

Road Condition Survey System
Basic Operation Manual

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Japan International Cooperation Agency
Pasco Corporation

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Forms

- Form_FR01 Work Material Check List
- Form_FR02 Vehicle Inspection
- Form_FR03 Safety Management Record
- Form_FR04 Field Note
- Form_FR05 Daily Activity Record

Appendices English - Vietnamese

- Appendix 1 Jurisdiction and Management Company

Appendix 2 Route Names

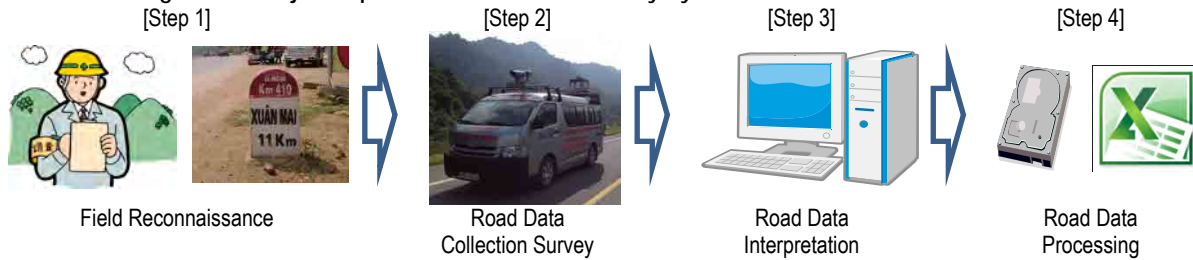
Appendix 3 Input Data

1. Introduction

1.1 Overview of Major Processes

There are four steps in the Road Condition Survey System: Field Reconnaissance; Road Data Collection Survey; Road Data Interpretation; and Road Data Processing.

Figure 1.1 Major Steps of Road Condition Survey System



(1) Field Reconnaissance

During field reconnaissance, a vehicle, other than the specialized survey vehicle, is used to record and confirm conditions such as segments of routes like locations of kilometer-posts for: 1) the road data collection survey; 2) road data interpretation; and 3) preparation of the data files. The major works are divided into: 1) Preparatory Work; 2) On-site Work; and 3) Office Work.

(2) Road Data Collection Survey

With the survey vehicle, the road conditions pavement surface images, rut depth and IRI are recorded with forward images.

(3) Pavement Damage Interpretation

The road data collection survey makes the pavement image data available. In this process, the pavement data are interpreted to assess damages to road surface. Setting and usage of the pavement damage interpretation application is explained with cases of damages.

(4) Preparation of Road Surface Condition Data Files

Data from field reconnaissance and the results of damage interpretation are combined to prepare road surface condition data. The results are available both in raw text files and formatted Excel files. Parameter settings and operation of an Excel macro application are explained.

1.2 Definition of Terms

The terms used in this manual are summarized in Table 1.1:

Table 1.1 Definition of Terms

Terminology	Definition
Data Code	The data code is a four digit code to identify data on road management, road structure and impassable road segment data.
Geographical Area	A geographic unit that is used to identify management unit.
Route Number	A number that identifies a route in a country. Generally, two to the digits are used.
Branch Number	A branch route number is used to differentiate a route number in detail.


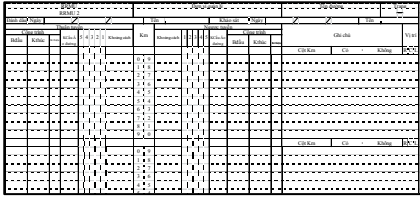

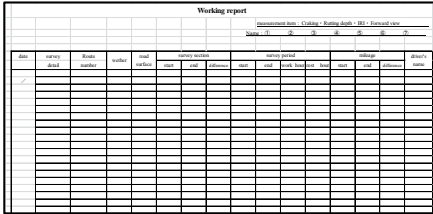

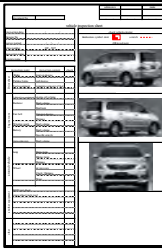








Inbound ¹	The direction that the number displayed on the kilometer post becomes smaller.
Outbound ¹	The direction that the number displayed on the kilometer post becomes larger.
Lane classification	Differentiation of lanes with marking on road surface to indicate where traffic flow follows.
Lane Number	The targeted lane number for the survey
Station Number	It shows the kilometer post number and distance from the kilometer post.
Kilometer Post	A road sign on the side of the road to indicate distances from major cities.
Kilometer-post number	The number indicated on the kilometer posts.
Management Area / Administrative Jurisdiction	Administrative division to manage roads or a section of a road.
Management Company	An entity that conduct road maintenance work including road facilities.
Overlapped Route	A route where two routes use the same section of a road, or a route where inbound and outbound traffic uses the same segment of road within a same route.
Carriageway marking	A lane marking on the road surface
Bridge	A fly-over structure to pass an obstacle or hazard.
Tunnel	Underground structure placed to a planned location with a minimum finished section area of 2 m ² .
Rock shed	A tunnel like structure to protect a road from avalanche, rock fall or mudslide.
Intersection	Different routes intersecting at grade
Round-about	A circular intersection where traffic flows in one direction around a central island.
Viaduct	Sections of a road where two route meet at different levels. It is a name of intersection structure that over passes the targeted survey route. When the targeted route crosses at grade or under the other route, the intersecting structure is not included to the viaduct structure.
Railroad Crossing	The section where railroad and road crosses at the same level.
Toll Gate	A facility that collects toll on the routes
Road Structure	Bridge, tunnel, rock shed
Pothole	A pothole is a type of disruption in the surface of a roadway where a portion of the road material has broken away, leaving a hole.
Crack	A break or fissure on a road.
Rut	A rut is a depression or groove worn into a road or path by the travel of wheels.
Profile	Displacement data of the vertical section or direction







1.3 Management of the Basic Operation Manual

This Basic Operation Manual shall be maintained and updated whenever changes are made in any of the operations. The changes shall be notified to all related workers and officials.

¹ Up-bound (Up) and down bound (down) is interchangeably used to express inbound and outbound.

Figure 2.2 Work Materials for Field Reconnaissance

Material	Image	Material	Image
Whiteboard	 <p>Used to include information in a site photograph</p>	Field Note	
Hard hat	 <p>Securing safety of workers</p>	Daily Activity Report	 <p>Daily work log</p>
Safety Vest	 <p>Securing workers</p>	Vehicle Inspection Form	 <p>Inspected before and after field reconnaissance</p>
Paint Brush	 <p>Used for Marking</p>	Laptop PC	 <p>Laptop PC (MS Excel 2003 required)</p>
Paint	 <p>For marking</p>	Route Map	 <p>General street map available</p>
Bucket	 <p>Transporting paint</p>	Pen(s)	 <p>for writing memos</p>
Retractable tap measure	 <p>Measuring scale</p>	Work Gloves	 <p>Used during marking</p>

Material	Image	Material	Image
Walking measure	 On site measurements	Digital camera	 for recording site conditions
Traffic guiding device (Flag or light guiding stick)	 for securing safety on site	Cellular Phone	 for telecommunication
Safety Cone	 for securing safety on site	Trip Meter	 To keep accurate distances



(2) Installation, Parameter Setting and Adjustment of Trip Meter and Auxiliary Device

Trip Meter and iPad are stored in an aluminum case. Trip Meter is a device to record distance using the pulse signal from a vehicle. iPad is a viewing and parameter encoding device used in association with Trip Meter.

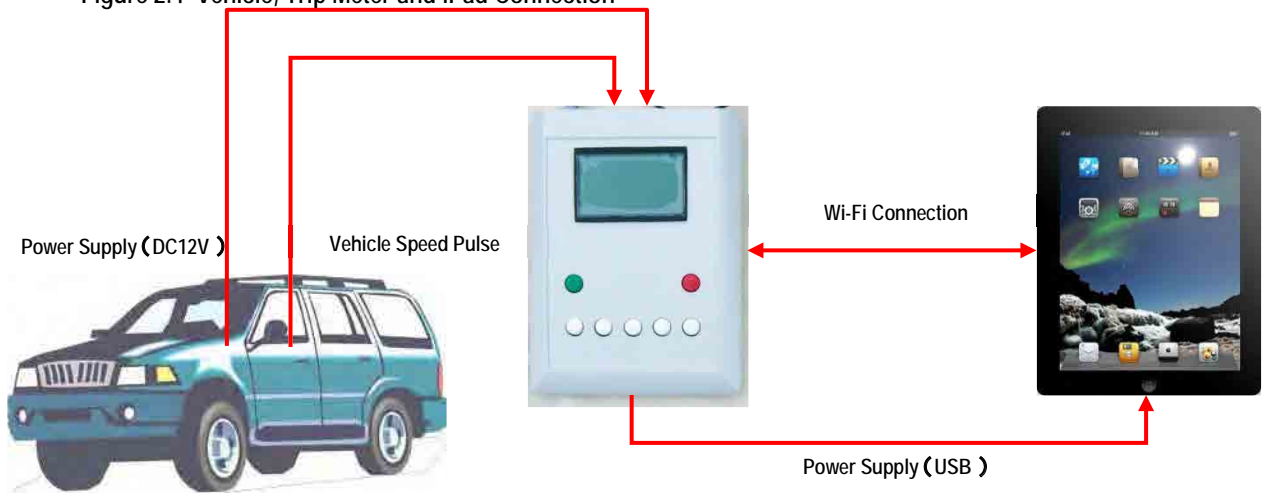
Figure 2.3 Trip Meter in an Aluminum Case



A. Installing Equipment

Installation of Trip Meter requires following connections: 1) Vehicle Speed Pulse Signal Input Cable; 2) Power cable connection; 3) USB cable connection; and 4) Wi-Fi connection.

Figure 2.4 Vehicle, Trip Meter and iPad Connection



1) Vehicle Speed Pulse Signal Cable Connection

The vehicle speed pulse input cable from Trip Meter shall be connected to the vehicle speed pulse output cable of the vehicle. The cable shall be securely connected so that it would not be disconnected due to vibration from the vehicle. It is to note that the location of the cable of pulse out may be different from vehicle to vehicle. It is advised to prepare a vehicle speed pulse cable beforehand. The photographs show the case of TOYOTA INNOVA. The light pink cable is the pulse cable.

Figure 2.5 Vehicle Speed Pulse Signal Cable (Toyota INNOVA)



2) Power Cable Connection

Trip Meter shall have 12 Volt power supply. The power cable from Trip Meter shall be connected to the cigar socket. When power is supplied, Trip Meter automatically starts.

Figure 2.6 Power Cable Connection



3) USB Cable Connection

Trip Meter and iPad need to be connected to supply power to iPad. It is to note that the USB cable is only to supply power; not data will be transferred.

Figure 2.7 USB Cable Connection



B. Data Connection Setting

Trip Meter and iPad need to be connected through Wi-Fi to transfer data.

1) Wi-Fi Setting

Wi-Fi connection of Trip Meter and iPad are to be established. Five seconds after Trip Meter is turned on, Trip Meter emits Wi-Fi signal. iPad shall be turned on after Trip Meter emits the Wi-Fi signal. Setting of iPad is as follows:

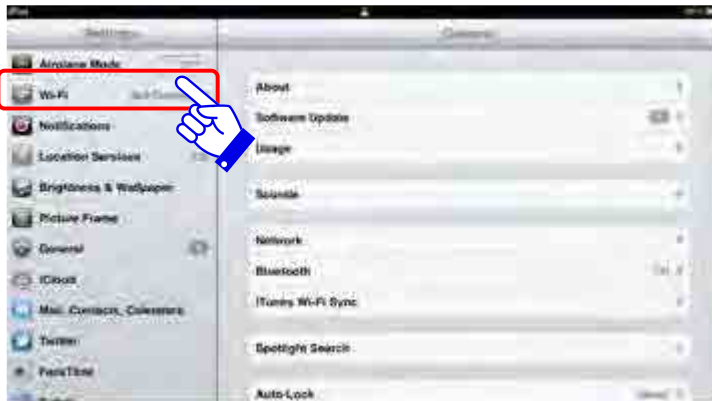
- (1) Tap "Setting" icon of iPad.

Figure 2.8 Setting Icon



(2) Tap Wi-Fi icon at the left side.

Figure 2.9 Selecting the Wi-Fi Icon



(3) Among the list of network connections, SSID with a colon will be shown: 70: d5: 7e: xx: xx: xx. Tap the connection to establish connection with Trip Meter.

Figure 2.10 The Network Name



2) [Initial Connection]

When Wi-Fi connection between Trip Meter and iPad is established for the first time, following setting shall be established.


- 1) Tap  and show details.
- 2) Tap the "Static" button.
- 3) Tap the IP address and input "192.168.100.2"
- 4) Tap subnet mask, and enter "255.255.255.0"
- 5) Tap the top-left corner button to go back to the previous page.
- 6) When the network name (SSID), which was initially set, is tapped, the system asks a password. Enter [pasco_9821431].

Figure 2.11 Initial Setting Procedure



3) Starting Application

Tap the Dtmeter on iPad to start the application.

