we have collected informations concerned such as outline of the expressway, outline of the ETA, and related laws, etc. through immense assistance given by the ETA's staff.

We submit our suggestions about the following items.

1. Toll collecting business
2. Traffic operation
3. Miantenance and repairing
4. Organization of the ETA.
5. Accounting system
6. Training of personnel
7. Prevention of accidents
8. Public relations
9. Public relations

We have done our best; however, we are afraid that this report may not satisfy the ETA's requirement fully because of the short term which was available. Therefore, this report may not cover all aspects of the management of the expressway, leaving some problems untouched. In order to deal with those problems, it would be possible for Japanese experts to co-operate with you again.

We hope this report will contribute in some measure to the ETA.

Finally, we wish to express our heartfelt thanks to the General manager Mr. Charan Bura-pharat and Deputy General Manager for engineering Mr. Siva Charoenpong, Chiif of Engineering Division Mr. Phaniet Saraithong, Mr. Sastra Bhothipaks, Miss Buphha Phalavaddhana, and Japanese advisor Mr. Makoto Okino and ETA's staff for having provided valuable assistance and co-operation to us.

September, 1980

Ryoichi Murakami  
(Expert of accounting)

Shinichi Monda  
(Expert of management & planning)

## SUGGESTION ON TOLL COLLECTING BUSINESS

According to the article 47 of the ETA. law, the minister shall have the power to decide the toll exclusive roadway, and as regulated in E.T.A. law in article 2 E.T.A. is a juristic person having the power to carry out all business in relation with operation of the expressway.

Namely, if the expressway is determined to be tolled, ETA. just has a power to receive the toll from the user of expressway.

So, it is very important to establish the way of management for toll collecting business on the expressway.

In order to establish the way of management for toll collecting business, we believe it should be necessary to examine the following matters.

1. System of toll collecting business
2. Organization of toll collecting business
3. Toll fare
4. Traffic volume on expressway etc.
5. Working system of the toll collector
6. Manual for toll collecting business
7. Inspection manual for toll collecting business
8. Maintenance of toll collecting machine
9. Training of toll collector
10. Others.

### 1. System of toll collecting business

On the expressway managed by the ETA, toll fare is set up according to the types of vehicle, but it is uniform for a very section of the expressway.

Toll is collected at the entrance gate by manpower and at exist it is free.

Toll collecting business is carried ou using the toll and data processing machine equipped in the toll gate and toll office etc.

Judging from the document of the contract, we think these toll machines are very good, so we have no necessity to comment on the system of toll collection.

### 2. Organization of toll collecting business

We shall comment on this matters in the comment on the organization of E.T.A.

### 3. Toll fare

#### (1) Business hour

In principle, toll collecting business should be carried out for 24 hours, however, in the early stage, it is rational to set the 16 hours of business. (exp. from 6.00 AM. to 10.00 PM.)

By the way it is desirable to prescribe the business hours for toll collecting business in the bylaw of ETA.

#### (2) Type of vehicle which shall pay the toll and exempted there from.

These things are decided by the minister based on the article 47 clause 2 of the ETA. Law.

As a rule, toll fare are charged for all vehicles passing the expressway, but for some kind of vehicles, toll fare should be exempted.

In Japan, the type of vehicles which shall be exempted from the toll fare are regulated in a notice of the Construction Ministry as shown in the following:

- (i) Police vehicle used for guard or escort patrol, emergency transport, and other emergency duties.
- (ii) Vehicle used for a criminal investigation by the public Prosecutors Office
- (iii) Vehicle used for prevention of epidemics and other emergency public duties charged by the officer of the national government and local public bodies.
- (iv) Vehicle used for disaster relief, activity for flood control, and fire services.
- (v) Vehicles used for the management of that road.
- (vi) In the case that passing of the other road is impossible because of the calamity and so on, and so there is no detour that it is necessary to pass the expressway.

#### (3) Toll rate for the expressway and period of toll collection.

Toll rate are determined by the minister according to the article 47 clause 3 of E.T.A. Law.

As for a period of toll collection, it is not clear. We think it is necessary to fix the period of the toll collection. In Japan it is regulated that toll road should be repaid within 30 years or so.

It is desirable to set up the principle for setting up the toll fare.

In Japan it is regulated that minister of construction has a power to permit the toll fare according to the appreciation by the authority engaging the toll collecting business, considering the following three matters.

- (i) Under the limit of the benefit
- (ii) Justice and propriety
- (iii) It is possible to repay.

(4) system of coupon ticket.

In Japan we have a system of discounted coupon ticket as shown in table 1 for the purpose of

- (i) promoting the use of expressway
  - (ii) saving in service time of toll collection
  - (iii) service for the user of expressway
- etc.

System of the coupon ticket is included in the permission of the toll fare.

Table 1 System of Coupon Ticket (pre paid)

| JAPAN HIGHWAY PUBLIC CORPORATION |                 | METROPOLITAN EXPRESSWAY PUBLIC CORPORATION |                 | HANSHIN EXPRESSWAY PUBLIC CORPORATION |                 |
|----------------------------------|-----------------|--|-----------------|---------------------------------------|-----------------|
| Kind                             | Discount Rate % | Kind                                       | Discount Rate % | Kind                                  | Discount Rate % |
| 31 times                         | About 3         | 9 times                                    | 9 times         | 9 times                               | About 11        |
| 110 "                            | About 10        | 24 "                                       | About 17        | 24                                    | About 17        |
| 250 "                            | About 20        | 73 "                                       | About 13        | 73 times                              | About 13        |
|                                  |                 | 150 "                                      | About 20        | 250 times                             | About 20        |

4. Traffic volumes on expressway, etc.

(1) Traffic volumes

According to the Report published by the ETA. (First Stage Expressway Construction Project, Din Daeng - Port Section), traffic volumes on expressway (toll) in 1990 is as shown in the figure- 1.

And also the report says the rate of growth of the traffic volume from 1970 to



1990 si 7.5 %/year.

So we can get the traffic volume in 1980 as shown in figure 2. (we can get the one dividing the 1990 volume by two)

But we consider in this traffic volume, there are through traffic such as Din Daeng - Bang Na and Din Daeng - Dao Kanong which will be generated when all the section of first stage expressway will be opened.

Fig - 1 Traffic volumes on expressway (1990)  
(per day)

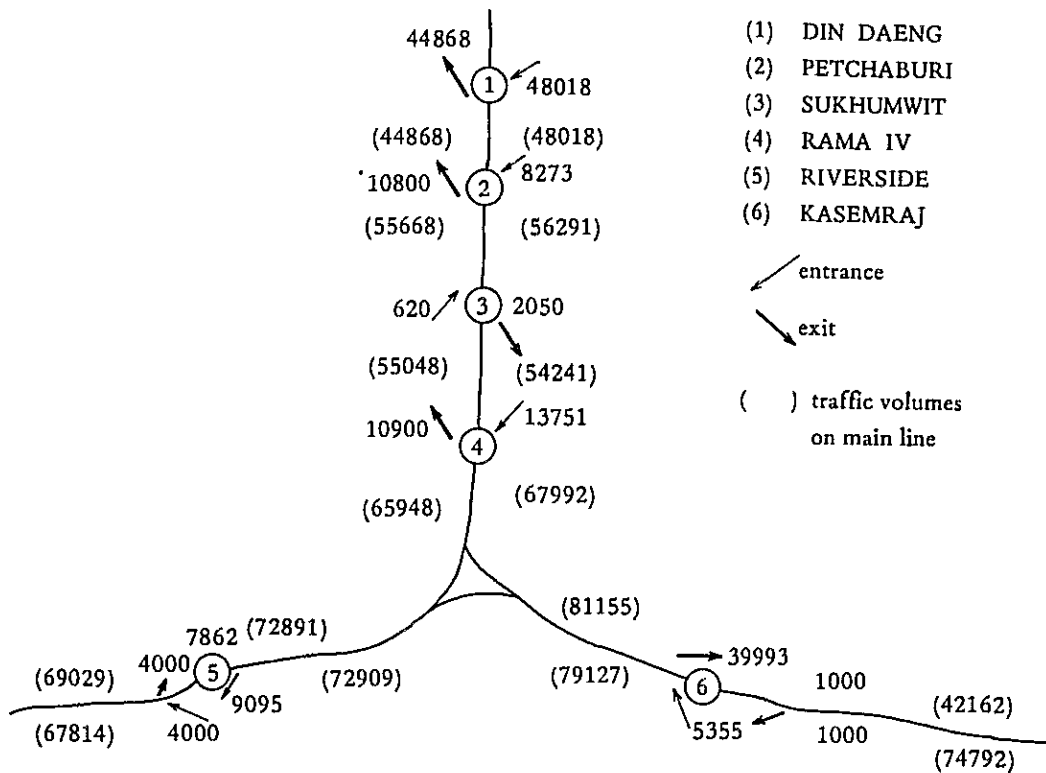
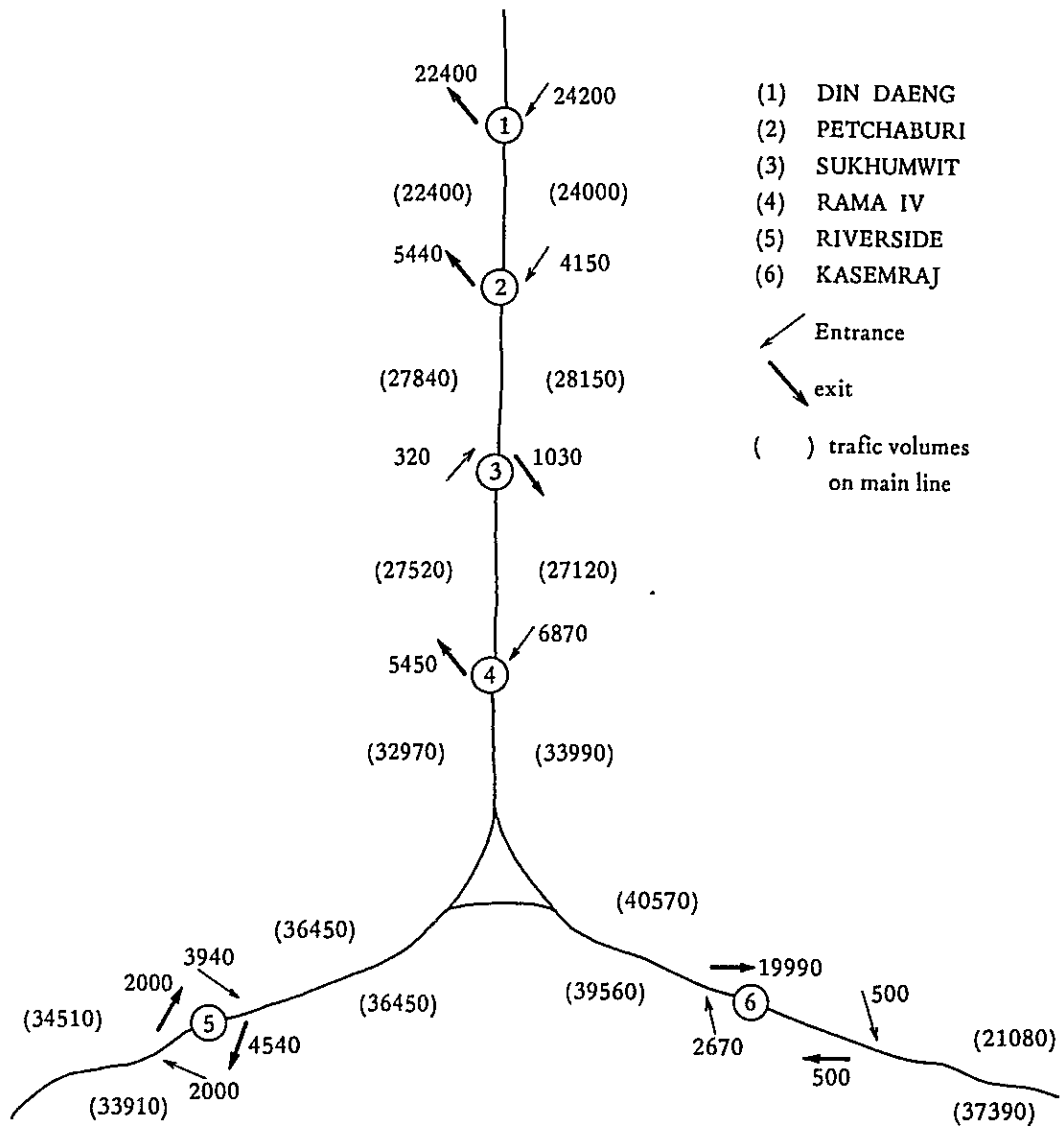


Fig - 2 Traffic volumes on expressway (1980)  
(per day)



So in case of opening of the first section only that is Din Daeng - Port, traffic volume of that section should be reduced.

However we don't have the detail information about the traffic volume, so in this comment we shall apply the traffic volumes shown in figure -2.

(2) Necessary number of lanes to be opened and number of collectors to be assigned.

We estimated the necessary number of lanes to be opened and number of collectors to be assigned for each toll office, using the traffic volume shown in figure -2.

The table of the estimation is shown in table 2.

Table 2 Number of collectors to be assigned etc.

|                | Traffic Volumes |            |            |            | Number of entrance gates (equipped) | Number of necessary lanes to be opened |        | Number of collectors |
|----------------|-----------------|------------|------------|------------|-------------------------------------|--|--------|----------------------|
|                | Entrance        |            | Exit       |            |                                     | daytime*                               | night* |                      |
|                | North ward      | South ward | North ward | South ward |                                     |  |        |                      |
| (1) Din Daeng  | --              | 22400      | 22400      | --         | 9                                   | 6                                      | 3      | 32                   |
| (2) Petchaburi | --              | 4150       | 5440       | --         | 3                                   | 2                                      | 1      | 11                   |
| (3) Sukhumwit  | 320             | --         | --         | 1030       | 2                                   | 1<br>(2)*                              | 1      | 11                   |
| (4) Rama IV    | --              | 6870       | 5450       | --         | 4                                   | 2                                      | 1      | 11                   |
| (5) Riverside  | 3940            | (2000)     | (2000)     | 4550       | 4                                   | 1<br>(2)*                              | 1      | 11                   |
| (6) Kasemraj   | 2670            | (500)      | (500)      | 10990      | 4                                   | 1<br>(2)*                              | 1      | 11                   |
| Total          |                 |            |            |            |                                     |  |        | 88                   |

- Note    \* daytime (6:00 – 22:00)    night (22:00 – 6:00)  
 \*\* According to the estimation, it is enough in one lane, but it is expected that in case of opening only first section, some of the through traffics will convert to these interchanges, so we add one lane to make sure. Number of collectors is estimated for two lanes.

Assumptions of estimation

- (1) We apply the “manual for estimating the number of collectors” set up by the NIHON DORO KODAN to estimate the necessary number of lanes to be opened and number of collectors to be assigned. (Reference II-1)  
 (2) In case of estimating the coefficient for shift and holiday, we apply the “office regulation in ETA. Working conditions of collector are as following

(a) Working hour of collector

|                                    |             |               |
|------------------------------------|-------------|---------------|
| actual working hour                | 8 hours/day | 40 hours/week |
| total working hour including lease | 9 hours/day | 45 hours/week |

(b) Holiday

|                  |              |                       |
|------------------|--------------|-----------------------|
| weekly holiday   | 2 days/week  | } total 147 days/year |
| national holiday | 13 days/year |                       |
| sick leave       | 30 days/year |                       |

(c) Working day                      218 days/year

5. Working system of the toll collector

(1) Shift

It is possible to consider the many working system of the collector.

For example we could show you a following system

(a) System of three shifts

|         |              |    |               |
|---------|--------------|----|---------------|
| group 1 | 8:00 – 17:00 | or | 7:00 – 16:00  |
| group 2 | 10:00 – 1:00 |    | 15:00 – 24:00 |
| group 3 | 24:00 – 9:00 |    | 23:00 – 8:00  |

(b) system of two shifts

|         |              |                        |
|---------|--------------|------------------------|
| group 1 | 8:00 – 17:00 | two consecutive shifts |
| group 2 | 16:00 – 9:00 |                        |

- (c) Mixed system of daytime duty (one shift) and day and night duty (two consecutive shifts)

|         |                         |
|---------|-------------------------|
| group 1 | 8:00 – 17:00            |
| group 2 | 8:00 – 9:00 of next day |

In case of system (a), it is necessary to shift at the midnight, so we think it is not desirable.

You should care the means of public transportation service when you arrange the shift.

As a rule, you have to take care of the possibility of getting home by means of public transportation.

From this point of view, system (b), is much better than system (a).

But in this case, you have to prepare the accommodation in the toll office.

For the reference, we shall show a table of working system carried out in Japan Highway Public corporation (Reference II-2).

- (2) Method for estimation of required number of toll collectors etc.

As a rule, we think it is desirable that each collector etc. has to go to his toll office personally.

Still, we can consider the method that each collector come to the some meeting point appointed by the ETA. and after that ETA.'s micro bus pick them up at that point and deliver them to the C.A.O. and other toll offices.

But we suppose this method may be inefficient.

The number of employee belonging to the C.A.O. and other toll offices is becoming 350 or more in the first section and more than 500 or so in the first stage. So number of persons attending the office should become to 240 – 350 per day.

It is not possible to carry these number of persons in short times by using the two 12 seater micro bus.

In order to carry the attendants by bus you have to increase the number of micro bus or introduce the larger one.

## 6. Manual for toll collecting business

Manual for toll collecting business has a purpose to provide necessary detail concerning

the management of toll collecting business and to promote the proper and smooth management of the business on the expressway.

Training of collector and inspection of toll collecting business is carried out on the assumption of this manual.

For the reference, we shall provide the draft of the manual. (Reference II-3)

#### 7. Inspection of toll collecting business

The purpose of the inspection is to secure the accurate and exact toll collecting business, to prevent an injustice of collector, and to promote the improvement of the business.

In order to carry out the efficient inspection and to get on effect, it is necessary to establish the system of inspection.

It is not necessary to say that system of the inspection is closely related to the system of toll collecting business, that is the system of toll collecting machine.

ETA.'s system of toll collecting business is well set up considering the inspection of toll revenue.

So, if you put that system to practical use we believe you can achieve your initial purpose.

For the reference we shall show the draft of inspection manual for toll collecting business based on our knowledge about your system which we could get from your explanations and other related documents. (Reference II-4)

#### 8. Maintenance of toll collecting machine

In order to carry out the toll collection smoothly and to get an effect of inspection, it is necessary that toll collecting machines always operate normally.

We can't expect what kind of accident will outbreak on ETA.'s toll collecting machine so we can't provide the adequate comment on maintenance of toll collecting machine.

But we think it is very important to carry out the maintenance by domestic technical skill, especially in future, number of machine will be increased, so this point is very important.

In Japan Highway Public Corporation, we have many toll collecting machines so that we have been bringing up a company charges in the maintenance and improvement of toll machine.

Now we maintain the toll machines by the way of consigning the maintenance to the company.

In that case, the company carries out the duty based on a manual or standard for mainten-

ance operation set up by the J.H.P.C.

We would like to show a standard concerning the frequency of examination of machine but in this time we don't have a data, so we can't show the standard.

#### 9. Training for toll collector

Necessary training for collector is as following;

- (1) How to operate the toll collecting machine.
- (2) How to discriminate the type of vehicles.
- (3) How to prepare the slips of receiveing and other management slip.
- (4) Courtesy or good manner.

As a rule in our corporation, we establish a administration office or toll office, about two month before opening of expressway or ordinary toll road.

Then we carried out on-the-job-training using the toll machine, manual for toll collecting business and other guidance books.

This training is charged by officers of operation bureaus and administration office, and a delivery company of toll machine and a maintenance company of toll machine.

Training period we think is about two weeks or so.

After opening the expressway, daily training is carried out mainly by the manager of administration office and a head of collectors according to the result of their duties. Each collector is directed to read the guide book and improve his toll collecting business.

#### 10. Others

- (1) You have to set up a uniform for toll collector, controller, manager of toll office etc.
- (2) You have prepare a bag using for carrying the received money from toll gate to office.

Reference II-1

Manual for estimating the number of collectors to be assigned (an extract)

I. Method of estimating the number of collectors

Number of collectors is computed by the following way:

1. In case of toll office using the punch card system toll collecting machine
  - (1) Relation between traffic volumes per hour and number of lanes to be opened (table 1)
  - (2) Number of collectors assigned for one lane  
Number of collectors assigned for each one lane is set up 1.5
    - (a) Number of collectors assigned in daytime  
= Number of lanes to be opened in daytime (total number of exit and entrance lane)  $\times$  1.5
    - (b) Number of collectors assigned in nighttime  
= Number of lanes lanes to be opened in night time (total number of exit and entrance lane)  $\times$  1.5

note: daytime = 7:00 – 19:00 (12 hours)  
nighttime = 19:00–7:00 (12 hours)

- (3) Number of collectors  
Number of collectors can be got in following way:

Number of collectors = (number of collectors assigned in daytime + number of collectors assigned in night time)  $\times$  coefficient for shift and holiday (= 2.19)

note: The method of estimating the coefficient.

The coefficient is estimated by following way

|       |  |            |
|-------|--|------------|
| (i)   | Working hour per week                                  | 44 hours   |
| (ii)  | Working hour per day                                   | 7.33 hours |
| (iii) | Number of holidays such as a paid and national holiday | 40 days    |
|       | { a paid holiday                                       | 20 days    |
|       | { national holiday                                     | 12 days    |
|       | { other holiday  | 8 days     |



$$\text{Coefficient} = \left( \frac{12H}{7.33H} \right)^* \times \left\{ \frac{7.3H \times 365D}{(44H \times 52W + 7.33H) - (40D \times 7.33H)} \right\}^{**}$$

\* coefficient for shift  
(= 1.637)

\*\* coefficient for holiday  
(= 1.337)

2. In case of other toll office

(1) Relation between traffic volumes per hour and number of lanes to be opened.  
(Table 2)

(2) Number of collectors assigned for one lane.  
Number of collectors assigned for each lane is set up 1.25

(a) Number collectors arranged in daytime  
= Number of lanes to be opened in daytime (total number of exit and entrance) x 1.25

(b) Number of collectors assigned in daytime  
= Number of lanes to be opened in nighttime (total number of exit and entrance) x 1.25

note: daytime = 6:00 – 22:00 (16 hours)  
nighttime = 22:00 – 6:00 (8 hours)

(3) Number of collectors

Number of collectors can be got by following way

$$\text{Number of collectors} = \left\{ \begin{array}{l} \text{(number of collectors assigned in} \\ \text{daytime} \times \frac{16H}{5.33H}) + \text{(number of collectors assigned in} \\ \text{nighttime} \times \frac{8H}{7.33H}) \end{array} \right\} \times \text{coefficient for holiday} \\ \text{(= 1.337)}$$

Table 1 Relation between traffic volumes per hour and number of lanes to be opened  
(in case of punched card system)

Average number of vehicles waiting per one lane = 3 vehicles

| number of lane to be opened<br>kind of lane | 1                       | 2             | 3             | 4             | 5             | 6             | 7             | 8             | 9             | 10            | 11            | 12            | 13            | 14            | 15            | 16            | 17            | 18            |  |
|---|-------------------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|--|
| exit  | service time<br>17 sec. | 267<br>-481   | 482<br>-673   | 694<br>-901   | 902<br>-1113  | 1114<br>-1329 | 1330<br>-1541 | 1542<br>-1756 | 1757<br>-1973 | 1974<br>-2180 | 2181<br>-2388 | 2389<br>-2596 | 2597<br>-2804 | 2805<br>-3012 | 3013<br>-3237 | 3238<br>-2464 | 3465<br>-3674 | 3675<br>-3884 |  |
|   | service time<br>20 sec. | 226<br>-409   | 410<br>-589   | 590<br>-765   | 766<br>-945   | 946<br>-1129  | 1130<br>-1309 | 1310<br>-1492 | 1493<br>-1675 | 1676<br>-1836 | 1837<br>-2028 | 2029<br>-2204 | 2205<br>-2381 | 2382<br>-2557 | 2558<br>-2748 | 2749<br>-2939 | 2940<br>-3118 | 3119<br>-3296 |  |
| entrance<br>service time 7 sec.             | 647<br>-1168            | 1169<br>-1682 | 1683<br>-2186 | 2187<br>-2700 | 2701<br>-3224 | 3225<br>-3738 | 3739<br>-4241 | 4242<br>-4875 |               |               |               |               |               |               |               |               |               |               |  |

Table 2 Relation between traffic volumes per hour and number of lanes to be opened  
(in case of other system)

Average number of vehicles waiting per one lane = vehicles

| number of lane to be opened               | 1    | 2           | 3            | 4             | 5             | 6             | 7             | 8             | 9             | 10            | 11            | 12            | 13            |
|---|------|-------------|--------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|
| exit and entrance<br>service time 10 sec. | -453 | 454<br>-818 | 819<br>-1178 | 1179<br>-1531 | 1532<br>-1891 | 1892<br>-2258 | 2259<br>-2618 | 2619<br>-2985 | 2986<br>-3353 | 3354<br>-3707 | 3708<br>-4059 | 4060<br>-4412 | 4413<br>-4765 |

Reference II-2 Working system operated on Japan Highway Public Corporation

Table of office hours for collectors (standard)  
勤務時間割表




Case of  
Traffic volumes are under 6000 vehicles/day  
Two lanes are to be operated

| Time            | Days of the week |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    | 拘束時間 (A) | 乗働時間 (B) | 直接時間 (C) | 間接時間 (D) | 休憩時間 (E) |      |
|-----------------|------------------|---|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----------|----------|----------|----------|----------|------|
|                 | 0                | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 |          |          |          |          |          | 24   |
| Day time duty   |                  |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |          |          |          |          |          |      |
| 日勤 1            | 2                | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2  | 2  | 2  | 2  | 2  | 2  | 2  | 2  | 2  | 2  | 2  | 2  | 2  | 2  | 2        | 8:30     | 7-20     | 5:00     | 2:20     | 1:00 |
| 2               |                  |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |          | "        | "        | "        | "        | "    |
| 3               |                  |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |          | "        | "        | "        | "        | "    |
| 4               |                  |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |          | "        | "        | "        | "        | "    |
| Night time duty |                  |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |          |          |          |          |          |      |
| 夜勤 1            |                  |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |          | 16:30    | 14-40    | 10:00    | 4:40     | 1:50 |
| 2               |                  |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |          | "        | "        | "        | "        | "    |
| 3               |                  |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |          | "        | "        | "        | "        | "    |

Working condition

- 1. working hours 44 hours/week
- 2. lease more than one hour per day
- 3. holiday weekly/holiday one day/week  
national holiday 40 days/gear  
raid holiday

Explanatory notes

-  Direct working hours = working at toll gate (toll collection)
-  Indirect working hours = preparation and management of toll collection (working in toll office)
-  Lease

- (A) working hour including lease = (B) + (E)
- (B) Actual working hours = (C) + (D)
- (C) Direct working hours
- (D) Indirect working hours
- (E) Lease