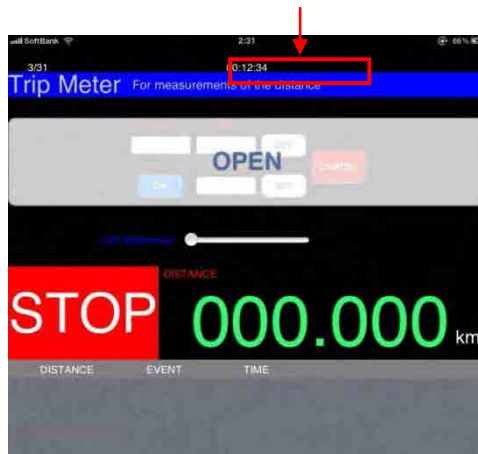
Figure 2.12 Dtmeter Icon



When the application is started, a connection between Trip Meter and iPad is established. After the connection establishment, "0" will be displayed when the vehicle is stopped. When the vehicle is moving, the display shows the distance. The time counter starts in seconds and displayed as indicated with the red arrow.

When the counter does not start, Trip Meter and iPad are not connected. Refer the trouble shooting section and try to establish the connection.

Figure 2.13 Application View



C. Initial Setting for Measurement

The initial setting for measurement shall be conducted when: Trip Meter is installed to a vehicle for the first time; Trip Meter is transferred to another vehicle; a tire is changed; Trip Meter has not been used for more than a month.

1) Time Setting

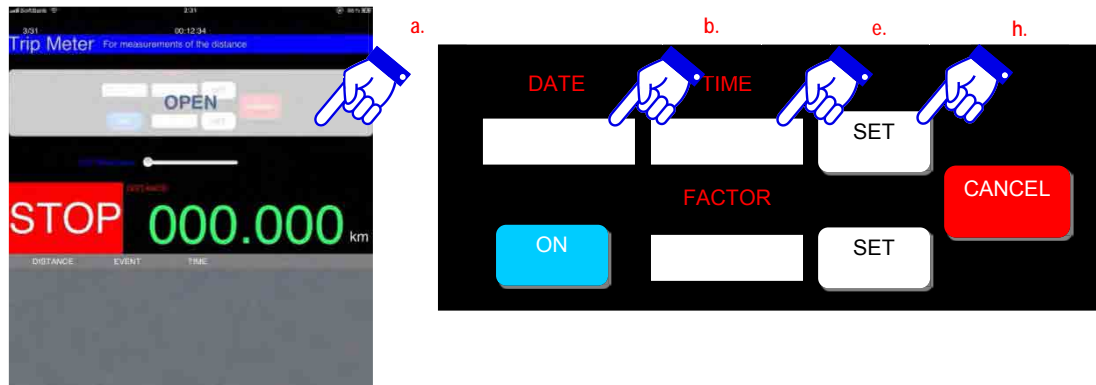
Time is set using the iPad application Dtmeter as in the following procedure:

- a. Tap the Open button.

When Trip Meter has been active and measuring distances, the display would not change to the Setting mode even when the Open button is tapped.

- b. Tap the Date text box.
- c. Enter the date in a date format: yy/mm/dd.
- d. Tap "Enter" to end.
- e. Tap the TIME text box.
- f. Enter the time in a time format: hh:mm:ss.
- g. After entering, Tap "Enter" to end the operation.
- h. The SET button is displayed; Tap the SET button.
- i. The setting button and other menu are hidden under the OPEN button and the time will be displayed.

Figure 2.14 Time Setting Procedure (iPad)



2) Distance Calibration

Trip Meter needs to be calibrated to determine the adjustment value. The calibration is conducted on a straight segment of road with one kilometer distance actually measured.

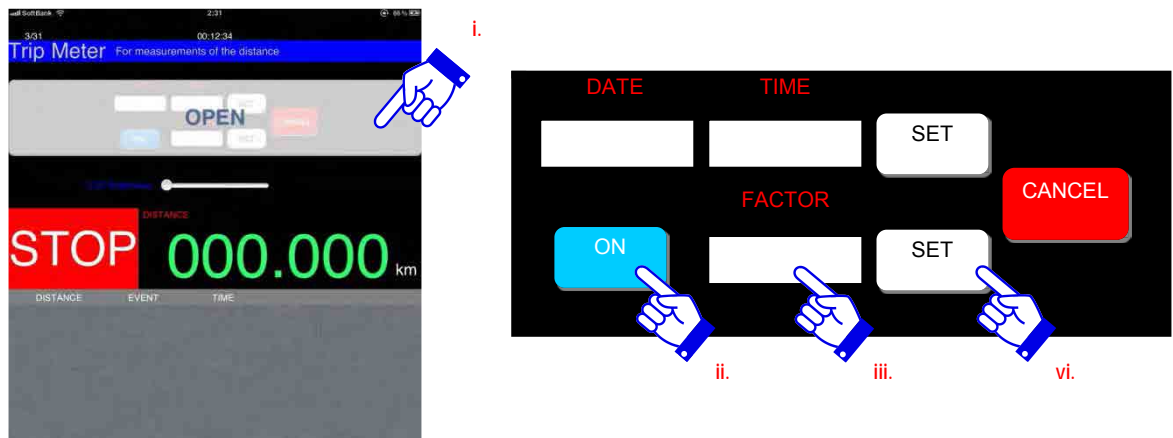
The starting point and end point need to be marked as in Figure 2.15.

Figure 2.15 Marking Example – 1 km Distance



- a. [Setting before the Calibration Run]
 - i. Tap the OPEN button. It is to note that while measuring the system cannot be changed to the Setting mode.
 - ii. If the FACTOR text box is not shown, tap the ON button.
 - iii. Tap the FACTOR text box.
 - iv. When the keyboard is shown, enter 10000 as a preparation value of adjustment. 10000 means an adjustment value of 1.0000.
 - v. After entering tap "Enter."
 - vi. When the SET button is displayed, tap the SET button.
 - vii. The SETTING button and others are hidden under the OPEN button, and the adjustment value 1.0000 is set. After the SETTING is completed, run the calibration distance.

Figure 2.16 Operation Procedure before the Calibration Run



- b. [During the Calibration Run]
 - i. Press the START button at the starting point.
 - ii. Confirm [0] m, [S] on the iPad screen.
 - iii. Drive one kilometer along the calibration segment set.
 - iv. At the end point of the segment, press the STOP button of Trip Meter.
 - v. On the iPad screen, [travelled distance] m, and [E] will be shown.

The calibration runs shall be conducted more than three times.

When three similar values are acquired from reading the [distance travelled] on the screen, calculate the average.

The average value times ten will become the adjustment value. For example, the average of the three values 1234, 1230, and 1232 is 1232; the adjustment value is 1232 time 10 which is 12320. It is to note that during calibration, the unit of [distance travelled] becomes the number of pulse; during actual measurement, the number of pulse is converted to meter automatically.

Figure 2.17 Operation Procedure during the Calibration Run

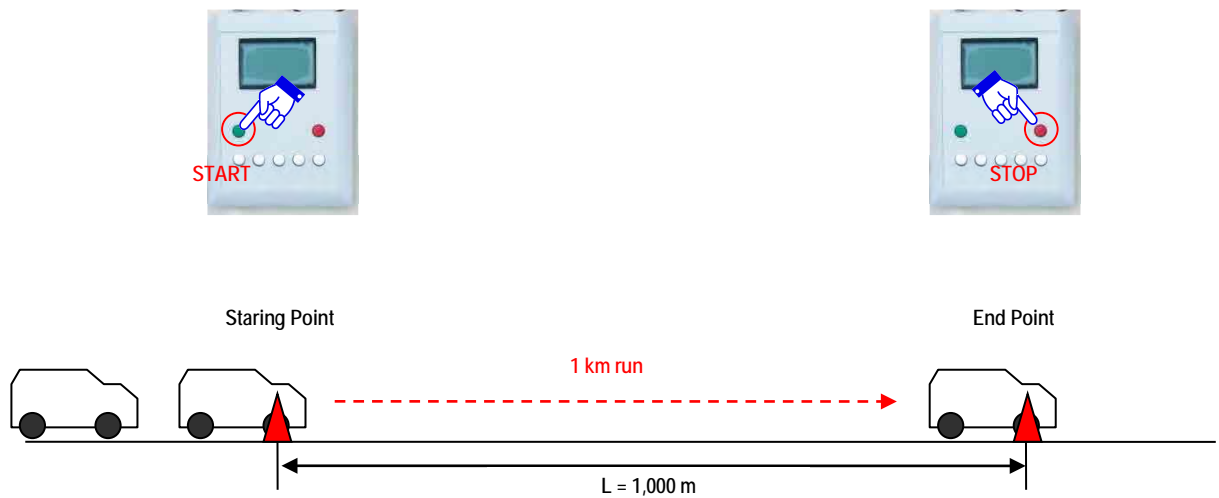
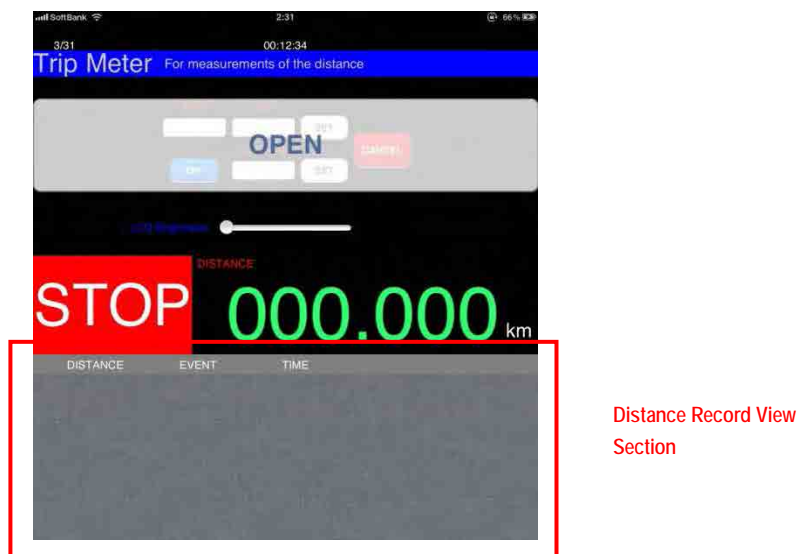


Figure 2.18 Distance Record View Section

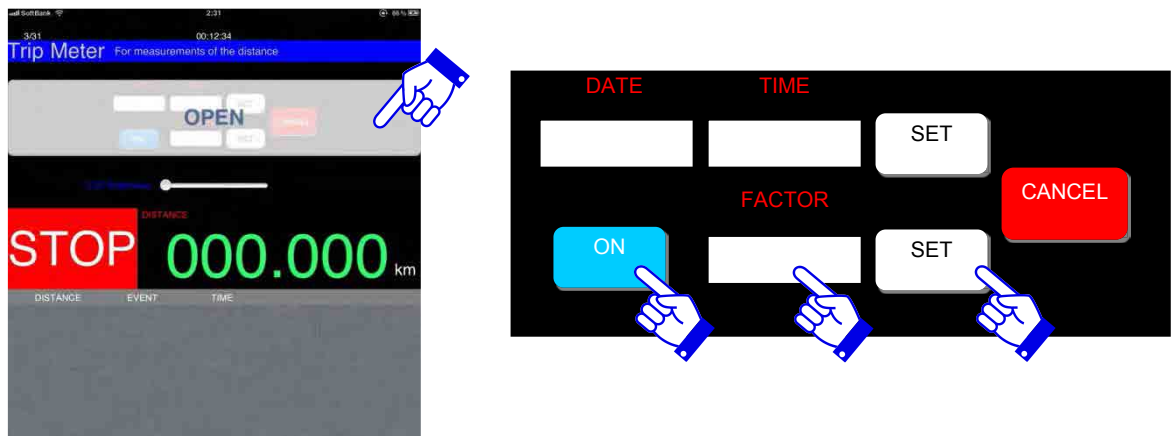


3) Distance Adjustment Parameter Setting

Distance adjustment parameter setting shall follow the following procedure.

- i. Tap the OPEN button.
- ii. Tap the ON button.
- iii. Tap the FACTOR text box when it is shown.
- iv. Enter the five digit parameter for the distance adjustment.
- v. Tap [SET].
- vi. Tap the SET button, when it appears.
- vii. The adjustment value appears under the OPEN button.

Figure 2.19 Procedure of Distance Calibration Parameters



After setting the trip meter, indicate starting points and ending points shall be marked and noted. The leader shall indicate the routes of the day onto the road map.

Figure 2.20 A Road Map



(3) Vehicle Inspection

The leader and the driver shall inspect the vehicle before the commencement of the work using the form indicated below.