Table of attendance at office for collectors  
勤務割表

| Date<br>月日<br>時分 | 1<br>SAT. | 2<br>MON. | 3<br>TUES. | 4<br>WED. | 5<br>THUR. | 6<br>FRI. | 7<br>SAT. | 8<br>SAN. | 9<br>MON. | 10<br>TUES. | 11<br>WED. | 12<br>THUR. | 13<br>FRI. | 14<br>SAT. |
|------------------|-----------|-----------|------------|-----------|------------|-----------|-----------|-----------|-----------|-------------|------------|-------------|------------|------------|
| 1                |           |           |            |           |            |           |           |           |           |             |            |             |            |            |
| 2                |           |           |            |           |            |           |           |           |           |             |            |             |            |            |
| 3                |           |           |            |           |            |           |           |           |           |             |            |             |            |            |
| 4                |           |           |            |           |            |           |           |           |           |             |            |             |            |            |
| 5                |           |           |            |           |            |           |           |           |           |             |            |             |            |            |
| 6                |           |           |            |           |            |           |           |           |           |             |            |             |            |            |
| 7                |           |           |            |           |            |           |           |           |           |             |            |             |            |            |
| 8                |           |           |            |           |            |           |           |           |           |             |            |             |            |            |
| 9                |           |           |            |           |            |           |           |           |           |             |            |             |            |            |
| 10               |           |           |            |           |            |           |           |           |           |             |            |             |            |            |
| 11               |           |           |            |           |            |           |           |           |           |             |            |             |            |            |
| 12               |           |           |            |           |            |           |           |           |           |             |            |             |            |            |
| 13               |           |           |            |           |            |           |           |           |           |             |            |             |            |            |
| 14               |           |           |            |           |            |           |           |           |           |             |            |             |            |            |

14 x 40日 ÷ 52週 = 11 14

Explanatory notes

— Work

— Weekly holiday

⊖ Wakers for compensatory holiday (for national & paid holiday)

Table of office hours for collectors (standard)  
勤務時間割表

Case of

Traffic volumes are under 100000 vehicles/day

Three lanes in daytime and two lanes in night time are to be opened

| Time 時分                | 拘禁時間 (A) |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   | 勤務時間 (B) | 直接時間 (C) | 間接時間 (D) | 休憩時間 (E) |      |
|------------------------|----------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|----------|----------|----------|----------|------|
|                        | 0        | 1 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |          |          |          |          | 2    |
| Daytime duty           |          |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |          |          |          |          |      |
| 日勤                     |          |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   | 8.30     | 7.20     | 5.00     | 2.20     | 1.00 |
| 1                      |          |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   | "        | "        | "        | "        | "    |
| 2                      |          |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   | "        | "        | "        | "        | "    |
| 3                      |          |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   | "        | "        | "        | "        | "    |
| 4                      |          |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   | "        | "        | "        | "        | "    |
| Day and nighttime duty |          |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |          |          |          |          |      |
| 昼夜勤                    |          |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   | 24.30    | 14.40    | 10.00    | 4.40     | 9.50 |
| 1                      |          |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   | "        | "        | "        | "        | "    |
| 2                      |          |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   | "        | "        | "        | "        | "    |
| 3                      |          |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   | "        | "        | "        | "        | "    |
| 4                      |          |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   | "        | "        | "        | "        | "    |

Table of attendance at office for collectors  
勤務割表

| Date     | 1    | 2    | 3     | 4    | 5     | 6    | 7    | 8    | 9    | 10   | 11   | 12    | 13   | 14   |
|----------|------|------|-------|------|-------|------|------|------|------|------|------|-------|------|------|
| 時間<br>時間 | SAT. | MON. | TUES. | WED. | THUR. | FRI. | SAT. | SAN. | MON. | TUES | WED. | THUR. | FRI. | SAT. |
| 1        |      |      |       |      |       |      |      |      |      |      |      |       |      |      |
| 2        |      |      |       |      |       |      |      |      |      |      |      |       |      |      |
| 3        |      |      |       |      |       |      |      |      |      |      |      |       |      |      |
| 4        |      |      |       |      |       |      |      |      |      |      |      |       |      |      |
| 5        |      |      |       |      |       |      |      |      |      |      |      |       |      |      |
| 6        |      |      |       |      |       |      |      |      |      |      |      |       |      |      |
| 7        |      |      |       |      |       |      |      |      |      |      |      |       |      |      |
| 8        |      |      |       |      |       |      |      |      |      |      |      |       |      |      |
| 9        |      |      |       |      |       |      |      |      |      |      |      |       |      |      |
| 10       |      |      |       |      |       |      |      |      |      |      |      |       |      |      |
| 11       |      |      |       |      |       |      |      |      |      |      |      |       |      |      |
| 12       |      |      |       |      |       |      |      |      |      |      |      |       |      |      |
| 13       |      |      |       |      |       |      |      |      |      |      |      |       |      |      |
| 14       |      |      |       |      |       |      |      |      |      |      |      |       |      |      |
| 15       |      |      |       |      |       |      |      |      |      |      |      |       |      |      |
| 16       |      |      |       |      |       |      |      |      |      |      |      |       |      |      |
| 17       |      |      |       |      |       |      |      |      |      |      |      |       |      |      |

17人 x 40日 ÷ 52週 = 13 ← 18

Table of attendance at office for collectors

勤務割表

| Date | 1    | 2    | 3     | 4    | 5     | 6    | 7    | 8    | 9    | 10   | 11   | 12    | 13   | 14   |
|------|------|------|-------|------|-------|------|------|------|------|------|------|-------|------|------|
| 月日   | SAT. | MON. | TUES. | WED. | THUR. | FRI. | SAT. | SAN. | MON. | TUES | WED. | THUR. | FRI. | SAT. |
| 時間   |      |      |       |      |       |      |      |      |      |      |      |       |      |      |
| 1    |      |      |       |      |       |      |      |      |      |      |      |       |      |      |
| 5    |      |      |       |      |       |      |      |      |      |      |      |       |      |      |
| 9    |      |      |       |      |       |      |      |      |      |      |      |       |      |      |
| 2    |      |      |       |      |       |      |      |      |      |      |      |       |      |      |
| 6    |      |      |       |      |       |      |      |      |      |      |      |       |      |      |
| 10   |      |      |       |      |       |      |      |      |      |      |      |       |      |      |
| 3    |      |      |       |      |       |      |      |      |      |      |      |       |      |      |
| 7    |      |      |       |      |       |      |      |      |      |      |      |       |      |      |
| 11   |      |      |       |      |       |      |      |      |      |      |      |       |      |      |
| 4    |      |      |       |      |       |      |      |      |      |      |      |       |      |      |
| 8    |      |      |       |      |       |      |      |      |      |      |      |       |      |      |
| 12   |      |      |       |      |       |      |      |      |      |      |      |       |      |      |
| 13   |      |      |       |      |       |      |      |      |      |      |      |       |      |      |
| 14   |      |      |       |      |       |      |      |      |      |      |      |       |      |      |
| 15   |      |      |       |      |       |      |      |      |      |      |      |       |      |      |
| 16   |      |      |       |      |       |      |      |      |      |      |      |       |      |      |
| 17   |      |      |       |      |       |      |      |      |      |      |      |       |      |      |
| 18   |      |      |       |      |       |      |      |      |      |      |      |       |      |      |
| 19   |      |      |       |      |       |      |      |      |      |      |      |       |      |      |

19人 x 40日 ÷ 52週 = 15 ← 16

Table of office hours for collectors (standard)

勤務時間割表

Case of

Traffic volumes are under 15000 vehicle/day

Four lanes in daytime and two lanes in night time are to be opened

| Time 時分            | 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 拘束時間 (A) | 労働時間 (B) | 直接時間 (C) | 間接時間 (D) | 休憩時間 (E) |
|--------------------|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|----------|----------|----------|----------|----------|
|                    | [Grid for duty assignment]                                       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |          |          |          |          |          |
| Daytime duty       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 8:30     | 7:20     | 5:15     | 2:25     | 1:10     |
| 日勤 1               | [Duty bars]  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | "        | "        | "        | "        | "        |
| 2                  | [Duty bars]  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | "        | "        | "        | "        | "        |
| 3                  | [Duty bars]  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | "        | "        | "        | "        | "        |
| 4                  | [Duty bars]  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | "        | "        | "        | "        | "        |
| 5                  | [Duty bars]  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | "        | "        | "        | "        | "        |
| 6                  | [Duty bars]  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | "        | "        | "        | "        | "        |
| Day and night duty |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 24:30    | 14:40    | 10:15    | 4:25     | 9:50     |
| 昼夜勤 1              | [Duty bars]  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | "        | "        | "        | "        | "        |
| 2                  | [Duty bars]  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | "        | "        | "        | "        | "        |
| 3                  | [Duty bars]  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | "        | "        | "        | "        | "        |
| 4                  | [Duty bars]  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | "        | "        | "        | "        | "        |





Table of attendance at office for collectors  
勤務割表

| Date     | 1   | 2   | 3    | 4   | 5    | 6   | 7   | 8   | 9   | 10   | 11  | 12   | 13  | 14  |
|----------|-----|-----|------|-----|------|-----|-----|-----|-----|------|-----|------|-----|-----|
| 曜日<br>時間 | SAT | MON | TUES | WED | THUR | FRI | SAT | SAN | MON | TUES | WED | THUR | FRI | SAT |
| 1        |     |     |      |     |      |     |     |     |     |      |     |      |     |     |
| 8        |     |     |      |     |      |     |     |     |     |      |     |      |     |     |
| 15       |     |     |      |     |      |     |     |     |     |      |     |      |     |     |
| 2        |     |     |      |     |      |     |     |     |     |      |     |      |     |     |
| 9        |     |     |      |     |      |     |     |     |     |      |     |      |     |     |
| 16       |     |     |      |     |      |     |     |     |     |      |     |      |     |     |
| 3        |     |     |      |     |      |     |     |     |     |      |     |      |     |     |
| 10       |     |     |      |     |      |     |     |     |     |      |     |      |     |     |
| 17       |     |     |      |     |      |     |     |     |     |      |     |      |     |     |
| 4        |     |     |      |     |      |     |     |     |     |      |     |      |     |     |
| 11       |     |     |      |     |      |     |     |     |     |      |     |      |     |     |
| 18       |     |     |      |     |      |     |     |     |     |      |     |      |     |     |
| 5        |     |     |      |     |      |     |     |     |     |      |     |      |     |     |
| 12       |     |     |      |     |      |     |     |     |     |      |     |      |     |     |
| 19       |     |     |      |     |      |     |     |     |     |      |     |      |     |     |
| 6        |     |     |      |     |      |     |     |     |     |      |     |      |     |     |
| 13       |     |     |      |     |      |     |     |     |     |      |     |      |     |     |
| 20       |     |     |      |     |      |     |     |     |     |      |     |      |     |     |
| 7        |     |     |      |     |      |     |     |     |     |      |     |      |     |     |
| 14       |     |     |      |     |      |     |     |     |     |      |     |      |     |     |
| 21       |     |     |      |     |      |     |     |     |     |      |     |      |     |     |
| 22       |     |     |      |     |      |     |     |     |     |      |     |      |     |     |
| 27       |     |     |      |     |      |     |     |     |     |      |     |      |     |     |
| 23       |     |     |      |     |      |     |     |     |     |      |     |      |     |     |
| 28       |     |     |      |     |      |     |     |     |     |      |     |      |     |     |
| 24       |     |     |      |     |      |     |     |     |     |      |     |      |     |     |
| 29       |     |     |      |     |      |     |     |     |     |      |     |      |     |     |
| 25       |     |     |      |     |      |     |     |     |     |      |     |      |     |     |
| 30       |     |     |      |     |      |     |     |     |     |      |     |      |     |     |
| 26       |     |     |      |     |      |     |     |     |     |      |     |      |     |     |
| 31       |     |     |      |     |      |     |     |     |     |      |     |      |     |     |
| 32       |     |     |      |     |      |     |     |     |     |      |     |      |     |     |
| 33       |     |     |      |     |      |     |     |     |     |      |     |      |     |     |
| 34       |     |     |      |     |      |     |     |     |     |      |     |      |     |     |
| 35       |     |     |      |     |      |     |     |     |     |      |     |      |     |     |
| 36       |     |     |      |     |      |     |     |     |     |      |     |      |     |     |
| 37       |     |     |      |     |      |     |     |     |     |      |     |      |     |     |
| 38       |     |     |      |     |      |     |     |     |     |      |     |      |     |     |
| 39       |     |     |      |     |      |     |     |     |     |      |     |      |     |     |

$$39 \text{人} \times 40 \text{日} \div 52 \text{週} = 30 \text{ ← } 31$$

## Reference II-3

### Manual for toll collecting business

#### Chapter 1. General Provision

(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 expressway managed by the ETA.

(Application)

Article 2. The management of the toll collecting business on the expressway is to follow the provisions of these articles in addition to the regulation of the management of expressway toll collecting business<sup>1</sup>.

#### Chapter 2. Toll collecting Business

##### Section 1. General Rules

(Preparation for the work, etc.)

Article 3. Starting the toll collecting service, a collector must make all necessary arrangement for the collecting service to carry out his duty smoothly.

- ② Starting the toll collecting service a collector must clear out any private money or other prohibited one with him.

(Opening and Closing of the lanes)

Article 4. As a collector opens or closes the lane, he must do it quickly; however, regarding to safety.

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

(Operation of the machine, etc.)

Article 5. A collector must operate the machines accurately and carefully.

- ② As a collector notices the machine trouble, he must report it to the manager of the toll office and follow his instructions. However, in case of a slight trouble and easily adjusted by him, above mentioned procedure is unnecessary.
- ③ While in toll collecting service a collector should keep attention to the surroundings for fear that a crime and an accident should happen.

(Classification of fares)

Article 7. The classification of fares to be collected and the types of vehicle fall under the classification of fares which are shown in the attached table.

Section 2. The works at the toll gate

(Toll collection at the gate)

Article 8. The collector, at the toll gate, is to confirm the types of vehicle, to push the registration button for that type to receive the toll fare in cash or by voucher and then push the cash or voucher button of the toll machine, under the classification of fares as described in Article 7.

- ②. When the collector is presented by the passer-by with the free passing certificate issued under the attached rule, he must push the zero registration button, and push the voucher button, after confirming the written items on the certificate.
- ③. When the collector received the voucher, he stamp a seal of its office. (attached Form B. 12)

(Measure to unqualified vehicles in passing)

Article 10. Measure to the motorcycles, light weight vehicles and other vehicles prohibited to pass the expressway by government. Gazette is under the attached rules.

(Measure to the vehicle with a different voucher)

Article 11. On being presented with a different coupon ticket or the different free passing certificate from a passer-by, the collector must return it to the passer-by and receive the toll in cash.

(Measure to passer-by unable to pay)

Article 12. When the collector treats the passer-by unable to pay the toll (following referred to it as "the person unable to pay the toll), he must report it immediately to the manager of the toll offices.

- ②. When the manager of toll office received the report on preceding clause from the collector and then asked this person unable to pay the toll the circumstance and admit it reasonable, he is to fill in the blank of the written notice of payment of unpaid fare attached to the non-payment management slips (attached paper Form 3-2)

(The measure to the illegally passing vehicle)

Article 13. If there is the passer-by who manages to be free from the toll, the collector must make an effort to prevent it from passing through the tollgate.

- ②. If there is the vehicle in the above case, passing in spite of collector's restraint, the collector must write down the registration number of the vehicle and other characteristics of the car and report it to the manager of toll office.

- ③ On taking measures under the preceding clause, the collector must fill in the blank of slips of non-payment management. (attached paper Form B 3-1)

(Making slips of receiving)

Article 14. As the service is over, a collector immediately must arrange the received money prepared money for changes use received coupon tickets and other vouchers, and then prepare slips of payment. (attached paper Form B 1)  
slips of receiving (attached paper Form B 2)  
slips of non payment management (attached paper From B 3)  
(following referred to them as “managing slips”)  
in the counting room, and submit them to the manager of toll office.

- ② As the collector presents, under preceding clause, the slips of receiving and the slip of management, he must submit the received coupon ticket the certificate of the free charge vehicle the received toll and prepared money for changes usos.

### Section 3. Coupon ticket and other vouchers

(Form of the coupon ticket, etc.)

Article 15. Form of the coupon ticket is determined in attached rule.<sup>6</sup>

- ② Management of receipts and disbursement and storage for the commutation ticket is done based on the coupon ticket control manual.<sup>6</sup>

(Form of the certificate of free charge vehicle)

Article 16. Form of the certificate of free charge vehicle is determined in attached rule.<sup>7</sup>

(Sales of coupon ticket)

Article 17. Manager of the C.A.O. etc. must sell the coupon ticket in cash.

- ② Manager of the C.A.O. etc. has to write down the name, address and the place of employment of a purchaser in the notebook.

### Chapter 3. Investigation of received toll

(Investigation of received toll)

Article 13. Manager of the toll office must confirm the received toll, slips of receiving and other vouchers, and investigate them by checking up the record of recording machine.

- ② The way of confirmation and investigation is determined by the inspection manual of toll collecting business.

(Storage of received toll)

Article 19. Head of the collector must put the received toll and slip of payment into the bag and storage them in the strong room.

(Disposal of received coupon tickets. etc.)

Article 20. Disposal of received coupon ticket, certificate of free charge vehicle, and slips of receiving and other managing slips is done based on the attached table 2.

(Preparation of record of daily etc.)

Article 21. Manager of the toll office must prepare the following documents, and submit them to the manager of C.A.O.

- (1) Daily record of toll collecting business (A) (attached paper form B 4)
- (2) Daily record of sold coupon ticket (attached paper form B 5)
- (3) Slip of daily revenue (attached paper form B 10)

(Preparation of monthly report)

Article 22. Manager of the C.A.O. must prepare the following monthly reports and submit them to the director of engineering department of the head quarter until the 10th day of the following.

- (1) Monthly report of toll collecting business (attached paper form B 6)
- (2) Monthly report of traffic volume. (attached paper form B7)
- (3) Monthly report of sold coupon ticket (attached paper form B 8)
- (4) Monthly report of toll collecting business of each toll office (attached paper form B 9)
- (5) Summary slip of daily revenue (attached paper form B 11)

#### Chapter 4. The others

(The collection of an extra charge)

Article 23. When there is the vehicle prescribed in article 18. the manager of toll office must confirm the address of the passer-by and notify the payment of extra charge appointing the date of payment and address of payment. In this case the date of payment should be limited with in 10 days after the issue of the notification of payment.

(Reporting to the manager of the C.A.O. etc.)

Article 24. As the manager of the toll office receives the report from under the article 13. he must report it to the C.A.O.

- ② As the manager of the toll office admits something necessity in the report under article 5 clause 2., article 12. he must report it to the C.A.O. as quickly as possible.

(Documents to be prepared)

Article 25. Documents to be prepared in the C.A.O. and T.O. are shown in the attached Table 3.<sup>10</sup>

- ② Documents provided by the recording machine are shown in the attached Table 3.

(Business diary)

Article 26. The manager of C.A.O. and manager of toll office must prepare the business diary (attached form 10)<sup>9</sup> and to record the circumstance of daily business, result of supervision for busienss and other necessary things.

(Management of excess or deficit of received toll)

Article 27. Management of excess and deficit of received toll is ruled in other manual.<sup>8</sup>

(Inspection of toll collecting business)

Article 28. The director of engineering department of the head quarters and the manager of the C.A.O. must carry out the inspection of toll collecting works according to the inspection manual of toll collecting business.

Note:

1. Regulation of the management of expressway toll collecting business.
2. Amount of prepared money for the charge.
3. Table 1
4. Rules for free passing certificate
5. Management rules for unqualified vehicle in passing
6. Form of coupon ticket and management manual
7. Form of certificate of free charge vehicle
8. Manual for management of excess and deficit of received toll
9. From 9. Business diary
10. Table 3 Document to be prepared

As we don't have enough time and necessary data to set up these matters, this report may not be perfect. Howcer, it may be your guide line.

TABLE - 2 DISPOSAL OF RECEIVED COUPON TICKET ETC.

| KIND                               | TERMS OF STORAGE                               |                  | OFFICER RESPONSIBLE FOR DISPOSAL |
|------------------------------------|--|------------------|----------------------------------|
|                                    |  | WAY OF DISPOSAL  |                                  |
| RECEIVED COUPON TICKETS            | ONE MONTH                                      | DESTOROY BY FIRE | MANAGER OF THE C.A.O.            |
| FREE PASSING CIRTIFICATE           | "  | "                |                                  |
| SLIPS OF RECEIVEING                | THREE MONTH AFTER PREPARATORY                  | "                | "                                |
| SLIPS OF NON PAYMENT MANAGEMENT    | (BUT IN CASE THAT PAYMENT IS NOT DONE IS DANE) | "                | "                                |
| A WRITTEN NOTICE OF PAYMENT (COPY) | "  | "                | "                                |
| SLIPS OF PAYMENT                   | "  | "                | "                                |





Form - B2

SLIPS OF RECEIVING

No. \_\_\_\_\_

|          |                       |
|----------|-----------------------|
| I.C. No. | Name of the collector |
|          |                       |

|                            |  |
|----------------------------|--|
| Manager of the toll office | Name of the officer confirming this slip |
|                            |  |

| WORKING NO. | LANE NO. | COLLECTOR'S NO. | d. | mo. | yr. | WORKING HOUR |     |     |
|-------------|----------|-----------------|----|-----|-----|--------------|-----|-----|
|             |          |                 |    |     |     | hr           | min | min |
|             |          |                 |    |     |     |              |     |     |
|             |          |                 |    |     |     |              |     |     |
|             |          |                 |    |     |     |              |     |     |
|             |          |                 |    |     |     |              |     |     |
|             |          |                 |    |     |     |              |     |     |
|             |          |                 |    |     |     |              |     |     |
|             |          |                 |    |     |     |              |     |     |
|             |          |                 |    |     |     |              |     |     |
|             |          |                 |    |     |     |              |     |     |

|                          |                    |                       |
|--------------------------|--------------------|-----------------------|
| RECEIVED AMOUNT OF MONEY | NUMBER OF VOUCHERS |                       |
|                          | COUPON TICKET      | CERTIFICATION OF FREE |
|                          | 5 B                | 10 B total            |

|   |
|---|
| NUMBER OR SHEETS OF THE ISSUED SLIP OF MANAGEMENT |
| NONPAYMENT<br>UNAUTHORISED<br>PASSING             |

|                        |                          |
|------------------------|--------------------------|
| AMOUNT OF EXCESS FARES | AMOUNT OF SHORTAGE FARES |
| B                      |                          |

|          |
|----------|
| REMARKS: |
|          |



DAILY RECORD OF SOLD COUPON TICKET

D.      Mo.      yr.

| CLASSIFICATION  |                         | REGISTERED NUMBER |    | SOLD VOLUME | AMOUNT | REMARKS |
|-----------------|-------------------------|-------------------|----|-------------|--------|---------|
| TYPE OF VEHICLE | KIND OF BOOK OF TICKET  | FROM              | TO |             |        |         |
| (exp.)          | 50 TIMES.<br>100 TIMES' |                   |    |             |        |         |
| TOTAL           |                         |                   |    |             |        |         |

|                            |                                |                                |
|----------------------------|--------------------------------|--------------------------------|
| MANAGER OF THE TOLL OFFICE | NAME OF THE OFFICER CONFIRMING | NAME OF THE OFFICER MAKING OUT |
|                            |                                |                                |

Monthly report of toll collecting business

|   | Classifi-<br>cation of<br>vehicle | Traffic volume |                              | Revenue (₹)                    |                |        |       |  |
|---|-----------------------------------|----------------|------------------------------|--------------------------------|----------------|--------|-------|--|
|   |                                   | This month     | Accumulation<br>of this year | Item                           | Toll<br>office | C.A.O. | Total | Accumulated (D)<br>Revenue of this year              |
| 1   |                                   |                |                              | Received Toll for Cash         |                |        |       | Accumulate Revenue (E)<br>of same month of last year |
| 2   |                                   |                |                              | Received Coupon ticket         |                |        |       | Ratio C/F  |
| 3   |                                   |                |                              | Collected non payment toll     |                |        |       | Ratio D/F  |
| 4   |                                   |                |                              | Amount of covered deficit      |                |        |       |  |
| 5   |                                   |                |                              | Amount of reduction of revenue |                |        |       |  |
| 6   |                                   |                |                              | Total                          |                |        | (C)   |  |
| Report on business  |                                   |                |                              |                                |                |        |       |  |
| 10  | Coupon<br>ticket                  |                |                              |                                |                |        |       |  |
| Total (A)   |                                   |                |                              |                                |                |        |       |  |
| Free charge vehicle   |                                   |                |                              |                                |                |        |       |  |
| Number of traffic<br>volume of same (B)<br>month of last year |                                   |                |                              |                                |                |        |       |  |
| Ratio A/B   |                                   |                |                              |                                |                |        |       |  |
| Weather   | Fine                              |                | Cloudy                       |                                | Rain           |        |       |  |

Name of toll office

| Classification of vehicle |  |  |  |  |  |  |  | Coupon ticket | Total | Free charge vehicle |
|---------------------------|--|--|--|--|--|--|--|---------------|-------|---------------------|
| DATE                      |  |  |  |  |  |  |  |               |       |                     |
| 1. days of the week       |  |  |  |  |  |  |  |               |       |                     |
| 2.                        |  |  |  |  |  |  |  |               |       |                     |
| 3.                        |  |  |  |  |  |  |  |               |       |                     |
| -                         |  |  |  |  |  |  |  |               |       |                     |
| -                         |  |  |  |  |  |  |  |               |       |                     |
| -                         |  |  |  |  |  |  |  |               |       |                     |
| -                         |  |  |  |  |  |  |  |               |       |                     |
| -                         |  |  |  |  |  |  |  |               |       |                     |
| -                         |  |  |  |  |  |  |  |               |       |                     |
| 30.                       |  |  |  |  |  |  |  |               |       |                     |
| 31.                       |  |  |  |  |  |  |  |               |       |                     |

| Classification of vehicle |             |        |       |        | Total Amount |
|---------------------------|-------------|--------|-------|--------|--------------|
|                           | Toll office | C.A.O. | Total | Amount |              |
| 1.                        | vol         | vol    | vol   | ⌘      |              |
| 2.                        |             |        |       |        |              |
| 3.                        |             |        |       |        |              |
| <b>Total</b>              |             |        |       |        |              |

Form - B9 Monthly report of toll collecting business of each toll office (mo. yr.)

| Classification of vehicles     | DIN DAENG | --- | C.A.O. | Total |
|--------------------------------|-----------|-----|--------|-------|
|                                |           |     |        |       |
| 1                              |           |     | -      |       |
| 2                              |           |     | -      |       |
| 3                              |           |     | -      |       |
| 10 coupon ticket               |           |     | -      |       |
| Total                          |           |     | -      |       |
| Free charge vehicle            |           |     | -      |       |
| Cash                           |           |     | -      |       |
| Sold Coupon ticket             |           |     | -      |       |
| Collected nonpayment toll      |           |     | -      |       |
| Amount of covered deficit      |           |     | -      |       |
| Amount of reduction of revenue |           |     | -      |       |
| Sold Coupon ticket             |           | -   | -      |       |
| Collected nonpayment toll      |           | -   | -      |       |
| Amount of covered deficit      |           | -   | -      |       |
| Amount of reduction of revenue |           | -   | -      |       |
| Total                          |           |     |        |       |