Figure 2.21 FORM_FR02_Vehicle Inspection

	admission		make

document No	
-------------	--

vehicle inspection sheet

<table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td>inspection date</td><td style="text-align: center;">/ /</td></tr> <tr><td>Group No</td><td></td></tr> <tr><td>survey period</td><td style="text-align: center;">/ ~ /</td></tr> <tr><td>plate number</td><td style="text-align: center;">30T - 5327</td></tr> <tr><td>inspection name</td><td></td></tr> <tr><td>operate name</td><td></td></tr> </table>	inspection date	/ /	Group No		survey period	/ ~ /	plate number	30T - 5327	inspection name		operate name		<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td colspan="2" style="text-align: center;">check vehicle exterior</td> </tr> <tr> <td style="text-align: center;">kindication symbol dent</td> <td style="text-align: center;">scratch</td> </tr> <tr> <td style="text-align: center;"></td> <td style="text-align: center;">- - - - -</td> </tr> <tr> <td colspan="2" style="text-align: center;">(fill in red pen)</td> </tr> <tr> <td colspan="2" style="text-align: center;"></td> </tr> <tr> <td colspan="2" style="text-align: center;"></td> </tr> <tr> <td colspan="2" style="text-align: center;"></td> </tr> </table>	check vehicle exterior		kindication symbol dent	scratch		- - - - -	(fill in red pen)							
inspection date	/ /																										
Group No																											
survey period	/ ~ /																										
plate number	30T - 5327																										
inspection name																											
operate name																											
check vehicle exterior																											
kindication symbol dent	scratch																										
	- - - - -																										
(fill in red pen)																											

	inspection point	inspection content	check
Drive sheet	Brake	treat on degree	
	Parking brake	pull degree	
	Fuel equipment	remaining amount of fuel	
Engine room	Lubrication equipment	engine oil volume	
	Radiator	fluid volume	
		fluid leak	
	Fan belt	Tension degree	
		Damage	
	Window wash	fluid volume	
	Battery	fluid volume	
Specific gravity			
transmission	fluid volume		
around vehicle	lamp	Brake lamp	
		Blinker lamp	
		Damage	
	Wheel	air pressure	
		Crack / Damage	
Wear			
another equipment	MOT test sheet		
	spare wheel, jack, tool		
other			

(4) Safety Management

The leader shall call a meeting and all the member of field reconnaissance shall be confirm contents of the field reconnaissance of the day. The leader shall inform locations of sites to be

(1) On-site Check Points

The navigator and leader shall confirm the following locations on site.

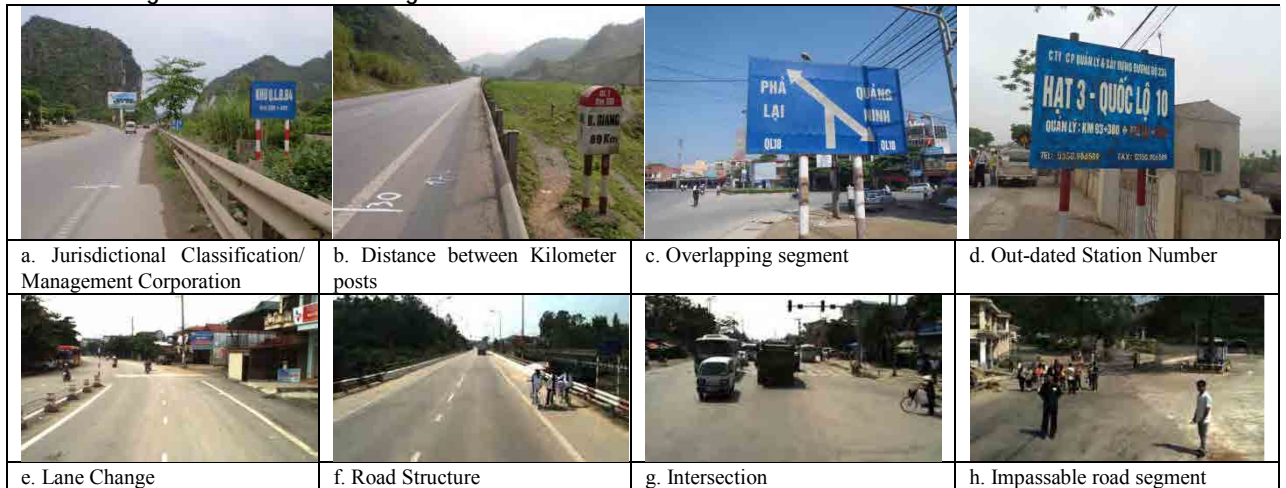
Table 2.1 On-site Check Points

	Data	Items for Confirmation	Operation					Note
			Trip Meter Operation	Marking	Field Note	Photograph		
a.	Names of Road Management Division and Management Corporation	Starting Point	Y	Y	Y	Y		
		Ending Point	Y	Y	Y	Y		
		Jurisdictional organization, Administrative Corporation	Y	Y	Y	Y	Check the road sign boards.	
b.	Distance between the kilo posts	Distance between the kilometre posts	Y	YN	Y	YN	At a location where the vehicle cannot park, such as curved area or bridge, marking and photographing are not conducted.	
c.	Overlapping Segments	Locations of overlapping route segments	Y	Y	Y	Y	Check locations of starting and ending points of overlapping management segments.	
d.	Station Number	Distances from the kilometre posts and station numbers.	Y	Y	Y	Y	Check discrepancies between actual and information on the station posts.	
e.	Lane structure	Locations where lane structures change	Y	N	Y	N	Only the main lane and locations of changes need to be confirmed.	
f.	Road Structure	Location and Name	Y	YN	Y	YN	Location: Distance from the closest kilometer post. When joints are visible, they do not have to be marked nor photographed.	
g.	Intersection	Locations and intersecting road names	Y	N	Y	N	Location: Distance from the closest kilometer post	
h.	Impassable Road Segment	Road segments that cannot be surveyed.	Y	Y	Y	Y	Conditions and reasons shall be noted. e.g. close to the national boundary.	

Note: YN--Yes or No--depending on the road condition.

When the navigator or leader recognizes the check points, the navigator shall notify the driver to stop the vehicle. At the location, operation of the trip meter; marking; taking photographs; and required data and information are recorded onto the field note are conducted. The leader confirms completion of: the trip-meter operation; marking; photographs; and field notes. After the leader's confirmation, the navigator tells the driver to move to the next check point.

Figure 2.23 Road Side Images of Check Points



a. Jurisdictional Classification/ Management Corporation	b. Distance between Kilometer posts	c. Overlapping segment	d. Out-dated Station Number
e. Lane Change	f. Road Structure	g. Intersection	h. Impassable road segment

(2) Operations at Check Points

A. Operation of Trip Meter

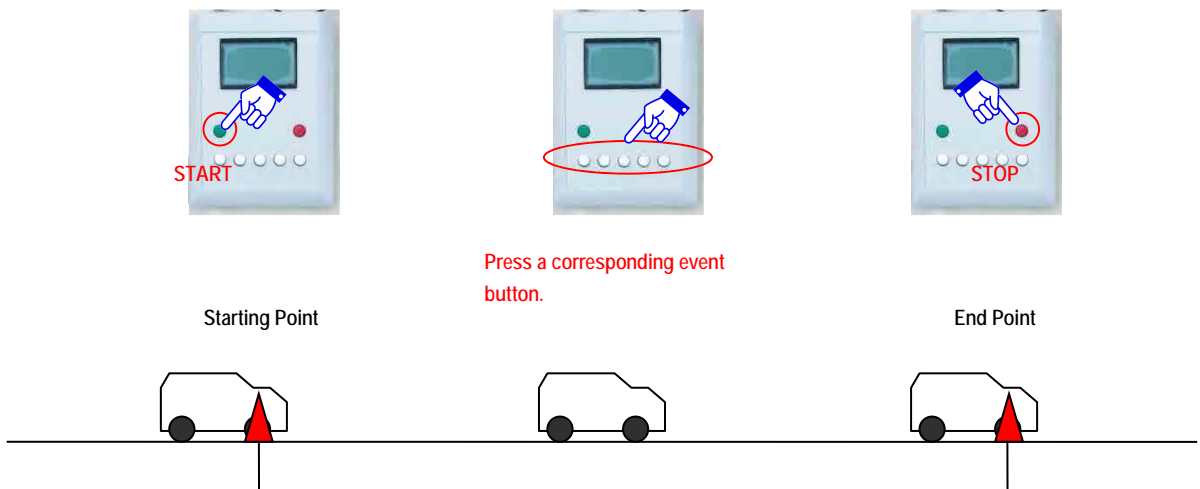
Operation of Trip Meter is simple. Just press the Start button to start. On the liquid crystal panel of Trip Meter and iPad [0] m, [S] will be shown, and the data will be recorded.

At the check point, the operator presses the Event button; the locations are recorded. There are five event buttons on Trip Meter. The operator needs to press corresponding event button depending to the type of check points.

Table 2.2 Event Operation at Corresponding Locations

Location	Trip Meter Button	Display	
		Event	Meter
Starting point	Start	S	0
End point	End	E	distance at the end
Jurisdiction, management company	1	1	corresponding distance
Kilometer post	2	2	corresponding distance
Road structure	3	3	corresponding distance
Intersection, railway crossing, toll gates	4	4	corresponding distance
Overlapping segments, station number discrepancies	5	5	corresponding distance
Lane Change	5	5	corresponding distance

Figure 2.24 Measurement Procedure (Starting Point and End Point)

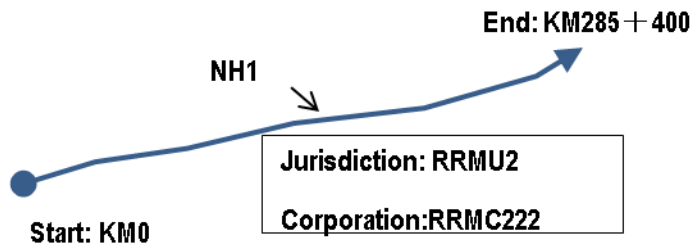


B. When to Press the Event Buttons

1) Jurisdictional Classification, Management Company (Trip Meter Button 1)

At the starting and ending point, the operator needs to press the button 1. Also, at the locations where jurisdiction or maintenance company change, the button 1 needs to be pressed.

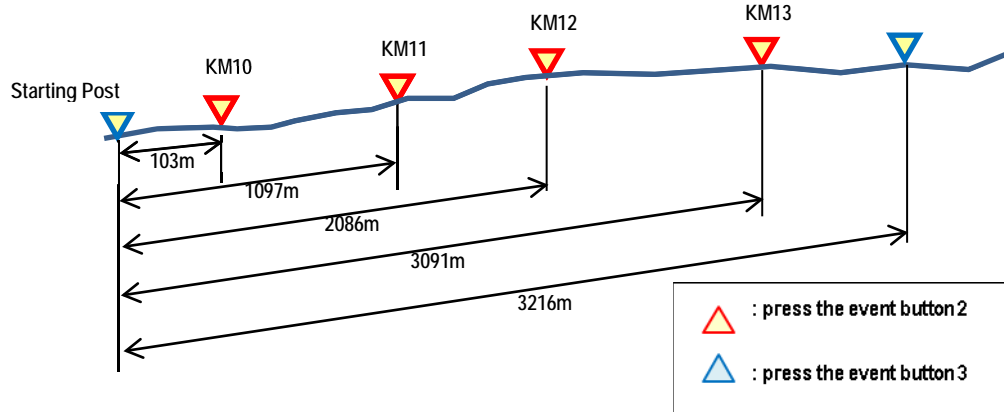
Figure 2.25 Points Where Trip Meter Button 1 Needs to be Pressed



2) Kilometer Posts (Trip Meter Button 2)

The operator needs to press the button 2 when there are kilometer posts.

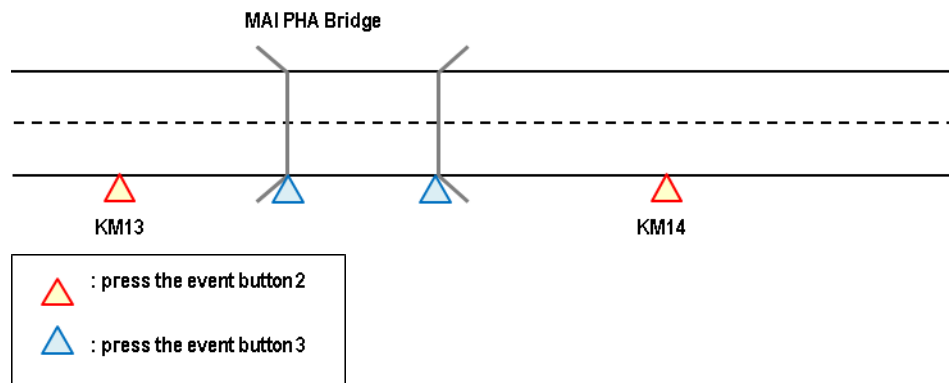
Figure 2.26 Kilometer Posts (Trip Meter Button 2)



3) Road Structure (Trip Meter Button 3)

A bridge exists on a targeted National Highway 1. Along the National Highway 1, there is bridge. If this is the case the operator needs to press the even buttons 2 and 3 at the following timing.

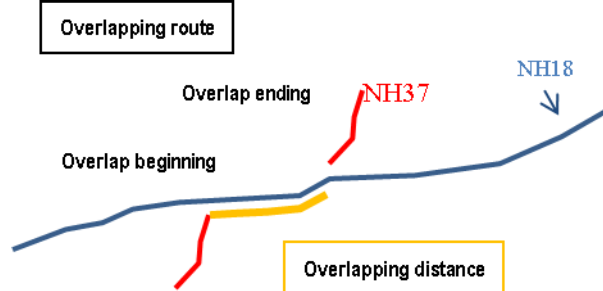
Figure 2.27 Timing of Pressing the Event Buttons 3 at Bridge



4) Overlapping (Trip Meter Button 5)

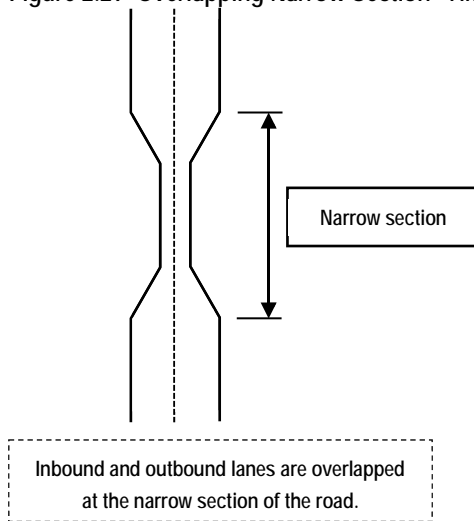
Overlapping segment of a road such as NATIONAL HIGHWAY37 and NATIONAL HIGHWAY18, Trip Meter Button 5 shall be pressed.