SLIP OF DAILY REVENUE

|                        |                  |
|------------------------|------------------|
| Manager of toll office | Person in charge |
|                        |                  |

|                     |
|---------------------|
| Name of toll office |
|                     |

| Amount of received money (A) | Amount of sold coupon ticket (B) | Collected amount out of non-payment (C) | amount of covered deficit (D) | Amount of reduction of settled revenue (E) | Toll revenue (A)+(B)+(C)+(D)+(E) |
|------------------------------|----------------------------------|---|-------------------------------|--|----------------------------------|
|                              |                                  |   | Δ                             |  |                                  |

|                       |
|-----------------------|
| Amount of non-payment |
|                       |

| Amount of received money (A) | Amount of money should be received (I) | Paid amount out of non-payment (J) | Amount of excess on deficit (A)-(I)-(J) |
|------------------------------|--|------------------------------------|---|
|                              |  |                                    |   |

|   |        |         |
|---|--------|---------|
| Mistake of received money recognized by collector | excess | deficit |
|   |        |         |

| Measure to amount of received money |                             |
|-------------------------------------|-----------------------------|
| Balance carried from pre. dau       | Amount of today's deposit   |
|                                     |                             |
|                                     | Balance carried to next day |

| Classification of vehicles | Cash | Coupon ticket | Management of non-payment | Total |
|----------------------------|------|---------------|---------------------------|-------|
| 1                          |      |               |                           |       |
| 2                          |      |               |                           |       |
| 3                          |      |               |                           |       |
| Total                      |      |               |                           |       |

|                            |
|----------------------------|
| Certificate of free charge |
|                            |

|                            |
|----------------------------|
| Illegally passing vehicles |
|                            |

Form - B11

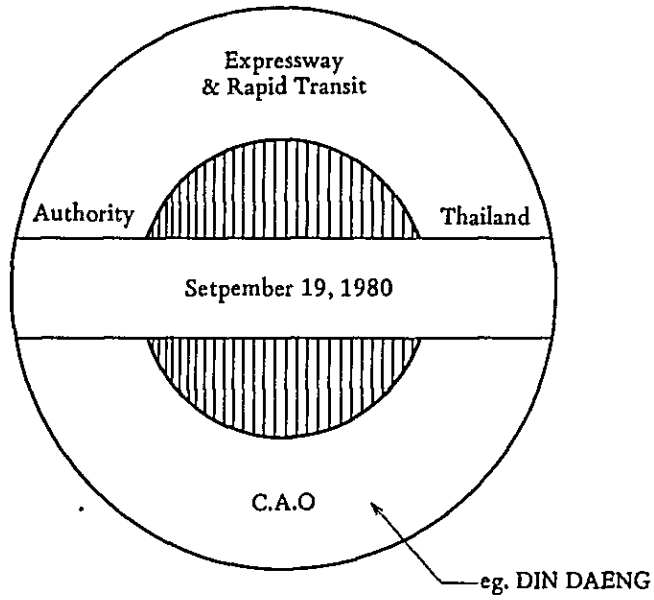
Summary slip of daily revenue

(d. mo. yr.)

|                  |                  |
|------------------|------------------|
| Manager of C.A.C | Person in charge |
|                  |                  |

| Name of toll office | Amount of received money (A) | Amount of sold coupon ticket (B) | Collected amount out of non-payment (C) | Amount of covered deficit (D) | Amount of reduction of settled | Toll revenue (A)+(B)+(C)+(D)+(E) | Amount of non-payment (F) | Amount of excess or deficit |
|---------------------|------------------------------|----------------------------------|---|-------------------------------|--------------------------------|----------------------------------|---------------------------|-----------------------------|
|                     |                              |                                  |   |                               |                                |                                  |                           |                             |

| Name of toll office | Mistake of received money recognized by collector |         | received coupon ticket | Free charge vehicle                            |                               | Measure to amount of received money |                             |  |
|---------------------|---|---------|------------------------|--|-------------------------------|-------------------------------------|-----------------------------|--|
|                     | excess  | deficit |                        | Whether there is a certificate or not is isn't | Balance carried from pre. day | Amount of today's deposit           | Balance carried to next day |  |
|                     |   |         |                        |  |                               |                                     |                             |  |
| Total               |   |         |                        |  |                               |                                     |                             |  |



Inspection manual for the toll collecting business

Chapter 1. General Provision

(Purpose)

Article 1. This manual is to provide a basic rule concerning the examination and inspection about toll collecting business and to secure the accurate and exact toll collecting business and to promote the improvement of the business.

Chapter 2. Examination

(Examination)

Article 2. Examination of the toll collecting business is carried out about the following matters in C.A.O. or toll station.

- (1) To examine the slips of receiving, and other management slips prepared by collectors,
- (2) To check up the following items for each duty of collectors using the daily record of toll collecting business, and records from the recording machine.
  - (a) amount of received money
  - (b) number of passer-by vehicles
- (3) To check up the total amount of received toll and sold coupon ticket entered in the Summary of daily revenue and total amount of actually deposited money and money stored in a strong room.
- (4) To check up the daily record of toll collecting business and daily operating summary print-out etc. from recording machine.
- (5) To examine the other items which the manager of C.A.O. considers to be necessary.

(Persons charge in examination)

Article 3. Examination prescribed in the preceding provision is charged by chief and deputy chief of toll collecting division in C.A.O., manager of toll office, and head of collector in toll office.

(Survey and report after the examination)

Article 4. When the person in charge in examination finds out mistakes of toll collecting business, he has to check the toll machine, ask the reason of mistake from the related collector, and survey the cause of mistake.

- ② When the person in charge in examination found out important and unusual matters in the result of preceding examination, he has to report them to the manager of C.A.O.

(Measure taken by the manager of C.A.O.)

Article 5. As manager of C.A.O. reports the result based on the previous provision, he has to carry out the training for toll collecting business and in necessary case he has to report it to the director of Department of Expressway.

### Chapter 3. Inspection

(Inspections)

Article 6. Inspection of toll collecting business prescribed in this chapter are carried out by C.A.O and H.Q.

- ② Inspection by C.A.O. carried out on occasion audit is charged by the manager of C.A.O. or persons appointed by the manager of C.A.O.
- ③ Head quarters carried out the periodical and occasional on the-site-inspection. In this case, the inspection is charged by chief of controlling of expressway system section or person appointed by the chief on approval of director of the Department of EXpressway.

(Occasional Inspection by C.A.O.)

Article 7. Occasional inspection is carried out occasionally at toll station referring the result of the examination and inspection about collector's tendency.

- ② In this inspection person charge in inspection has to examine excess and deficit of received toll, frequency of missregistration, discrepancy, and faulty of axle detector, etc, and survey number of passer by vehicle in practice.
- ③ Manager of C.A.O. has to staale the date and time of inspection, inspection item, and a way of inspection, each time.

(Measure of the result of occasional inspection)

Article 8. As a result of the inspection, if he finds out problems, he has to take measures to guide the collector, and to improve the way of toll collecting business.

- ② As a result of the inspection if he finds out important and unusual matters, manager of C.A.O. has to report them to the director of Department of Expressway.

(Inspection about tendency of collecting business of each collector)

Article 9. Inspection about collector's tendency is carried out in way of analysing results of trend study concerning discrepancy of received toll, and frequency of misregistration, using the documents as shown in table 1 and other data.

(Measure to the inspection about collector's tendency)

Article 10. As a result of the inspection if manager finds out important and unusual matters, he was to report them to the director of Department of Expressway.

- ② The manager of C.A.O. has to notice it to related manager of toll office, and order him investigation of cause of outbreak of important and unusual matters, and training of toll collectors.
- ③ When director of Department of Expressway receives the report prescribed in the preceding provisions, he has to indicate the operation of occasional inspection prescribed in article 7. or occasional field inspection prescribed in article 12 to the manager of C.A.O. or chief of controlling of expressway system section

(Periodical field inspection)

Article 11. Periodical field inspection is to be carried out once a year based on a inspection plan which is prepared by the chief of controlling of expressway system section on approved of the director of Department of Expressway.

- ② In the inspection plan prescribed in preceding clause, operation time and important item of inspection etc. are to be determined.

(Occasional field inspection)

Article 12. Occasional field inspection's carried out at the toll gate, in the way of interrupting the toll collecting business, examining error of received money and received vouchers and surveying the number of vehicles passing through the toll gate actually.

- ② This inspection is carried out when the chief of controlling of expressway system section considers to be necessary according to the result of tendency inspection or periodical field inspection or director of department of expressway considers to be necessary according to their provision of article 10 clause.
- ③ Matter for the occasional field inspection such as date and time of inspection, item and way of inspection are to be determined by chief of controlling of expressway system section.

(Measure to the result of field of field inspection)

Article 13. The chief of controlling of expressway system section has to report the result of periodical and occasional field inspection to the director of department of expressway in this case if there is a matter to be improved relating to the toll collecting business and other, he has to put the plan of improvement.

(Measure of improvement carried out by the director of Department of Expressway)

Article 14. The director of Department of Expressway has to take necessary measures to improve the toll collecting business according to the report, when he gets the reports prescribed in article 4, article 8 clause 2, article 12 clause 1 and 2, and article 1.

### III. Suggestion on traffic operation

#### 1. Work responsibility and cooperation with the agencies concerned

##### (1) Traffic police

(a) It is desirable that the road supervisor and traffic police should execute traffic control in close cooperation in order to operate the Expressway safely and smoothly.

As Department of Highway has its Highway Patrol police Division, it is recommended that the ETA have its own traffic police division.

##### (b) Work responsibility and cooperation

We'd like to introduce agreements concluded by the Japan Highway Public Corporation and prefectural polices on the traffic operation of the Meishin Expressway in 1963 as detailed in the Reference III-1 attached.

##### (2) Fire Brigade

(a) It is advised that the ETA conclude assistance agreements with the police department for such cases as fires, bus accidents accompanied with large casualties.

##### (3) First aid

(a) It is advised that the ETA conclude agreements with specific ambulance hospitals for medical service at any time.

#### 2. Manual for site works of traffic Control (the Japan Highway Public Corporation)

This manual covers on-site works for traffic patrolling, treatment of accidents, removal of disabled vehicles and removal of obstacles from the road, etc.

The manual are attached as Reference III-2.

#### 3. Arrangement of vehicles and equipment for traffic operation

##### (1) Vehicles

It is recommended to provide the following vehicles:

- |                          |   |
|--------------------------|---|
| (a) Patrol vehicles      | 2 |
| (b) Crash rescue vehicle | 3 |

|     |                         |   |
|-----|-------------------------|---|
| (c) | Hydraulic truck crane   | 2 |
| (d) | Ambulance               | 1 |
| (e) | Long wheel base pick up | 2 |
| (f) | Tow truck               | 1 |

(2) Equipment

Equipment refers to Reference III-2.

4. Restrictions on the use of expressway

It is advised to regulate following items.

1. To make clear restrictions on compensation for damages of expressway facilities
2. To use a shoulder when a car is in trouble

5. Traffic operations in the Japan Highway Corporation

Traffic must always be kept moving safely and smoothly in order to keep the expressway functioning. But traffic congestion or some extraordinary situations often occur caused by traffic accidents or sudden and rapid increases in traffic volume. The work of traffic operations is to prevent such situations as much as possible, and, to deal with them once they have occurred in order to prevent the situation from further deterioration and to restore the expressway to its original state as soon as possible. Providing information to drivers, directing the traffic flow, enforcing temporary lane regulations or main expressway closures and such are the work of traffic operations. Therefore, traffic operations cover a wide range of specific activities and performed jointly by expressway administrative agencies in cooperation with the police force and fire stations.

(1) Patrols

Regular patrols are conducted by patrol cars of the police force, the traffic operations office of Nihon Doro Kodan and JAF.

(2) Traffic accident control

When a traffic accident occurs, the first notice is sent to the control center of the traffic operations office placed in the Administration Bureau through any of the emergency telephones, the mobile radio units installed in patrol cars, the business telephone system or by other means. The operator in the control center gives appropriate instructions to all concerned agencies, after confirming the location of the traffic accident, whether or not medical aid is required, and whether there is any obstruction for other vehicles.

Fig. 1 shows chart of accident control.



### (3) Treatment of Disabled Vehicles

Repair of disabled cars is entrusted to repairmen of the JAF by the JHPC and the JAF has stations at every service area. The operator of the control center connects the emergency telephone line from the car trouble site to the nearest JAF station and JAF repair cars go to the site if necessary with repair men to deal with the trouble. In addition, JAF patrol cars conduct regular patrols and often come upon disabled cars on the main expressway. If the driver requires aid in this case, the JAF men repair the disabled car.

### (4) Communication Systems and Their Operations

The main communication systems on the expressway are as follows:

#### 1) Emergency Telephones

Emergency telephone boxes are installed every kilometer on both sides of the expressway for drivers inform the control center of traffic accidents, car trouble or other emergencies.

#### 2) Radio Telephones

The control center is informed of traffic conditions, road conditions, and any other exceptional conditions on the expressway by moving police patrol cars, traffic operation forces, maintenance offices and the JAF (Japan Automobile Federation) through a radio communication system. Emergency instructions are also sent to patrol cars through this system.

#### 3) Business Telephone System

Every administrative section and related agency on the expressway are connected by a business telephone system which makes it possible.

#### 4) Emergency Instruction System

Information or instructions concerning emergency situations such as temporary road closures are sent simultaneously to all or concerned sections from the control center through an emergency instruction telephone system which has loudspeakers attached.

Most of those systems were installed and are maintained by JTTC (The Japan Telegram and Telephone Corporation) under contract with Nihon Doro Kodan.

The control center which operates and controls the 1), 2) and 4) systems above is located in the Administration Bureau building. This center is staffed by members of Nihon Doro Kodan and the Expressway Police Force 24 hours a day. Information on traffic conditions, road conditions, traffic accidents, car trouble and so on is all processed by the control center

which issues all instructions to the proper sections or exterior agencies through any of the above communication system.

**Expressway**

(Examples) Occurrence of an accident

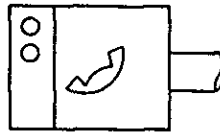
**The First notice or report**

- North bound ○○ KP, collision between a large sized truck and a microbus
- Microbus overturned, large truck overturned, concrete piles scattered over full lanes
- Casualties: several, road damaged cars damaged
- mark means matters carried out with the first notice or report.