Figure 2.28 Overlapping Route --Timing of Pressing the Event Buttons 5



Another case is a narrow section of a road where inbound and outbound traffic share the same lane.

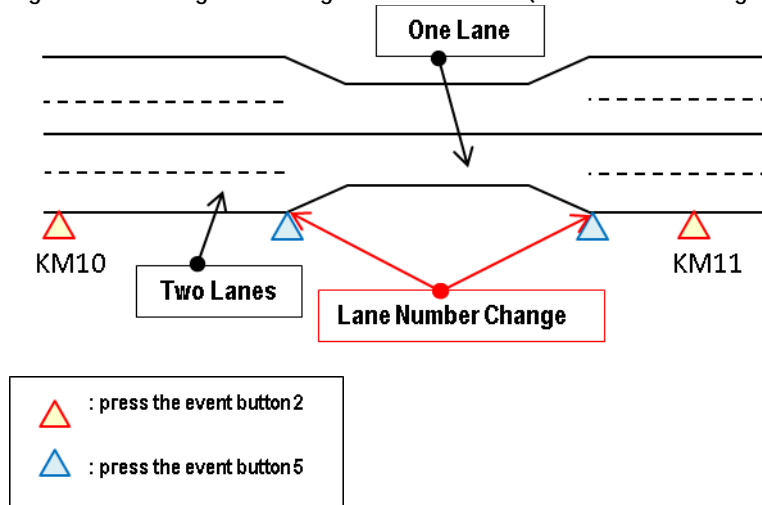
Figure 2.29 Overlapping Narrow Section--Timing of Pressing the Event Buttons 5



5) Lane Number Change (Trip Meter Button 5)

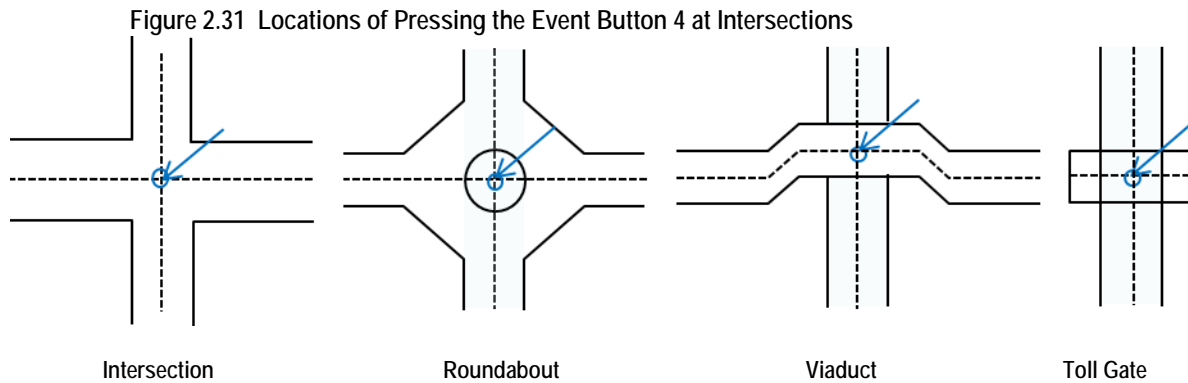
When the number of lane changes, press 5 of the Trip Meter button.

Figure 2.30 Timing of Pressing the Event Button (Lane Number Change--Button 5)



6) Intersections (Trip Meter Button 4)

The operator presses the fourth button at an intersection, roundabout, viaduct and toll gate.



C. Field Note Preparation

The operator needs to record the events whenever Trip Meter's button is pressed onto the field notes. The items to be recorded are: jurisdiction, management company, route name, date, kilometer post, distances form kilometer posts, and names of structure. An example is shown in the following figure. It is to note that the same structure is to be recorded from both directions. The numbers from 0 to 9 represent 100 meter distance from corresponding kilometer post.

Table 2.3 Items to Enter in the Field Note

Item	Contents
Jurisdiction	RRMU2, 4, 5, 7
Management Company	RRMC222, 224, 226, 232, 234, 236, 238, 240, 242, 248, 999
Route Name	NH1, 2, 3, 3 (old), 4E, 5, 6, 6-1, 6-2, 6-3, 10, 15, 18, 37, 38, 38B, 43, 70, 279, Connecting NH1 with Ninh Phuc Port, Route Noi Bai - Bac Ninh, Ho Chi Minh Route, Southern Ring Road No.3 to Cau Dau
Page Number	The page number of the field note
Surveyed Date	The date when the survey was implemented.
Kilometer Post Number	The number on the kilometer post place on site.
Road Surface Classification	Road surface type: Asphalt Concrete (AC), Cement Concrete (CC), or Unpaved (UP)
Distance from a kilometer post	Accumulated distance from the start of the survey route.
Structure Name	Name of structure; if not identified, leave it blank.
Structure Code ²	Bridge: B, Tunnel: T, Railway Crossing: RC, Intersection: I Roundabout: RB, Viaduct: V
Distance	Distance from the starting point to the beginning or ending point of a structure
Existence of physical kilometer post	At certain location of every kilometer, a physical kilometer post may be missing.
Location of installed kilometer post	Left, center, or right.

The upper section of the field note is relatively easy. Fill out: jurisdiction; management company, route number; and survey date. The kilometer number is written as it increases by one. The numbers below the kilometer number are one digit representing 100 meters. When an object or structure is recorded, the location by 100 meter is to be identified and noted onto the field note.

² A structure name that the intersecting route is crossing over the survey route. At grade intersection or an intersecting route going under the survey route is not called viaduct

Figure 2.32 An Example of Field Note (1)

RRMU		Đơn vị quản lý		Tên đường		Trạng	
RRMU 2		236		rnh.1		-12	
Đánh dấu Ngày		Tên		Khảo sát		Ngày	
17/4/2012		Tuan					
Công trình		Nước tuyến		Công trình		Ghi chú	
Bđầu	Kthúc	Km	Khoảng cách	1	2	3	4
AC		33	31042				
		0 9					
		1 8					
		2 7					
		3 6					
		4 5					
		5 4					
		6 3					
20950	20930 B	7 2					
		8 1					
		9 0					
AC		34	30050				
		0 9					
		1 8					

There are two chances of recording onto the field note, since inbound and outbound directions are recorded. On the left side, the outbound information is written; on the right side, inbound information is to be written.

Figure 2.33 An Example of Field Note (2)

RRMU		Đơn vị quản lý		Tên đường		Trạng	
RRMU 2		236		rnh.1		-12	
Đánh dấu Ngày		Tên		Khảo sát		Ngày	
17/4/2012		Tuan					
Công trình		Nước tuyến		Công trình		Ghi chú	
Bđầu	Kthúc	Km	Khoảng cách	1	2	3	4
AC		33	31042				
		0 9					
		1 8					
		2 7					
		3 6					
		4 5					
		5 4					
		6 3					
20950	20930 B	7 2					
		8 1					
		9 0					
AC		34	30050				
		0 9					
		1 8					

D. Marking

Road surface marking is done at: starting and ending points; jurisdiction or management company change; kilometer posts; road structure; and tunnel. Use white paint and draw lines perpendicular to the road direction; write characters.

Figure 2.34 Marking Specifications

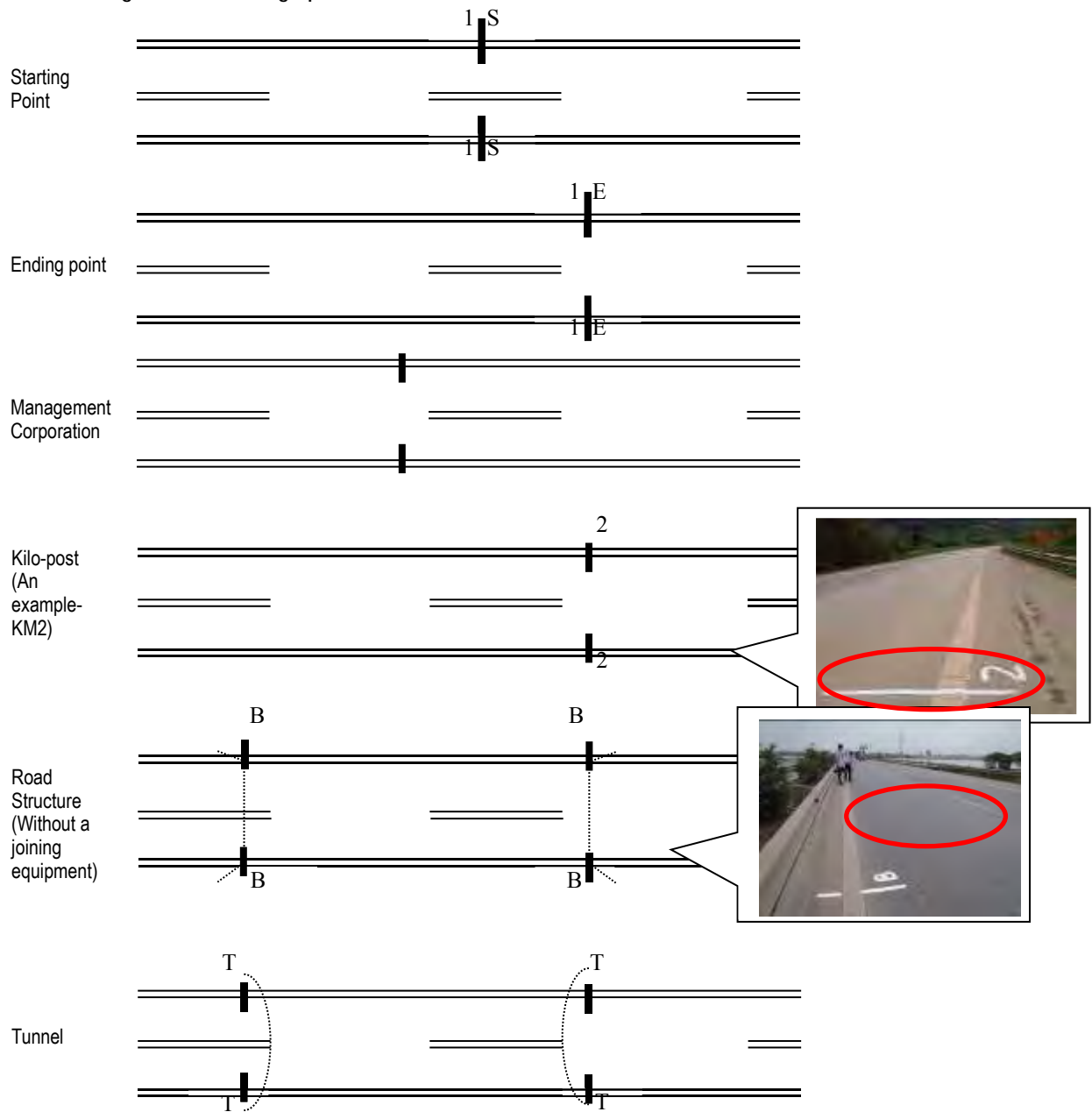


Table 2.4 Marking Characters

Marking Locations	Characters
Starting Point	1S (Route No. 1 Starting Point)
Ending Point	1E (Route No. 1 End Point)
Kilometer Post	4 (an example of 4 kilometre post)
Road Structures	B (Bridge), T (Tunnel)
Management Boundary	Line only

E. Safety Management

While marking, the safety keeper shall need to assure safety of the workers.

Figure 2.35 Safety Keeper



F. Impassable Road Segments

The end of a segment that cannot be surveyed shall be marked with a stick or equivalent. The location shall be photographed so that the location can be identifiable during data collection with the survey vehicle. For example, if there is a national border, a vehicle or person cannot enter the other side to record a starting point or end point. If it is the case, the starting point can be shifted to a point where a survey vehicle can enter. From the national border to the starting or end point, a walking measure is used. In the following example, a 10 meter distance is measured using a walking measure.

Figure 2.36 Work at Impassable Road Segments



G. Photographing

The leader shall take pictures of starting and ending points of the routes including overlapping starting and ending points. The terminal locations of construction segments shall be photographed also. The photographs shall be taken in a way to include surrounding areas.

Figure 2.37 Photograph – Kilometer Post, Field Reconnaissance



Figure 2.38 Photograph – Marking, Field Reconnaissance



H. Whiteboard Notes

The white board is used to clarify the marking points. The pieces of information to be included are: Route; Position; and Date. If it was a starting point or end point, "Start Point" or "End Point" would be included in the sign on the white board.

Figure 2.39 Notes on the White Board (Template)

Route	NH.***
Position	KM***+***
Starting point	
Date (dd/mm/yyyy)	

(3) Consideration during the Work

A. Parking during Location Confirmation

When the vehicle needs to be stopped on the road for marking or photographing, the leader and driver need to pay close attention to secure safety of the vehicle and surrounding areas. When parking is difficult, the driver may not attempt to park the vehicle.

B. Parameter Adjustment of Trip Meter

When a travel distance to a survey area or survey distance becomes long, Trip Meter may need some adjustment. The parameter adjustment shall be conducted when the error becomes larger than 5% (five meters in one kilometer distance).

2.5 Office Work

(1) Organization of Equipment and Tools --placing them to the original places

All the tools and equipment shall be placed to the original places.

Figure 2.40 Image of Tools and Equipment Organizations



(2) Vehicle Inspection

After coming back from field reconnaissance, the vehicle needs to be inspected as the same way it was started using the vehicle inspection form.

Table 2.5 FORM-FR02_Vehicle Inspection

vehicle inspection sheet			check vehicle status
document No.		163	163
inspection date	5 / 5 / 2012	check vehicle status	OK
Group No.	2	inspection start time	10:00
survey point		inspection end time	10:10
plate number	501-5322		
inspector name	Toshioya		
inspector name	1420		
inspection point	inspector's name	status	
Drive item	Brake	Worn or broken	✓
	Parking brake	not ok	✓
	Tire equipment	remaining amount of air	✓
Engine item	Lubrication equipment	amount of oil	✓
	Water pump	fluid volume	✓
		fluid level	✓
		fluid level	✓
Exterior item	Windshield	Damage	✓
	Window	Damage	✓
	Door	Damage	✓
	Body	Damage	✓
Interior item	Seat	Damage	✓
	Steering wheel	Damage	✓
	Instrument	Damage	✓
	Interior	Damage	✓
Other item	Light	Damage	✓
	Wiper	Damage	✓
	Door	Damage	✓
	Other	Damage	✓
Safety item	Safety belt	OK	✓
	Seat belt	OK	✓
Other equipment	Other equipment	OK	✓
	Other equipment	OK	✓
Other	Other	OK	✓
	Other	OK	✓

(3) Site Photographs

All the photographs taken on site shall be renamed and organized in specific folders.

Figure 2.41 Organized Photograph Files (An Example)



The first four digits are the sequential number for all the image files.

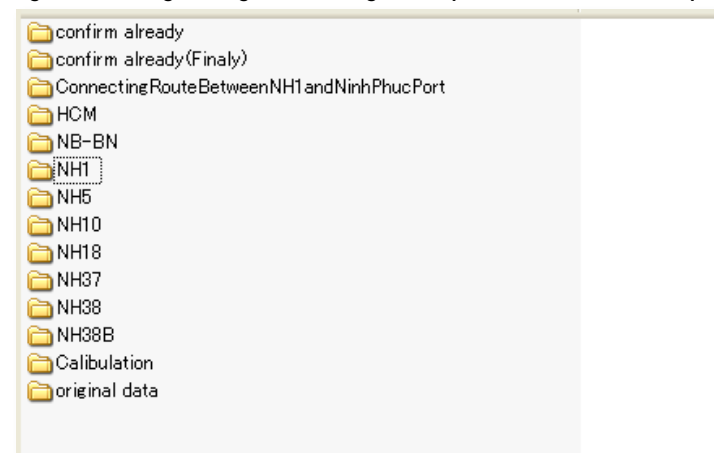
Figure 2.42 Organization of Photographs

Explanation	National Road 1, Starting Point, KM0	National Road 1, KM5, Kilometer post	National Highway 1, KM5, Marking
Image			
File name	0001_NH1_down_KM0_starting point.JPG	0005_NH1_down_KM5_kilometer-post.JPG	0006_NH1_Marking_KM5_Marking.JPG

(4) Storing the Trip Meter Data

The Trip Meter data shall be organized by route. For example the route of National Highway 1 can be saved in a folder “NH1.”

Figure 2.43 Organizing and Storing the Trip Meter Data (An Example)



(5) Confirmation of Documents

The leader shall make sure that all the forms used during field reconnaissance are organized and filed.

- i. Form_FR01 Work Material Check List
- ii. Form_FR02 Vehicle Inspection
- iii. Form_FR03 Safety Management Record
- iv. Form_FR04 Field Note
- v. Form_FR05 Daily Activity Record

(6) Preparation of Road Management Data

A. Outputs

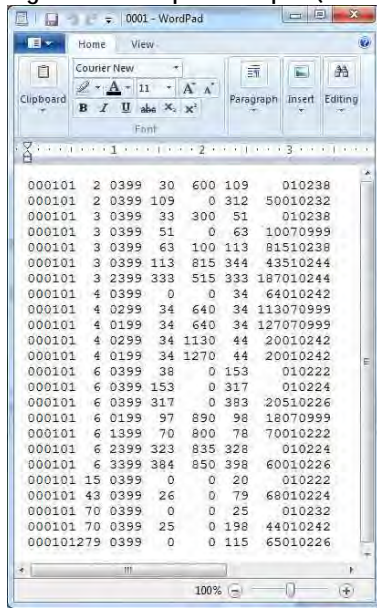
The road management data are classified into three: road management data; road structure data; and impassable segment. They are further divided by the codes shown in the following table.

Table 2.6 Road Management Data

Work order	Data Code	Data	Items for Confirmation
2	0001	Names of Road Management Division and Management Corporation	Jurisdictional organization, Administrative Corporation
1	0003	Distance between the kilo posts	Distance between the kilometer posts
3	0004	Overlapping Segments	Locations of overlapping route segments
7	0005	Station Number Notes	Distances from the kilometer posts and station numbers.
4	0101	Lane structure	Locations where lane structures change
5	0104	Road Structure	Location and Name
6	0105	Intersection	Locations and intersecting road names
8	0201	Impassable Road Segment Data	Road segments that cannot be surveyed.

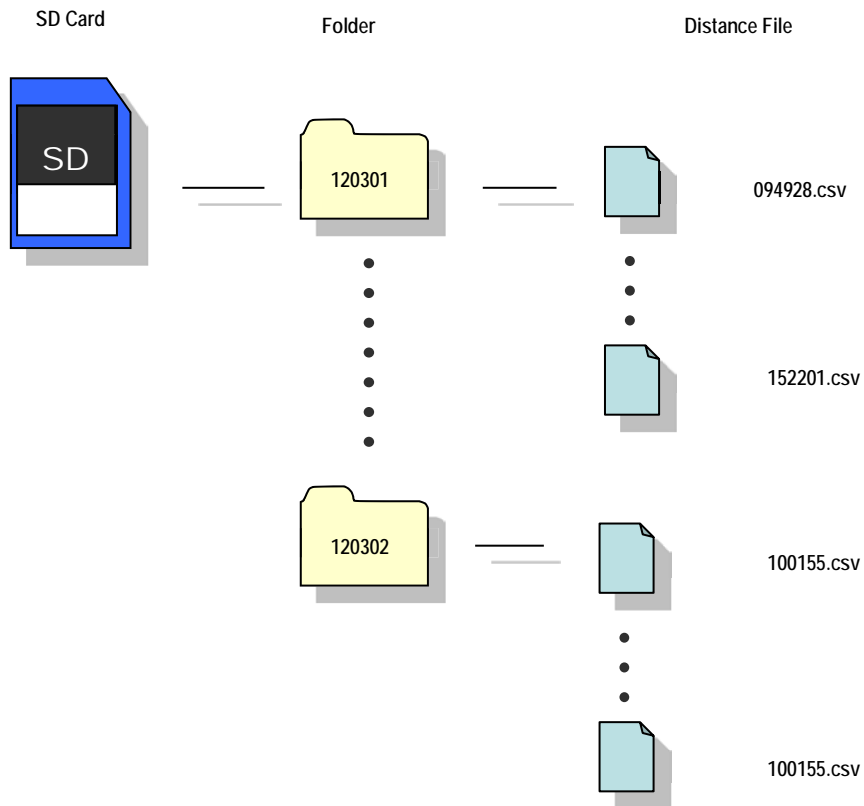
The outputs are text files with specified lengths. Following image capture is an example of the data code 0001-- Names of Jurisdiction and Management Company.

Figure 2.44 Output Example (0001: Names of Jurisdiction and Management Company)



The sources of the output files come from data from Trip Meter and field notes. The data in Trip Meter are stored in the SD Card. The organization of the folders and files are organized in dates and time. The folder names are dates; the file names are the starting time.

Figure 2.45 Trip Meter Data Organization



Take out the SD Card from Trip Meter and put it in a PC and open a file.

Figure 2.46 Data Format (text reader)

ROUTE, LANE, DIR, CAR NO, YEAR, MONTH, DAY,,	}	The first and second lines include the header information.
0,0,U,0,12,4,25,,		
DISTANCE, EVENT, HOUR, MINUTE ,SECOND, kp ,distance, name, Remarks	}	The fourth line and on are the data.
0,S,13,26,40,40,,,		
1004,2,13,31,2,41,1004,,		
2005,2,13,36,13,42,1001,,		
2158,3,13,36,39,,,		
2165,3,13,36,40,,,		
2901,2,13,41,9,43,896,,		
3898,2,13,46,26,44,997,,		
4903,2,13,51,12,45,1005,,		
5906,2,13,56,5,46,1003,,		

The csv file can be read in Excel, also.

Figure 2.47 Data Format (Excel) –Trip Meter Original Data File

ROUTE, LANE, DIR, CAR NO are not defined in Trip Meter; therefore, values 0, 0, U, 0 will be shown.

	A	B	C	D	E	F	G	H	I	J
1	ROUTE	LANE	DIR	CAR NO	YEAR	MONT	DAY			
2	0	0	U	0	12	4	18			
3	DISTANCE	EVENT	HOUR	MINUT	SECOND					
4	0	S		9	49	28				
5	267		3	9	50	47				
6	309		5	9	50	56				
7	352		3	9	51	4				
8	985		2	9	52	6				
9	1996		2	10	0	26				
10	2995		2	10	7	51				
11	4000		2	10	15	9				
12	5010		2	10	22	45				
13	6011		2	10	30	55				

Accumulated Distance (m)

S: START

E: END

1~5: EVENT Number

From the raw Trip Meter data, the trip meter working data file is prepared. Overall view of the trip meter working data file is shown in Figure 2.48.

Figure 2.48 Trip Meter Working File

1	ROUTE	LANE	DIR	CAR NO	YEAR	MONTH	DAY					
2		38	1 D	0	12		5					
3	DISTANCE	EVENT	HOUR	MINUTE	SECOND	Calculate Distance	KP	Facility Name	Remarks		Rounded Distance	
4	0	S	8	8	4			KM67+455	NH39 end			
5	470		2	8	8	59		KM68			470	
6	1549		2	8	12	38		1079 KM69			1080	
7	2223		5	8	28	30		674 KM69+762	not manage start		675	
8	5037		5	8	38	53		KM72+531	not manage end		0	
9	5461		2	8	39	38		424 KM73			425	
10	6405		3	8	43	12		944 KM73+944	Kênh Tiêu	Bridge start	945	
11	6438		3	8	43	16		977 KM73+977		Bridge end	975	
12	6488		2	8	43	21		1027 KM74			1025	
13	7506		2	8	47	37		1018 KM75			1020	
14	7883		3	8	50	23		377 KM75+377	GIÁT	Bridge start	375	
15	7907		3	8	50	25		401 KM75+401		Bridge end	400	
16	8459		2	8	51	6		953 KM76			955	
17	9475		3	8	56	20		1016 KM76+1016	HÒA MAC	Bridge start	1015	
18	9549		3	8	56	29		1090 KM76+1090		Bridge end	1090	
19	9628		2	8	56	40		1169 KM77			1170	
20	10596		2	9	1	3		968 KM78			970	
21	11520		2	9	3	58		924 KM79			925	
22	12642		2	9	7	15		1122 KM80			1120	
23	13673		2	9	11	2		1031 KM81			1030	
24	14698		2	9	14	32		1025 KM82			1025	
25	14772		5	9	16	53		74 KM82+074		change number of lane(2 to 3)	75	
26	15043		4	9	17	17		345 KM82+345		roundabout and viaduct	345	
27	15263		5	9	18	48		565 KM82+565		change number of lane(3 to 2)	565	
28	15700		2	9	19	31		1002 KM83			1000	
29	16718		2	9	24	7		1018 KM84			1020	
30	16921		3	9	27	6		203 KM84+203	ĐỒNG VĂN	Bridge start	205	
31	17256		4	9	27	39		538 KM84+538		viaduct(QL1)	540	
32	17525		3	9	28	8		807 KM84+807		Bridge end	805	
33	17639		4	9	28	22		921 KM84+921		IGNORE	920	
34	17746		2	9	34	50		1028 KM85			1030	
35	17751		1	9	34	55		5 KM85+005		Ending point	5	
36	17765	E		9	35	1						

Before starting, enter the data for ROUTE, LANE, DIR, CAR NO, since the Trip Meter original data file does not include the information.

In this example, following data are entered.

Figure 2.49 ROUTE, LANE, DIR, CAR NO

1	ROUTE	LANE	DIR	CAR NO	YEA
2		38	1 D		0
3	DISTANCE	EVENT	HOUR	MINUTE	SEC
4	0	S	8	8	
5	470		2	8	8

First add Calculate Distance to Column F.