**The second report**

- The death: 2, the seriously injured: 3, the slightly injured: 5
- Guard rail: 16m, 3 guard post broken
- Rail lanes: impossible road closure necessary
- △ mark means matter, carried out with the second report

○ emergency telephone



drivers concerned  
or another driver

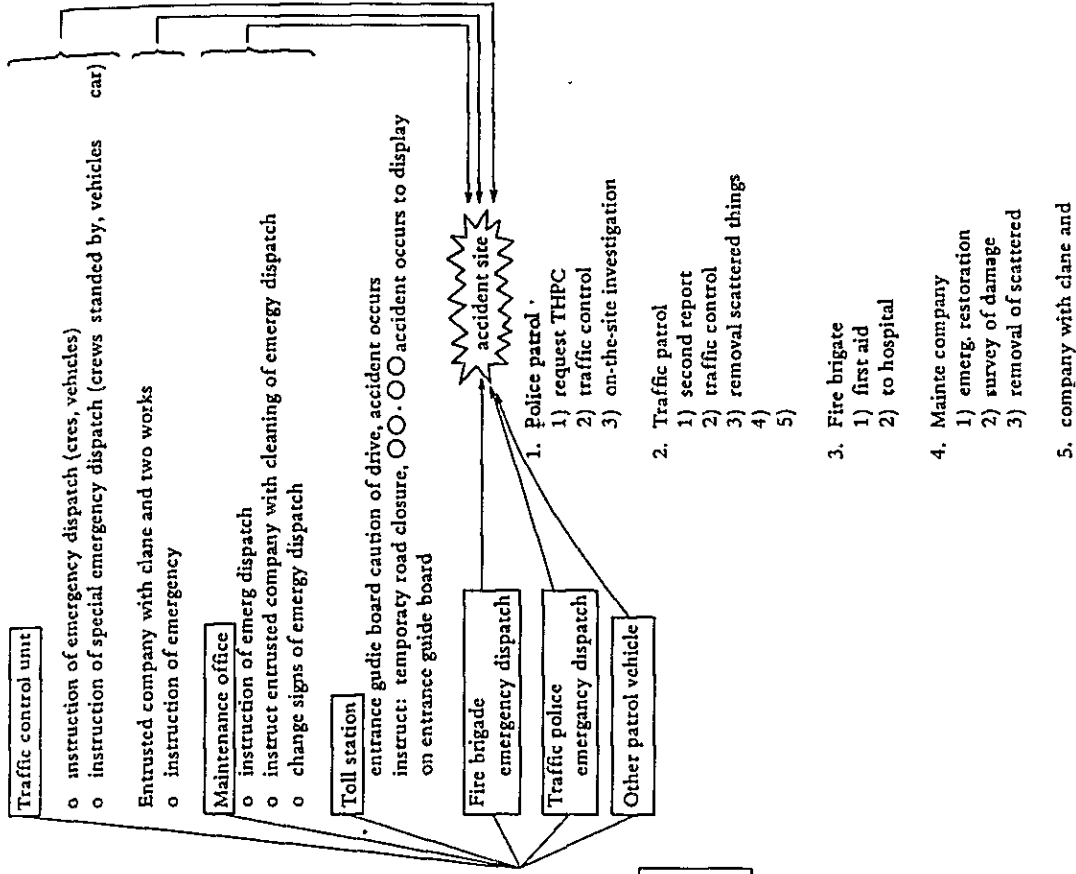


○ patrol discover while patrolling  
400MC

- traffic patrol
- police patrol
- patr
- 
- 



○ others: roadside resident, drivers at toll gate



## Reference II-1

Agreements on the traffic operation of the Meishin Expressway between prefectural polices concerned and the Japan Highway Public Corporation.

Prefectural polices (following refers to "the Police") and the Japan Highway Public Corporation (following refers to "the J.H.P.C.") conclude Agreements on the traffic operations of the Meishin Expressway (following refers to "the Expressway").

15th, July, 1963

- Article 1. Objectives  
Objectives of this agreement is to establish principles necessary in performing appropriate and efficient traffic operations on the Expressway, fixing up work responsibilities respectively and cooperating each other.
- Article 2. Mutual co-operation  
The Police and the J.H.P.C. have to keep close and usual contact, and mutual co-operation.
- Article 3. Operation of radio telephones  
The police and the J.H.P.C. have to keep mutual co-operation in regulating over radio telephone usage, etc. so as to operate such telephone effectively.
- Article 4. Traffic regulations and others
- (1) In case vehicles on the Expressway are endangered by destruction of road, traffic accident, or confusion of traffic which may probably occur etc, the police and the J.H.P.C. shall control the traffic and execute their duties to release the danger.
  - (2) According to the above mentioned, when such operations as closure of entrance booths at any interchanges 1 and etc. are needed, the J.H.P.C. shall take charge of the operations.
- Article 5. Removal of disabled vehicles  
Operations in case of accidents, vehicles in trouble and others are as follows:
- (1) Removal of disabled vehicles on carriageway shall be taken in charge by the police and the J.H.P.C. and when two trucks or crane trucks are needed, the J.H.P.C. shall be in charge.
  - (2) Roadside assistance for vehicles parking on shoulder, due to troubles such as overheat, running out of fuel, etc. shall be undertaken by the J.H.P.C.

(3) Operations at other area except on carriageway and shoulder shall be applied to the above mentioned mutatis mutandis.

Article 6. When the Police prosecutes offenders for exceeding the load limit or insufficient equipment, etc. the J.H.P.C. shall offer convenience to the Police.

Article 7. Inspection of vehicles parking on shoulder  
Inspection of vehicles parking on shoulder shall be carried out by the Police and the J.H.P.C.

Article 8. First Aid  
In case when the Police performs first aid, the J.H.P.C. shall co-operate with the Police.

Article 9. Usage of median openings  
The Police can use median openings in emergent cases such as treatment of accidents, first aid for the injured, pursuing criminals, or supervision of traffic violation, etc.

Article 10. Details for implementing the agreements  
Details necessary for implementation of the agreement shall be set up by chief of the Expressway Patrol Police and general manager of the Expressway Administration Bureau.

Manual for site work of traffic control

Table of Contents

|   |   |     |
|---|---|-----|
| ① | General Concerns .....                                | 143 |
|   | A. Health management, etc. ....                       | 143 |
|   | B. Clothes, etc. ....                                 | 143 |
|   | C. Reports, etc. ....                                 | 143 |
| ② | Inspection and Equipment for Vehicles and .....       | 144 |
|   | Itemization of Necessary Equipment .....              | 144 |
|   | A. Inspection and equipping of vehicles .....         | 144 |
|   | B. Vehicle equipment and its inspection .....         | 145 |
| ③ | Safety Concerns in Traffic Control.....               | 145 |
|   | A. Concerning driving .....                           | 145 |
|   | B. Concerning parking and stopping .....              | 146 |
|   | C. Concerning use of the openings in the median ..... | 147 |
|   | D. Concerning traffic control on the highway .....    | 148 |
| ④ | Road patrol .....                                     | 148 |
|   | A. Crew .....   | 148 |
|   | B. Measures for a disabled car .....                  | 149 |
|   | C. Removal of obstacles from the road .....           | 149 |
| ⑤ | Traffic accidents .....                               | 150 |
|   | A. Basic concerns .....                               | 150 |
|   | B. Traffic Control in 4- and 6-lane roads .....       | 151 |
|   | C. Closing of the road between interchanges .....     | 155 |
|   | D. Traffic control on a ramp .....                    | 150 |
|   | E. Removal of a car involved in an accident .....     | 156 |
|   | F. Completion of traffic control .....                | 150 |

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 disabled car 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. Traffic 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 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 shoulder 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 persons in 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 regarding 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 terms of paragraph ⑤ 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 be 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 immediately.

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 to 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      | For a 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

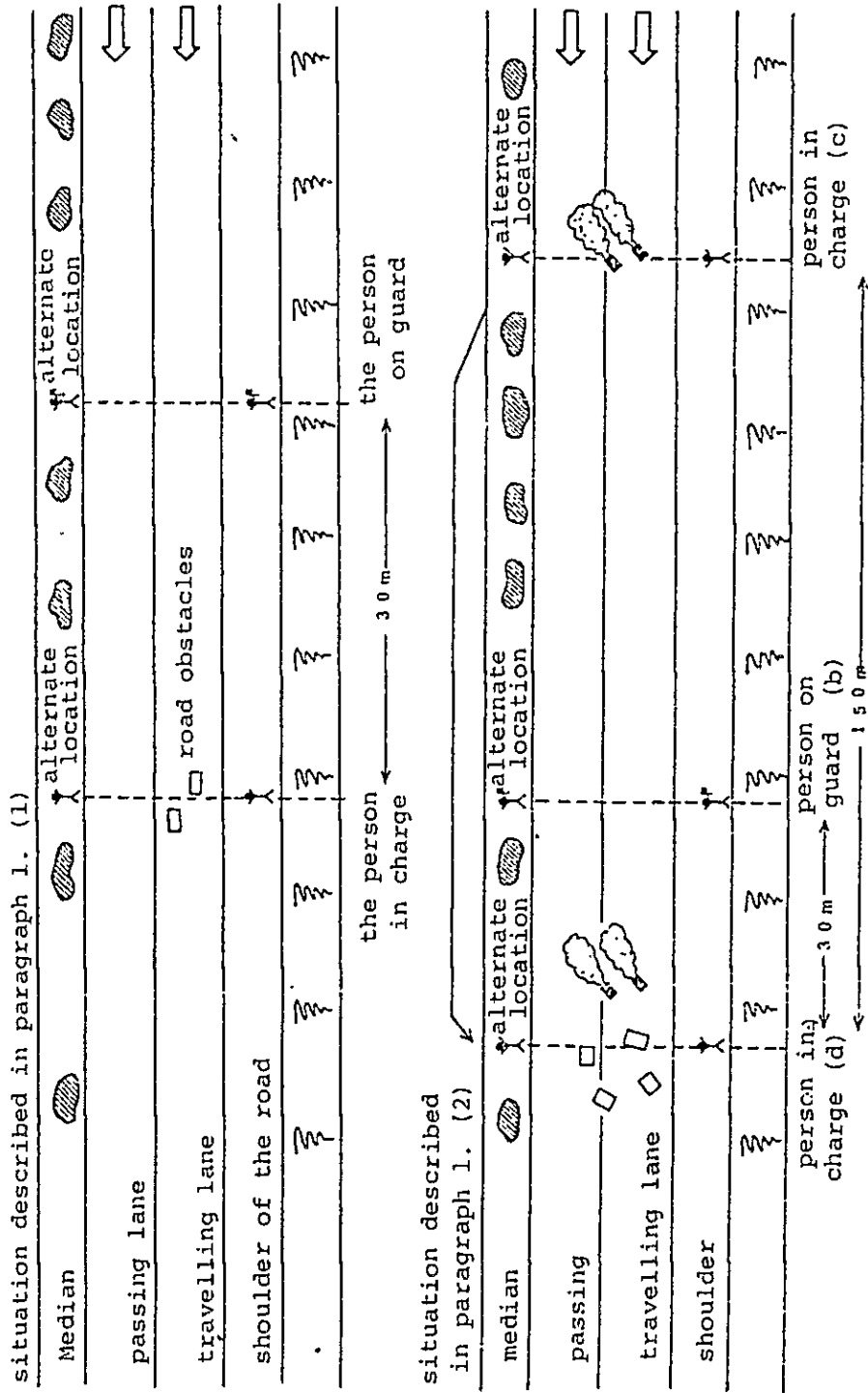
3. Traffic Directing Vehicles

| 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        |                              |
| Accident warning sign |               | 5        | Arrow, scotch light attached |