Figure 2.50 Column F – Calculate Distance: Trip Meter Working File

Layout Formulas Data Review View Developer					
fx =A5-A4					
D	E	F	G		
CAR NO	YEAR	MONTH	DAY		
0	12		5 19		
MINUTE	SECOND	Calculate Distance	KP	Facility	
8	8	4	KM67+455		
8	8	59	470	KM68	
8	12	38	1079	KM69	
8	28	30	674	KM69+762	
8	38	53		KM72+531	
8	39	38	424	KM73	

The function is entered to calculate the accumulated distance to the distance between the kilometre posts.

Second add KP to Column G.

Figure 2.51 Column G – KP: Trip Meter Working File

as Data Review View Developer				
E	F	G	H	
AR	MONTH	DAY		
12		5	19	
COND	Calculate Distance	KP	Facility Name	
4			KM67+455	
59		470	KM68	
38		1079	KM69	
30		674	KM69+762	
53			KM72+531	
38		424	KM73	
12		944	KM73+944 Kênh Tiêu	

Add names of kilometer post, when the event is "2." Write the number after "KM." When the event is other than "2" -- Kilometer Post, then add the distance after the kilometer post code such as in "KM67+455."

Third add Facility Name to Column H.

Figure 2.52 Column H – Facility Name: Trip Meter Working File

eloper		
G	H	I
19		
	Facility Name	Remarks
+455		NH39 end
+762		not manage start
+531		not manage end
+944	Kênh Tiêu	Bridge start
+977		Bridge end

Enter the names of facilities written in the field notes.

Forth, add Remarks to Column I.

Figure 2.53 Column I – Remarks: Trip Meter Working File

	G	H	I	J
19				
		Facility Name	Remarks	Rounded Distance
55			NH39 end	470
				1080
62			not manage start	675
31			not manage end	0
				425
44		Kênh Tiêu	Bridge start	945
77			Bridge end	975
				1025
				1020
77		GIÁT	Bridge start	375
01			Bridge end	400
				955

In the column I, enter information from the field notes. In the remarks, it is important to enter the station number information, since some of the station numbers and actual distance from the kilometer posts are different. The information will be extracted to make the field reconnaissance data management data file with the data code number "0005."

Fifth add rounded distances to Column J.

Figure 2.54 Rounded Distance to Column J

	I	J	K
	Remarks	Rounded Distance	
	NH39 end	470	
		1080	
	not manage start	675	

The function to be entered is as follows in the case of cell J5.

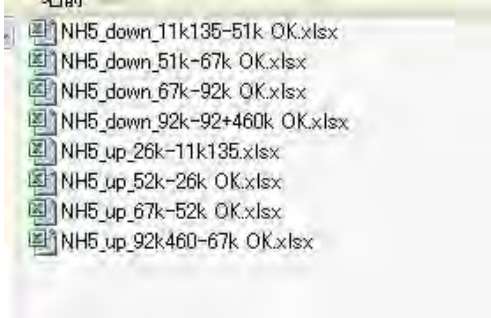
Figure 2.55 Rounded to the Nearest 5 or 0

	D	E
	CAR NO	YEAR
	0	12

The function gives the rounded numbers nearest to 0 or 5.

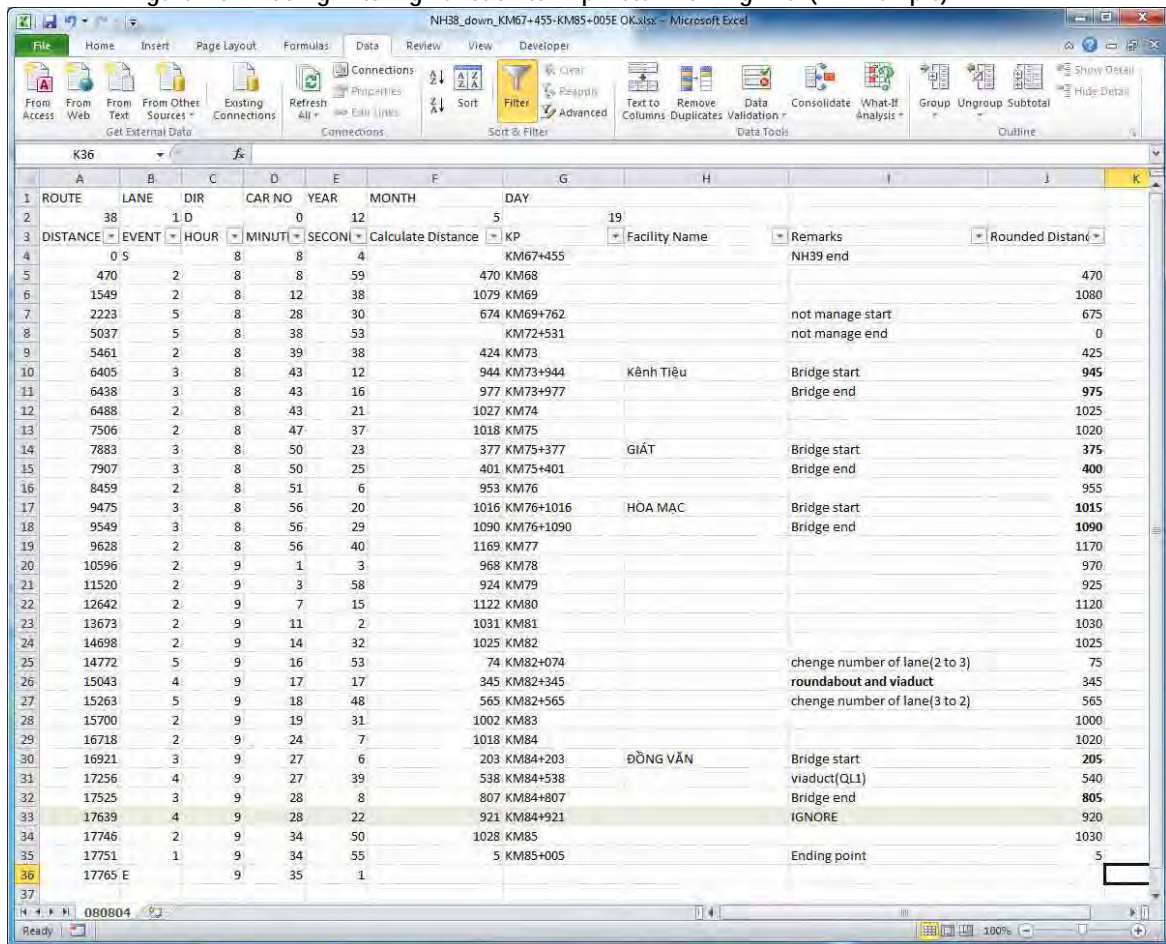
After entering all the data, organize all the Trip Meter working data files.

Figure 2.56 Organized Trip Meter Working Files



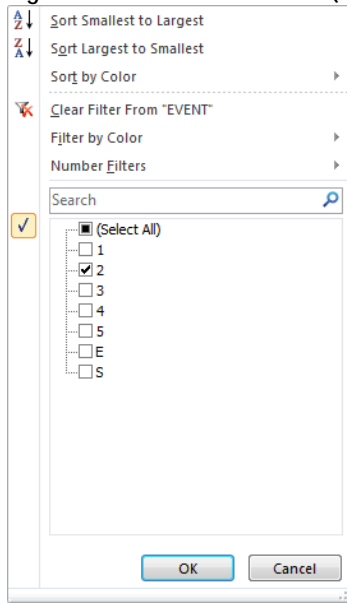
Add the filtering function to the Excel working file.

Figure 2.57 Adding Filtering Function to Trip Meter Working File (An Example)



Filter the data using the filter function of Excel.

Figure 2.58 Event "2" Filtered (An Example)



Following figure shows a filtered data--event 2 was selected.

Figure 2.59 Event Filtered (An Example)

ROUTE	LANE	DIR	CAR NO	YEAR	MONTH	DAY	DISTANCE	EVENT	HOUR	MINUTE	SECOND	Calculate Distance	Facility Name	Remarks	Rounded Distan
38	1	D	0	12	5	19									
470	2	8	8	59			470	2	8	59		470 KM68			470
1549	2	8	12	38			1079	2	8	38		1079 KM69			1080
5461	2	8	39	38			424	2	8	38		424 KM73			425
6488	2	8	43	21			1027	2	8	21		1027 KM74			1025
7506	2	8	47	37			1018	2	8	37		1018 KM75			1020
8459	2	8	51	6			953	2	8	6		953 KM76			955
9628	2	8	56	40			1169	2	8	40		1169 KM77			1170
10596	2	9	1	3			968	2	9	3		968 KM78			970
11520	2	9	3	58			924	2	9	58		924 KM79			925
12642	2	9	7	15			1122	2	9	15		1122 KM80			1120
13673	2	9	11	2			1031	2	9	2		1031 KM81			1030
14698	2	9	14	32			1025	2	9	32		1025 KM82			1025
15700	2	9	19	31			1002	2	9	31		1002 KM83			1000
16718	2	9	24	7			1018	2	9	7		1018 KM84			1020
17746	2	9	34	50			1028	2	9	50		1028 KM85			1030

Now it is ready to prepare the road management data files according to the confirmation items.

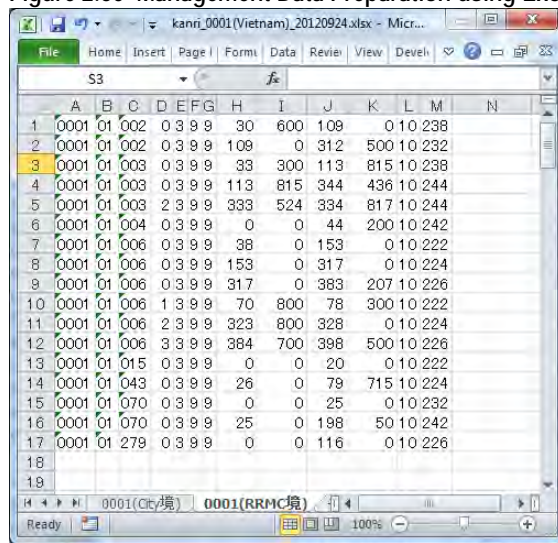
The number of confirmation items is eight. But the number of event buttons on Trip Meter is five; therefore, information in Remarks becomes important. For the data codes 0004 and 0101, the same event number 5 is used. One needs to manually separate the data from the Trip Meter working data files.

Table 2.7 General Method of Management Data File Preparation

Method	Data Code (file)	Event Number	Data
Filtering	0001	1	Names of Road Management Division and Management Corporation
Filtering	0003	2	Distance between the kilo posts
Filtering	0104	3	Road Structure
Filtering	0105	4	Intersection
Filtering and Remark	0004	5 (c.f. Remarks)	Overlapping Segments
Filtering and Remark	0101	5 (c.f. Remarks)	Lane structure
Manual: Extract information from Remarks	0005	-	Station Number note
Not included in Trip Meter working data file	0201	-	Impassable Segments

As explained in the beginning, the road management data are text files. For a person with data handling experiences may prefer editor software, but in this manual, MS Excel is presented as the tool for data preparation. The encoded Excel files are later saved as text files as final outputs of the field reconnaissance data.

Figure 2.60 Management Data Preparation using Excel as Coding Tool



As explained, the road management data has eight types. The structures of the eight types are slightly different, but there are common columns. The columns A to K are common for all eight types of data.

Table 2.8 Common Columns for All the Management Data Types

Cell	A	B	C	D	E	F	G	H	I	J	K
Meaning	Data Code	Management Area Classification	Route Number	Branch	Up or Down	Lane Classification	Lane Number	Kilometer post number	Distance from the Kilometer Post	Kilometer post number	Distance from the Kilometer Post
								Position From			

Column A is the data code. Corresponding codes are listed below:

Table 2.9 Column A: Data Code

Data Code	Data
0003	Distance between the kilo posts
0001	Names of Road Management Division and Management Corporation
0004	Overlapping Segments
0101	Lane Structure
0104	Road Structure
0105	Intersection
0005	Station Number note
0201	Impassable Road Segment

The final outputs of the management data are organized by the data codes. One management file has only one code.

Column B is the management area classification.

Table 2.10 Column B: Management Area Classification

Management Area Name	Code
Northern Area	01
Northern Middle Area	02
Southern Middle Area	03
Southern Area	04

Columns C and D are the route and branch numbers:

Table 2.11 Columns C and D: Route Numbers and Branch Numbers

Route Name	Route Number	Branch Number	Route Name	Route Number	Branch Number
National Highway 1	001		National Highway 10	010	
Southern Ring Road No.3 to Cau Dau	001	01	Connecting National Highway 1 with Ninh Phuc Port	010	01
National Highway 2	002		National Highway 15	015	
National Highway 3	003		National Highway 18	018	
National Highway 3B	003	01	Route Noi Bai – Bac Ninh	018	01
National Highway 3 (The old road branch)	003	02	Ho Chi Minh Route	021	
National Highway 4E	004		National Highway 37	037	
National Highway 5	005		National Highway 38	038	
National Highway 6	006		National Highway 38B	038	01
National Highway 6-1 (The old bypass road)	006	01	National Highway 43	043	
National Highway 6-2 (The old bypass road)	006	02	National Highway 70	070	
National Highway 6-3 (The old bypass road)	006	03	National Highway 279	279	

Column E is the data on inbound or outbound. "Inbound" is direction where the number on the kilometer posts decrease. "Outbound" is the direction where the numbers on the kilometer posts increase. When inbound or outbound does not have to be specified, the code "3" shall be used.