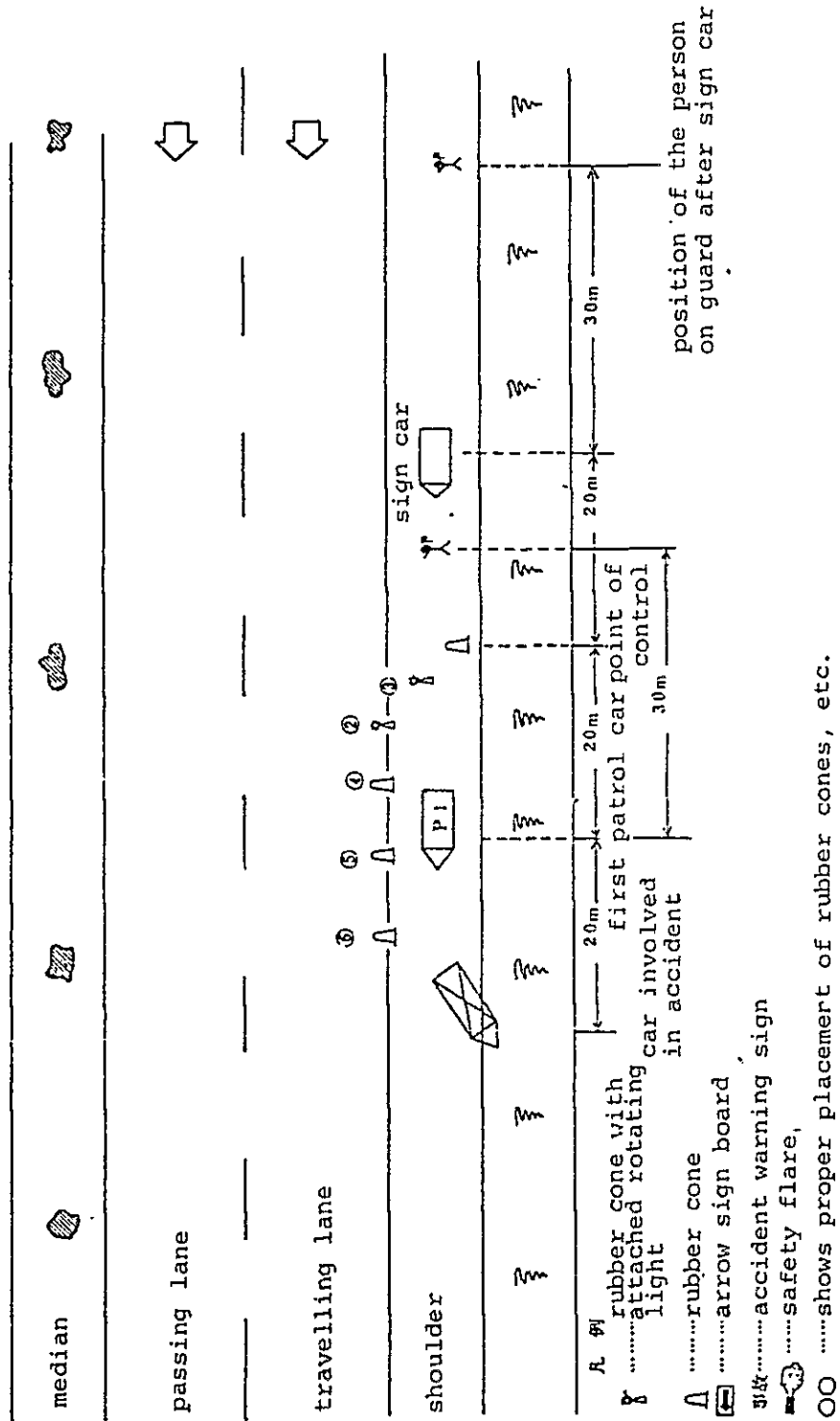
Attached Diagram 1

④ c. The removal of obstacles from the road



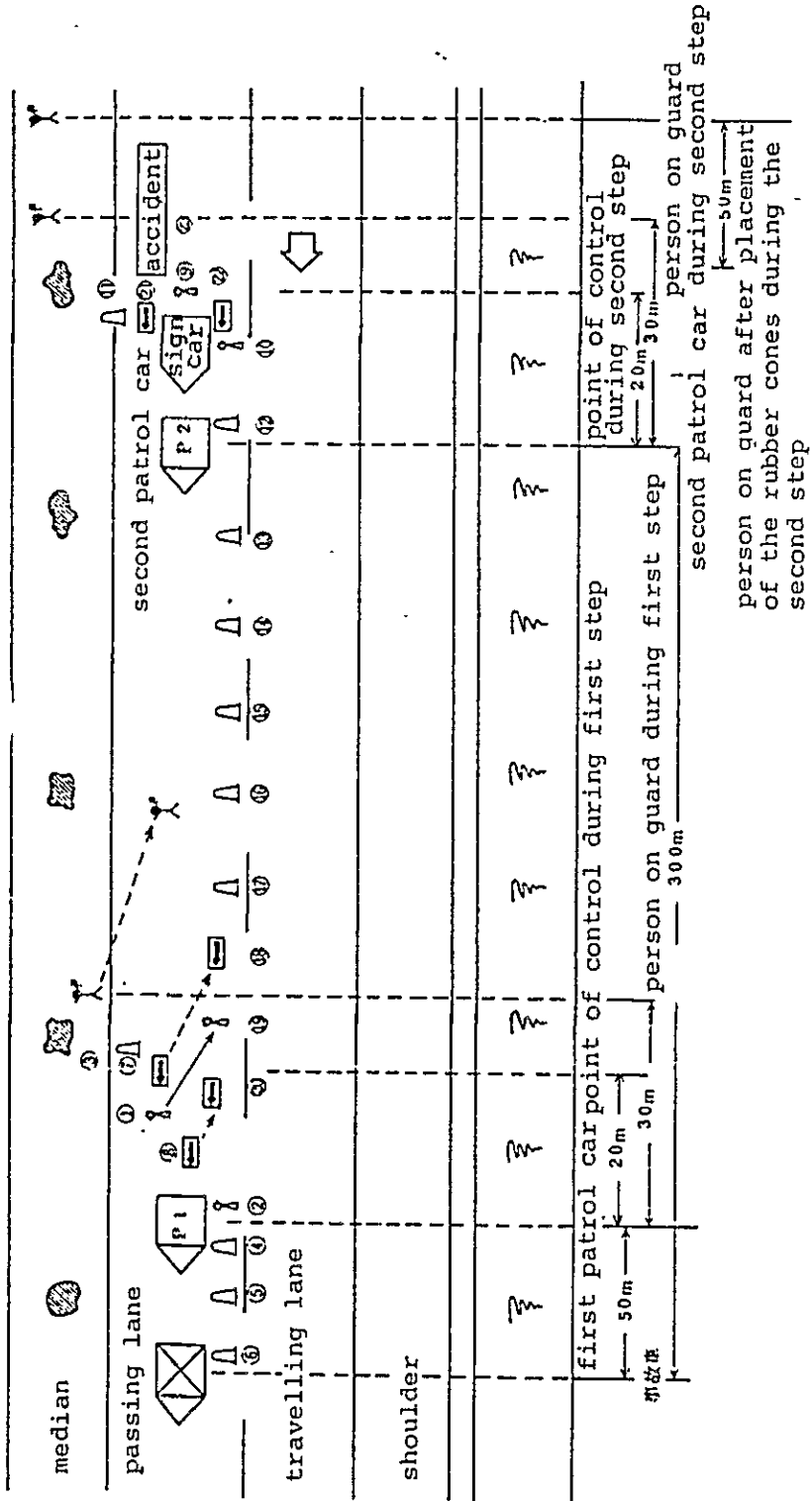
Attached Diagram 2

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



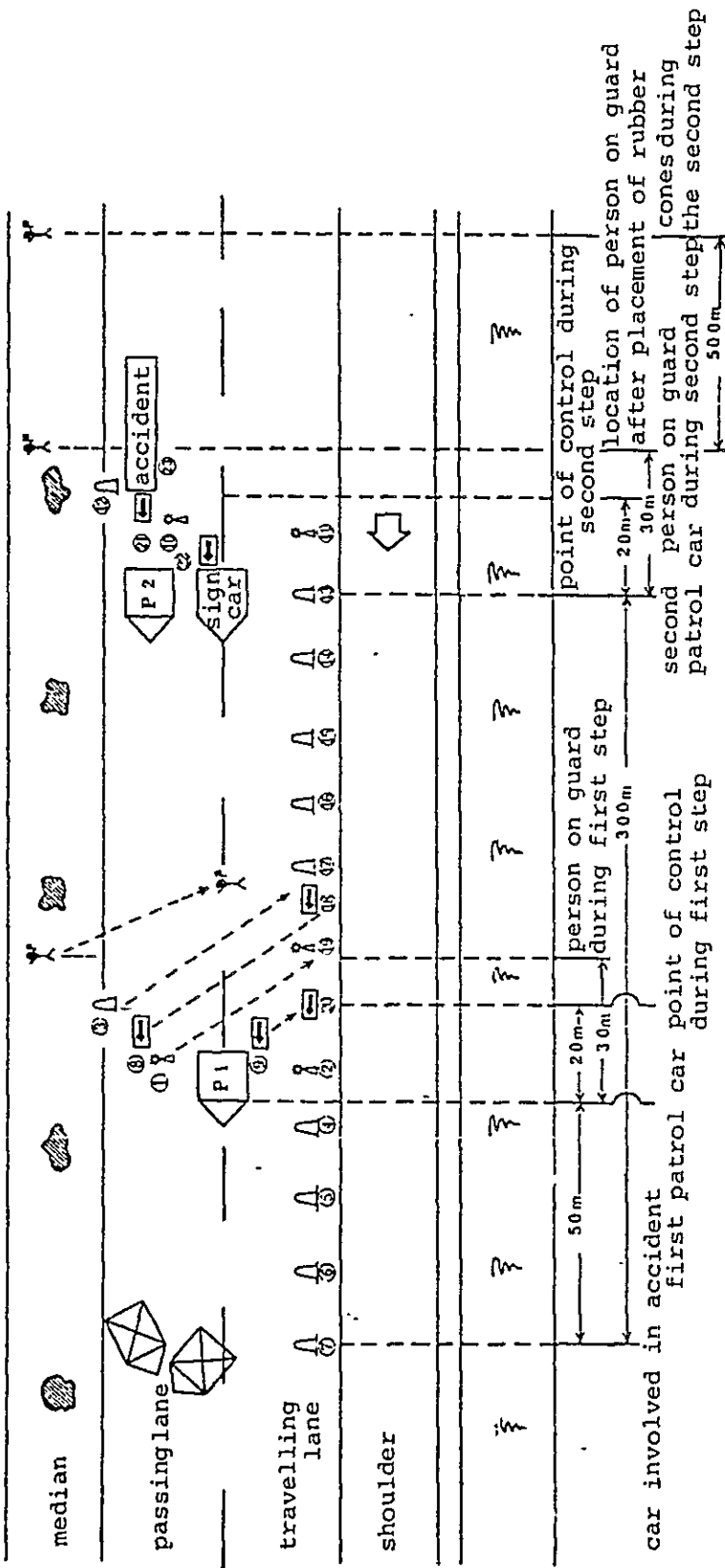
Attached Diagram 3

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



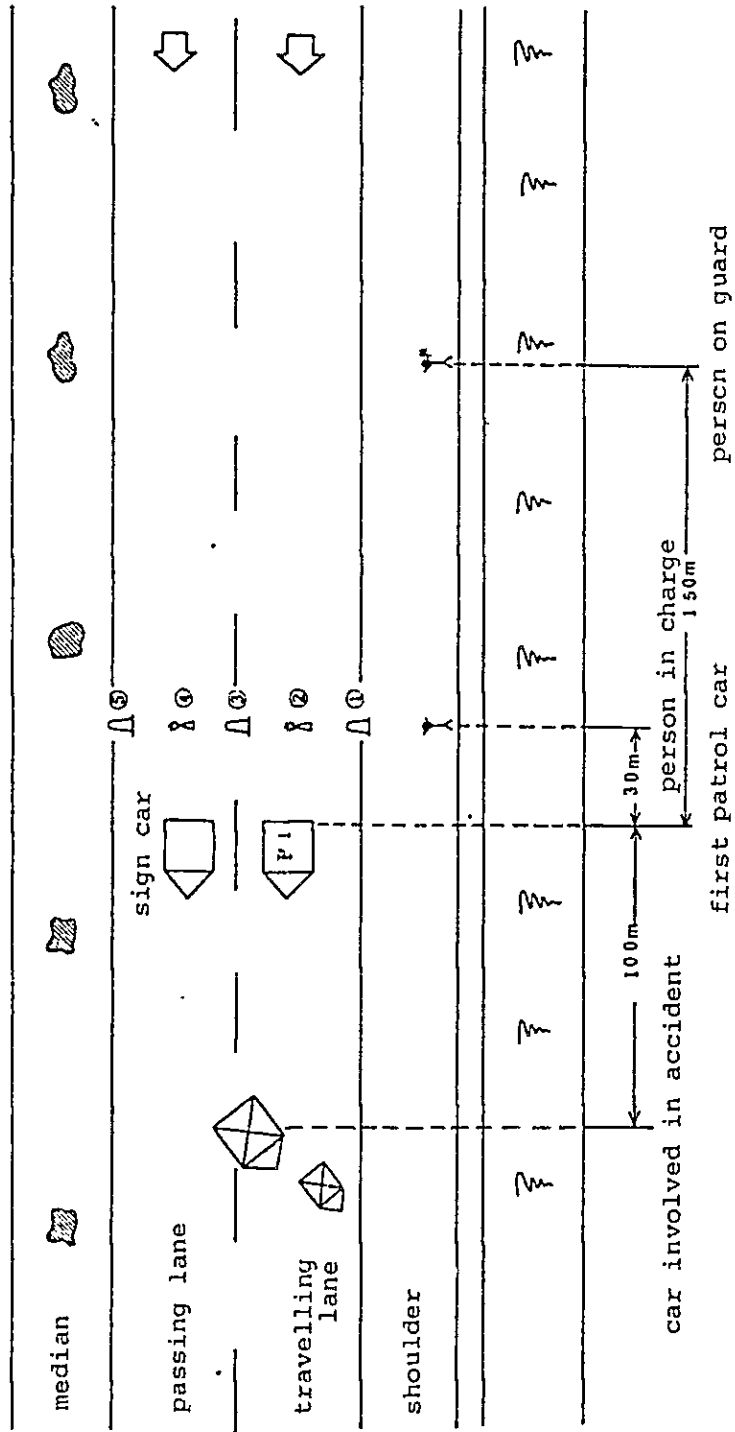
Attached Diagram 4

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



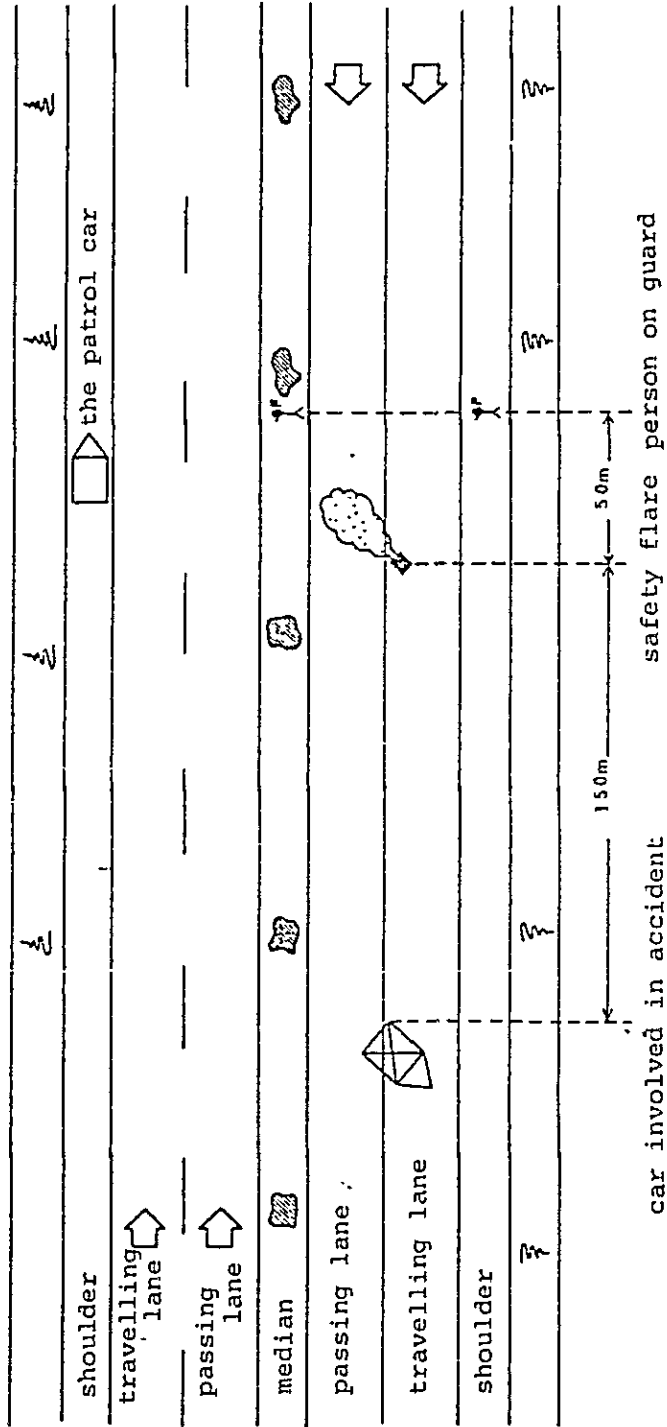
Attached Diagram 5

⑤ B. 6. Stopping the flow of traffic



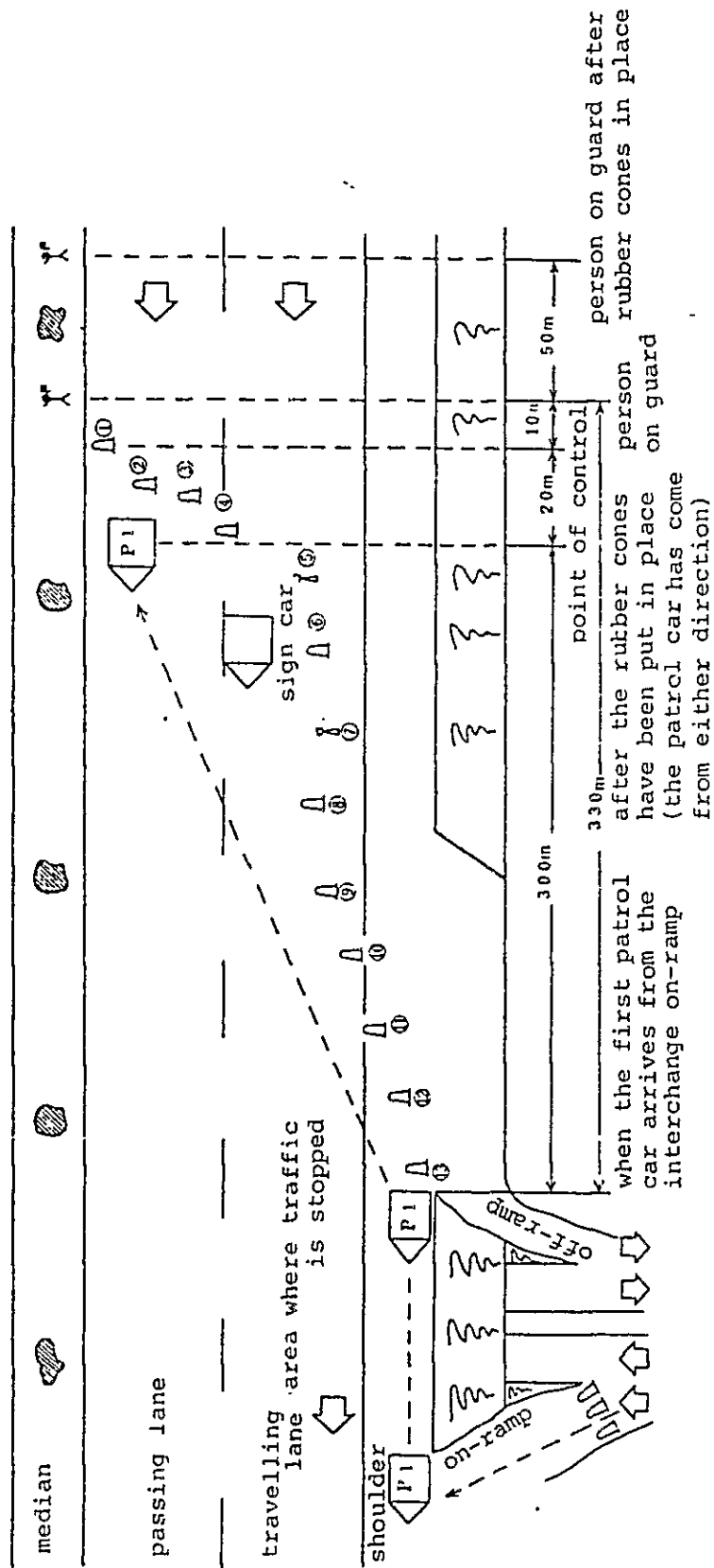
Attached Diagram 6

⑤ B. 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.



#### IV. Suggestion on Maintenance and repair works

##### 1. Patrols

It is desirable to execute routine maintenance patrolling

###### (1) Purpose

Patrolling to inspect and expressway and its structure provides an essential framework for maintenance operations. Apart from traffic patrolling, this patrolling should be conducted so as to discover defects on the expressway and its structures in early stages and conduct immediate repair work if needed.

Besides the regular patrols, special patrols should be carried out in case of heavy rainfall or high wind.

As most part of the EAT's expressway is consisted with viaducts, it can be said that the expressway is stronger against rainfall than any other roads composed of earthwork.

However, earth, sand and trash carried by traffic may often cause drainage to get blocked and create puddles when raining. In addition expansion joints should be inspected of much care because they may be damaged so often.

###### (2) Classification of patrols

According to the manual for maintenance patrolling and inspection issued by the Japan Highway Public Corporation, the patrolling is classified into three types: first class, second class and special patrols.

First class patrols is the most common way. It is conducted once a day, by two engineers in a special designed patrol vehicle equipped with some tools to inspect pavements, structures, shoulders, signs, facilities and traffic protection devices from the patrol vehicle. If an unsatisfactory situation is found, a report is submitted to the supervisor. If necessary, temporary will be made on the spot.

Second class patrol is conducted once a month to inspect slopes, piers, fences, and culverts which cannot be inspected from patrol vehicles driving on the expressway.

Special patrol is carried out at times of extra-ordinary weather conditions such as typhon, storm or others.

Fig-1 Shows items of inspection for patrols.

Fig. 1 Items of inspection or patrols

| Patrols<br>Items of inspection           | First Class   | Second Class   | Special'                     |
|--|---|--|------------------------------|
| 1. Inspection on pavement, etc.          | dirt, flush, pot holes, corrugation, softened by leaking oil, etc. exfoliation. | corks, pot holes ununiform sinking lost filler of expansion joints   | same as second class patrols |
| 2. Inspection on structures              | corrugation of railing unusual noise by an expansion joint                      | destruction of drainage, deformation of culverts and corrugated pipes, defects of bearings cracks of slab concrete | Same as second class patrols |
| 3. Inspection on shoulder and median     | destruction of anti-glare screens, openings                                     |  | same as first class patrol   |
| 4. Inspection on drainage                |   | destruction of inlet, manholes, side ditches, waterways  | same as second class patrols |
| 5. Inspection on traffic control devices | damage of traffic signs, guard rails or guard cables                            | destruction of delineation reflected, condition of markings vanished markings                                      | same as second class patrols |

2. Road cleaning

- i. Manpower cleaning should be examined whether to add machinery cleaning together or not.
- ii. Method for treatment of trash and its space should be provided.

The ETA is to conduct machinery cleaning with a sweeper and tow water tank trucks. However, trash in large size may not be collected by machinery cleaning. In this case, manpower cleaning as an auxiliary cleaning will be needed.

Table-1 Shows (standard) Frequency of Roadway Cleaning introduced by the Japan Highway Public Corporation.

(Standard) Frequency of Roadway Cleaning

| ADT             | Type of Roadway Cleaning |                   |                 |                 |
|-----------------|--------------------------|-------------------|-----------------|-----------------|
|                 | A                        | B                 | C               | D               |
| Less than 5000  | ½ weeks                  | ½ weeks           | 1/week          | 3/month         |
| 5,000 – 10,000  | 2/3 weeks                | 2/3 weeks         | 3 week          | 4/mong          |
| 10,000 – 25,000 | 1/week                   | 1/week            | 3/week          | 5/month         |
| 25,000 – 50,000 | 3/2 weeks                | 1/week            | 6/week          | 6/month         |
| 50,000 or more  | 2 or more/week           | 3 or more/2 weeks | 12 or more/week | 8 or more/month |

Note: Type A: Cleaning with a sweeper  
 B: Cleaning with a water truck  
 C: Cleaning with manpower (Supplementary work of type A and B)  