Table 2.12 Column E: Inbound or Outbound Classification

Classification	Code
In	1
Out	2
Specification not necessary	3

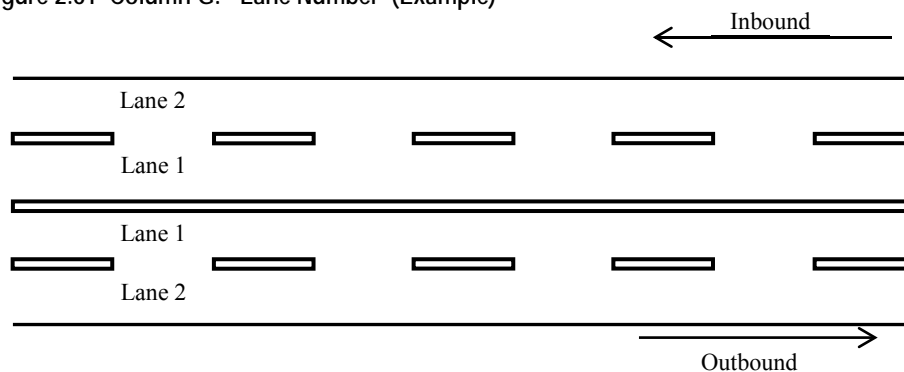
Column F: Lane classification

The lane classification has designed to classify lane types such as main, acceleration or deceleration lanes. In this survey project, a lane has not been classified; therefore, enter 9.

Column G: Lane Number

The lane number shall starts from the lane by the center line. The lane number "9" is used for road management data or road structure data that are not affected by the number lanes. or lane number.

Figure 2.61 Column G: Lane Number (Example)



The columns from H to K are numerals from kilometer posts.

Table 2.13 Columns from H to K: Positions form Kilometer Posts

H	I	J	K
Kilometer post number	Distance from the Kilometer Post	Kilometer post number	Distance from the Kilometer Post
Position From		Position To	

B. Distance from Kilometer Posts

Distance from kilometer posts are expressed using the kilometer post number and distance measured from a kilometer post. Four digits are allocated to express a kilometer post number. If the first digit is not 0 or 5, enter the number in a way to round the number to the nearest 0 or five. The data are entered from the right most digits.

For example, a segment of a road can be expressed from [5k+250] to [6 k +940]. It means the segment starts from 250 meter from the kilometer post number 5 to 940 m from the kilometer post number 6. The second example is from [53k +108] to [54k +750].

Figure 2.62 Road Segment Express

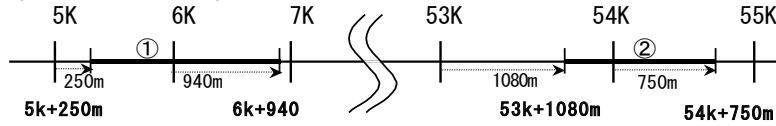


Table 2.14 Road Segment From and To

Road Segment From		Road Segment To	
Kilometer Post Number	Distance from the Kilometer Post	Kilometer Post Number	Distance from the Kilometer Post
15	19	24	28
5	2 5 0	6	9 4 0
5 3	1 0 8 0	5 4	7 5 0

If the number of kilometer post is negative or a road segment starts from the zero kilometer post to the negative direction, the absolute value of the distance to the negative direction is expressed from the nearest kilometer post of the positive direction. The example shows from [-2k+210] to [-0k+100]; the negative signs show the negative direction from the kilometer posts.

Figure 2.63 Road Segment Expression (An Example: Negative Direction from "0" Kilometer Post)

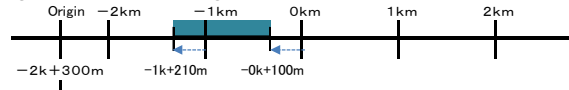


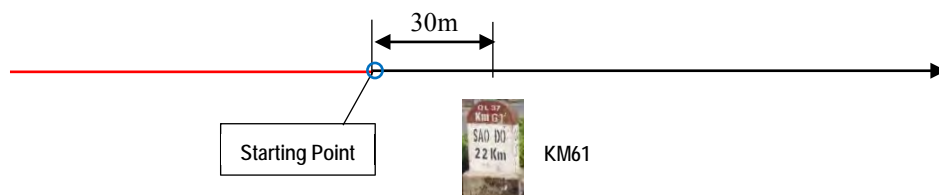
Figure 2.64 Expression of Road Segment (from, to)

H	I	J	K
-1	210	-0	100

Up to Column K, the data were the common data. From this point on, preparation of each independent management data file is discussed.

When the starting point of a survey route is not the location of the 0 kilometer post, the location of the starting point is expressed from the kilometer post ahead of the starting point. Assuming that the distance between the kilometer posts are 1,000 meters, the starting point is expressed from an imaginary kilometer post. For example, if a starting point to the next kilometer post is 30 meter, the distance from the previous kilometer post become 970 meter. In the following case it becomes [KM60+970].

Figure 2.65 Road Segment Expression (



The column widths can be changed by selecting a column and right click while the column is being selected. Enter the length of the column when a dialogue appears.

Figure 2.67 Column Width Change Dialogue Box



Table 2.16 Column Widths (0003)

Column	Width	Column	Width
A	4	G	1
B	2	H	4
C	3	I	5
D	2	J	4
E	1	K	5
F	1	L	2

When the widths are defined for all the columns, save as .prn file. The file name becomes "0003.prn" with an extension. Delete the extension manually.

Figure 2.68 Management File (0003)

```

000301001 0299 0 0 0 10 10
000301001 0299 0 10 1 0 990
000301001 0299 1 0 2 0 1010
000301001 0299 2 0 3 0 980
000301001 0299 3 0 4 0 1005
000301001 0299 4 0 5 0 1005
000301001 0299 5 0 6 0 1005
000301001 0299 6 0 7 0 1000
000301001 0299 7 0 8 0 1005
000301001 0299 8 0 9 0 1050
000301001 0299 9 0 10 0 1005
000301001 0299 10 0 11 0 1005
000301001 0299 11 0 12 0 1005
000301001 0299 12 0 13 0 1025
000301001 0299 13 0 14 0 990
000301001 0299 14 0 15 0 1005
000301001 0299 15 0 16 0 1005
000301001 0299 16 0 17 0 1005
000301001 0299 17 0 18 0 1005
000301001 0299 18 0 19 0 1005
000301001 0299 19 0 20 0 1010
000301001 0299 20 0 22 0 2015
000301001 0299 22 0 23 0 1150
000301001 0299 23 0 24 0 1000
000301001 0299 24 0 25 0 1005
000301001 0299 25 0 26 0 1005
    
```

D. Jurisdiction and Management Company (0001)

The data code "1" can be filtered from the working data file to the file for jurisdiction and management company files. The codes to jurisdiction and companies are:

Table 2.17 Jurisdiction and Company Codes

jurisdiction	code	company	code
RRMU2	10	RRMC222	222
RRMU4	20	RRMC224	224
RRMU5	30	RRMC226	226
RRMU7	40	RRMC232	232
Province	50	RRMC234	234
Company	60	RRMC236	236
Under construction	70	RRMC238	238
		RRMC240	240
		RRMC242	242
		RRMC244	244
		RRMC248	248
		Other	999

To the working file, encode corresponding jurisdiction code and management company code.

Table 2.18 Names of Jurisdiction and Management Company

0001	01	001	0	3	9	9	0	0	211	0	10	236
0001	01	001	0	1	9	9	211	0	211	1870	60	999
0001	01	001	0	1	9	9	211	1870	234	1660	10	236
0001	01	001	0	2	9	9	211	0	234	1660	10	236
0001	01	001	0	3	9	9	234	1660	234	24825	70	999
0001	01	001	0	3	9	9	234	24825	285	40	10	236
0001	01	001	1	3	9	9	159	545	174	310	10	248
0001	01	005	0	3	9	9	11	175	92	460	10	240
0001	01	010	0	2	9	9	0	0	0	6800	50	999
0001	01	010	0	1	9	9	0	0	0	6815	50	999
0001	01	010	0	2	9	9	0	6800	93	230	10	234
0001	01	010	0	1	9	9	0	6815	93	230	10	234
0001	01	010	0	3	9	9	93	230	93	5205	60	999
0001	01	010	0	3	9	9	93	5205	144	115	10	234
0001	01	010	0	3	9	9	144	115	144	2750	70	999
0001	01	010	1	2	9	9	0	0	0	6420	10	234
0001	01	010	1	1	9	9	0	0	0	6410	10	234

After entering the data, adjust the column widths as specified in Table 2.19.

Table 2.19 Management Data (0001)

Column	Width	Column	Width
A	4	H	4
B	2	I	5
C	3	J	4
D	2	K	5
E	1	L	2
F	1	M	3
G	1		

Edit and format the text data to produce the following management data.

Figure 2.69 Names of Jurisdiction and Management Company (0001)

```

000101001 0399 0 0 211 010236
000101001 0199 211 0 211 187060999
000101001 0199 211 1870 234 166010236
000101001 0299 211 0 234 166010236
000101001 0399 234 1660 2342482570999
000101001 0399 23424825 285 40010236
000101001 1399 159 545 174 31010248
000101005 0399 11 175 92 46010240
000101010 0299 0 0 0 680050999
000101010 0199 0 0 0 681550999
000101010 0299 0 6800 93 23010234
000101010 0199 0 6815 93 23010234
000101010 0399 93 230 93 520560999
000101010 0399 93 5205 144 11510234
000101010 0399 144 115 1442750070999
000101010 1299 0 0 0 642010234
000101010 1199 0 0 0 641010234
000101018 0399 0 0 46 28510248
000101018 1299 -0 1595 -0 116070999
000101018 1199 -0 1595 -0 115070999
000101018 1299 -0 1160 31 12010248
000101018 1199 -0 1150 31 12010248
000101021 0399 409 0 409 48070999
    
```

E. Overlapping (0004)

The overlap road segment data are produced to indicate overlapping road segments using an Excel sheet as a working data. From the columns A to K are common data; the column L represent the overlapping data. The code for overlapping can be chosen from Table 2.21. The cells in the column M are filled with route names that are more significant between overlapping routes within 100 bytes.

Table 2.20 Management Working Data - (0004)

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
1	0004	01	001	1	3	9	9	159	545	171	550	1	National Highway 1		
2	0004	01	037	0	1	9	9	82	1055	82	1505	1	National Highway 18		
3	0004	01	037	0	2	9	9	82	1055	82	1495	1	National Highway 18		
4	0004	01	038	0	1	9	9	28	415	28	445	2	Cau Doc		
5	0004	01	038	0	1	9	9	52	10	52	13445	1	National Highway 39		
6	0004	01	038	0	2	9	9	52	10	52	13400	1	National Highway 39		
7	0004	01	038	1	2	9	9	37	330	37	12650	1	National Highway 38		
8	0004	01	038	1	1	9	9	35	1940	35	12690	1	National Highway 38		
9	0004	01	038	1	1	9	9	88	780	88	7100				
10	0004	01	038	1	1	9	9	111	780	88	7120				
11	0004	01	038	1	1	9	9	111	780	111	7335				
12	0004	01	038	1	1	9	9	111	55	111	7330	1	National Highway 10		
13	0004	01	038	1	2	9	9	111	7830	111	12385	1	National Highway 1		
14	0004	01	038	1	1	9	9	111	7825	111	12370	1	National Highway 1		
15															

Enter the overlapping code as specified in Table 2.21.

Table 2.21 Overlapping Code (Column L)

Overlap Classification	Code
Route overlap	1
Inbound and outbound overlap	2

After finishing entering the overlapping code and the names of major routes, the column widths need to be specified as in Table 2.22.

Table 2.22 Column Width Specification (0004)

Column	Width	Column	Width
A	4	H	4
B	2	I	5
C	3	J	4
D	2	K	5
E	1	L	1
F	1	M	100
G	1		

Save the file as .prn file. The file name shall be 0004. Excel will give the file extension .prn automatically. After saving the file, delete the extension manually and rename the file.