 D: Cleaning with manpower (applied for roadways other than type A and B)

Trash collected with cleaning will amount to considerable volume in a short period, method for the treatment and space for stocking should be provided.

In Japan, Industrial Waste Treatment Law has been enacted so that we have found difficulties in wasting trash. Methods taken by the Japan Highway Public Corporation are that the trash is classified into two types: inflammables and noninflammables, at stock yards. Then in a stage reaching some amount, inflammables are destroyed with small trash burners or undertaken by public services with toll. While noninflammables have to convey to reclamation spots so as to be buried or to trash burning centers for pay.

3. Pavement Repairing

It is recommended to stock pre-mixed asphalt, propane gas burners and tampers for simple pavement repairs.

#### 4. Manual for maintenance and repair works

Maintenance division's staff should have to know about manual for maintenance and repair works in order to execute the on-site works.

Reference-IV-4 shows the manual introduced by the Japan Highway Public Corporation.

#### 5. Traffic regulations practiced by maintenance and repair works

- i. When controlling central lane out of three lanes, the median side lane should be controlled together. Controlling of central lane only may endanger the workmen because of vehicles passing by on both sides.
- ii. A sign car and safe guard should be distributed to keep workmen in safe.
- iii. Safety flares will be useful devices for traffic control because of highly visual identification from running vehicles.

#### 6. Arrangement of vehicles and equipment for maintenance and repair works

##### (1) Vehicles

- i. Maintenance vehicles for patrols and supervision of repair works will be needed.
- ii. Sign cars for maintenance and repair works may be necessary.
- iii. If manpower cleaning is adopted, a long wheel base pick up may be necessary.
- iv. A jet cleaner for cleaning drains, ditches will be needed in future.
- v. As above mentioned, vehicles needed in a short term will be as follows.

|                                    |    |
|------------------------------------|----|
| Maintenance vehicle (van type)     | -2 |
| Water truck                        | -1 |
| Hydraulic Aerial Basket Truck      | -1 |
| Long wheel base pick up (Sign car) | -1 |
| Road cleaner                       | -1 |

##### (2) Equipment

- i. Gernator -2
- ii. Equipments of maintenance vehicles, long wheel base pick ups refer to 'Reference-IV-4'.

#### 7. Subjects on facilities from the standpoint of maintenance

- a) Installation of on emergency opening at Din Daeng
- b) Providing trash treatment yard
- c) Providing yard for vehicles damaged by accidents
- d) Installation of distance marks
- e) Installation of fences for preventing loading, etc. from falling to main local roads.

Manuals for maintenance and repair work

Table of Contents

|      |   |     |
|------|---|-----|
| ①    | General Concerns .....  | 128 |
| I.   | Health management, etc. ....  | 128 |
| II.  | Clothes, etc. ....  | 128 |
| III. | Reports, etc. ....  | 128 |
| ②    | Inspection and Equipment for Vehicles<br>and Itemization of Necessary Equipment ..... | 129 |
| I.   | Inspection and equipping of vehicles .....  | 129 |
| II.  | Vehicle equipment and its inspection .....  | 130 |
| ③    | Safety Concerns in Traffic Control .....  | 130 |
| I.   | Concerning driving .....  | 130 |
| II.  | Concerning parking .....  | 130 |
| III. | Concerning traffic control<br>in the middle of a road .....                           | 131 |
| ④    | Road Patrol .....   | 131 |
| I.   | Crew .....  | 131 |
| II.  | Removal of obstacles from the road .....  | 131 |
| ⑤    | Concerning Inspection and Check-up .....  | 132 |
| ⑥    | Concerning Maintenance and Repair .....   | 132 |
| I.   | General items .....   | 132 |
| II.  | Working in a parking lot .....  | 133 |
| III. | Work at night .....   | 133 |
| ⑦    | Concerning Abnormal Weather<br>and the Occurrence of a Disaster .....                 | 133 |
| ⑧    | Concerning Vehicles for Specific Jobs .....   | 134 |
| I.   | Sweeper, water-sprinking vehicle,<br>guard rail washing vehicle, etc. ....            | 134 |
| II.  | Two truck, Beam lifter .....  | 134 |
| III. | Vehicle for inspection and measurement .....  | 135 |
| ⑨    | Concerning Working in High Places .....   | 135 |
| ⑩    | Traffic Control and Method of Operation .....   | 135 |

① General Concerns

I. 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 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) whistle
- (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 prescribed 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

1. 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 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.

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 Road 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 for 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 working in the parking lot in order to make a communication, 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-sprinkling 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 signs, 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 possible of the need for caution (For instance, there is the method of using a taperecorder through the megaphone 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.