Figure 2.70 Road Management Data (0004)

```

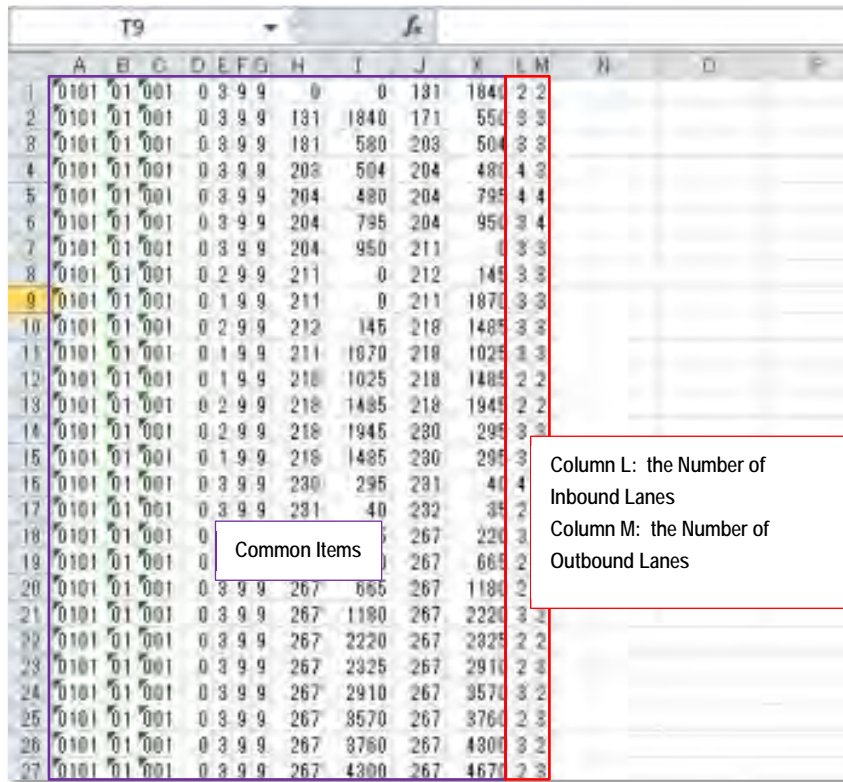
000401001 1399 159 545 171 5501National Highway 1
000401037 0199 82 1055 82 15051National Highway 18
000401037 0299 82 1055 82 14851National Highway 18
000401038 0199 28 415 28 4452Cau Doc
000401038 0199 52 10 52134451National Highway 39
000401038 0299 52 10 52134001National Highway 39
000401038 1299 37 390 37126601National Highway 38
000401038 1199 36 1340 36136901National Highway 38
000401038 1299 83 780 83 71001National Highway 10
000401038 1199 83 780 83 71201National Highway 10
000401038 1299 111 60 111 73351National Highway 10
000401038 1199 111 55 111 73301National Highway 10
000401038 1299 111 7850 111123851National Highway 1
000401038 1199 111 7825 111123701National Highway 1
    
```

F. Lane Structure Data (0101)

When the number of lanes changes, the lane structure data are created. For example, National Highway 1 is a survey target route; the number of lanes changes from two lane to one and one lane to two lanes. If this type of lane number change takes place, the locations of change need to be recorded.

The road structure data are encoded using the Trip Meter data and the records of field note. An Excel sheet is used to prepare an Excel working file as the data from the Trip Meter and field notes are being referred.

Figure 2.71 Lane Structure Data 0101 – Working Excel File



When the data encoding work is completed, the column widths need to be adjusted.

Table 2.23 Column Width Specification (0101)

Column	Width	Column	Width
A	4	H	4
B	2	I	5
C	3	J	4
D	2	K	5
E	1	L	1
F	1	M	1
G	1		

After adjusting the columns, the file needs to be saved. Save as .prn file to save the text file. Excel automatically add the extension .prn. Delete the file extension manually to prepare the road structure data 0101.

Figure 2.72 Lane Structure Data (0101)

```

010101001 0399 0 0 131 184022
010101001 0399 131 1840 171 55033
010101001 0399 181 580 203 50433
010101001 0399 203 504 204 48043
010101001 0399 204 480 204 79544
010101001 0399 204 795 204 95034
010101001 0399 204 950 211 033
010101001 0299 211 0 212 14533
010101001 0199 211 0 211 187033
010101001 0299 212 145 216 148533
010101001 0199 211 1870 218 102533
010101001 0199 218 1025 218 148522
010101001 0299 218 1485 218 194522
010101001 0299 218 1945 230 29533
010101001 0199 218 1485 230 29533
010101001 0399 230 295 231 4044
010101001 0399 231 40 232 3522
010101001 0399 232 35 267 22033
010101001 0399 267 220 267 66523
010101001 0399 267 665 267 118022
010101001 0399 267 1180 267 222032
010101001 0399 267 2220 267 232522
010101001 0399 267 2325 267 291023
010101001 0399 267 2910 267 357032
010101001 0399 267 3570 267 376023
010101001 0399 267 3760 267 430032
010101001 0399 267 4300 267 467023
    
```

G. Road Structure Data (0104)

From the Trip Meter working sheet, filter Event 3.

Figure 2.73 Road Structure Data - Excel Work File

	A	B	C	D	E	F	G	H	I	J	
1	ROUTE	LANE	DIRECTION	CAR NO	YEAR	MONTH	DAY				
2	37	1	D	0	12		5	16			
3	DISTANC	EVEN	HOUR	MINUT	SECON	Calculate Distance	KP	Name	Remarks	Rounded distance	
7	983	3		7	19	53	18	KM62+18	HẢO THỒN	Bridge Start	20
8	998	3		7	19	56	33	KM62+33		Bridge End	35
12	4449	3		7	33	15	450	KM65+450	LANG KHÊ	Bridge Start	450
13	4465	3		7	33	18	466	KM65+466		Bridge End	465
15	5072	3		7	36	42	74	KM66+74	NHÂN LÝ	Bridge Start	75
16	5089	3		7	36	44	91	KM66+91		Bridge End	90
19	7618	3		7	45	29	625	KM68+625		Culvert Start	625
20	7623	3		7	45	30	630	KM68+630		Culvert End	630
25	11072	3		7	58	20	59	KM72+59		Bridge Start	60
26	11077	3		7	58	21	64	KM72+64		Bridge End	65
27	11890	3		7	59	44	877	KM72+877		Bridge Start	875
28	11897	3		7	59	46	884	KM72+884		Bridge End	885
30	12754	3		8	3	6	739	KM73+739	BÌNH	Bridge Start	740
31	13070	3		8	3	36	1055	KM73+1055		Bridge End	1055
35	16370	3		8	13	39	347	KM77+347	THIỆN	Bridge Start	345
36	16394	3		8	13	42	371	KM77+371		Bridge End	370
41	17291	3		8	17	36	298	KM78+298	NINH CHẤP	Bridge Start	300
42	17317	3		8	17	40	324	KM78+324		Bridge End	325
53											

Copy the data to another sheet to make an Excel working data file. Encode the data in columns L, M and N.

Table 2.24 Road Structure Data – Excel Working Data File (0104)

	A	B	C	D	E	F	G	H	I	J	K	L	M
1	0104	01	001	0	2	9	9	2	755	2	895	B	DONG DANG
2	0104	01	001	0	2	9	9	19	810	19	940	B	MAI PHA
3	0104	01	001	0	2	9	9	33	855	33	675	B	SAI HO 1
4	0104	01	001	0	2	9	9	34	950	34	975	B	SAI HO 2
5	0104	01	001	0	2	9	9	35	150	35	175	B	SAI HO 3
6	0104	01	001	0	2	9	9	35	800	35	825	B	SAI HO 4
7	0104	01	001	0	2	9	9	36	725	36	755	B	SAI HO 5
8	0104	01	001	0	2	9	9	38	540	38	570	B	SAI HO 6
9	0104	01	001	0	2	9	9	38	860	38	875	B	KHUN CUM
10	0104	01	001	0	2	9	9	40	445	40	455	B	PAC RE
11	0104	01	001	0	2	9	9	49	910	49	915	B	LANG DANG
12	0104	01	001	0	2	9	9	56	210	56	215	B	LANG THANH
13	0104	01	001	0	2	9	9	57	515	57	545	B	AI CHI LANG
14	0104	01	001	0	2	9	9	81	480	61	580	B	CHI LANG
15	0104	01	001	0	2	9	9	66	495	66	510	B	SONG HOA 1
16	0104	01	001	0	2	9	9	66	755	66	770	B	SONG HOA 2
17	0104	01	001	0	2	9	9	77	235	77	260	B	CAI KINH
18	0104	01	001								83	765	B
19	0104	01	001								94	720	B
20	0104	01	001								95	135	B
21	0104	01	001	0	2	9	9	96	275	96	305	B	
22	0104	01	001	0	2	9	9	99	770	99	865	B	KEP
23	0104	01	001	0	2	9	9	99	1000	99	1030	B	HUONG SON
24	0104	01	001	0	2	9	9	112	410	112	425	B	CULVERT
25	0104	01	001	0	2	9	9	117	765	117	1060	B	XUONG GIANG
26	0104	01	001	0	2	9	9	131	1005	131	1435	B	NHU NGUYET
27	0104	01	001	0	2	9	9	145	75	145	140	B	NOI DUE
28	0104	01	001	0	2	9	9	157	625	158	560	B	PHU DONG
29	0104	01	001	0	2	9	9	159	955	159	1655	B	NO NAME
30	0104	01	001	0	2	9	9	159	1850	159	1885	B	BAY
31	0104	01	001	0	2	9	9	161	460	161	495	B	GIA LAM
32	0104	01	001	0	2	9	9	168	100	166	190	B	THANH TRI

To the columns L and M, select the code form Table 2.25. The column L is the major structure and the column M is reserved for another road structure to be recorded. Write a major structure name in the cells of column N.

Table 2.25 Road Structure Data Code

Structure Classification	Code
Bridge	B
Tunnel	T
Rock shed	R
Other	O

When all the data are entered, the column widths are defined. Select the column and right click to select column width to adjust the column widths as shown in Table 2.26.

Table 2.26 Column Width Specification (0104)

Column	Width	Column	Width
A	4	H	4
B	2	I	5
C	3	J	4
D	2	K	5
E	1	L	1
F	1	M	1
G	1	N	100

After the column widths are set, the file is saved as .prn file. The file name is 0104. Since Excel gives the file extension automatically, the file extension shall be removed and rename as 0104 without the file extension.

Figure 2.74 Road Structure (0104)

010401001	0299	2	755	2	895B	DONG DANG
010401001	0299	19	810	19	940B	MAI PHA
010401001	0299	33	655	33	675B	SAI HO 1
010401001	0299	34	950	34	975B	SAI HO 2
010401001	0299	35	150	35	175B	SAI HO 3
010401001	0299	35	800	35	825B	SAI HO 4
010401001	0299	36	725	36	755B	SAI HO 5
010401001	0299	38	540	38	570B	SAI HO 6
010401001	0299	38	860	38	875B	KHUN CUM
010401001	0299	40	445	40	455B	PAC RE
010401001	0299	49	910	49	915B	LANG DANG
010401001	0299	56	210	56	215B	LANG THANH
010401001	0299	57	515	57	545B	AI CHI LANG
010401001	0299	61	480	61	580B	CHI LANG
010401001	0299	66	495	66	510B	SONG HOA 1
010401001	0299	66	755	66	770B	SONG HOA 2
010401001	0299	77	235	77	250B	CAI KINH
010401001	0299	83	645	83	765B	HUU LUNG
010401001	0299	94	635	94	720B	NO NAME
010401001	0299	95	115	95	135B	DEN
010401001	0299	96	275	96	205B	CHANG THUAN

H. Intersection (0105)

The even number “4” can be filtered to extract the intersection data. Copy and paste the data to a new sheet and enter the remarks from the field note. The remarks shall be written with 100 byte.

Figure 2.75 Trip Meter Data – Excel Working Data

	A	B	C	D	E	F	G	H	I	J
1	ROUTE	LANE	DIRECTION	CAR NO	YEAR	MONTH	DAY			
2	37	1	D	0	12		5	16		
3	DISTANCE	EVEN	HOUR	MINUTE	SECOND	Calculate Distance	KP	Name	Remarks	Rounded distance
50	22596	4		9	2		17	KM83+17	Railway crossing	15
53										

Table 2.27 Road Management Data – Excel Working Data (Intersection 0105)

	A	B	C	D	E	F	G	H	I	J	K	L	M
1	0105	01	001	0	3	9	9	3	215				1 National Highway 1A
2	0105	01	001	0	3	9	9	4	185				1 National Highway 1B
3	0105	01	001	0	3	9	9	5	125				1 U/N
4	0105	01	001	0	3	9	9	15	625				1 U/N
5	0105	01	001	0	3	9	9	16	580				1 U/N
6	0105	01	001	0	3	9	9	20	1850				4 U/N
7	0105	01	001	0	3	9	9	93	190				5 TRAM THU PHU CAU LUONG MET
8	0105	01	001	0	3	9	9	99	95				1 National Highway 37
9	0105	01	001	0	3	9	9	114	75				1 National Highway 31
10	0105	01	001	0	3	9	9	121	785				1 U/N
11	0105	01	001	0	3	9	9	126	270				1 National Highway 81
12	0105	01	001	0	3	9	9	135	760				1 U/N
13	0105	01	001	0	3	9	9	138	480				4 National Highway 38
14	0105	01	001	0	3	9	9	139	745				4 Route Noi Bai Bac Ninh
15	0105	01	001	0	3	9	9		75				3
16	0105	01	001	0	3	9	9		55				3
17	0105	01	001	0	3	9	9	149	615				3
18	0105	01	001	0	3	9	9	151	65				3
19	0105	01	001	0	3	9	9	152	275				3
20	0105	01	001	0	3	9	9	159	110				5 TRAM THU PHU SO 2 QUOC LO 1
21	0105	01	001	0	3	9	9	182	65				3 U/N
22	0105	01	001	0	3	9	9	186	725				3 U/N
23	0105	01	001	0	3	9	9	192	875				3 U/N
24	0105	01	001	0	3	9	9	216	650				5 TRAM THU PHU CAU GIÉ
25	0105	01	001	0	3	9	9	218	1210				3 U/N

The intersection code shall be referred from Table 2.28 to fill out the items in the column L.

Table 2.28 Intersection Codes

Intersection Type	Code	Contents (Column M)
Intersection	1	Intersecting route name or U/N (unknown)
Roundabout	2	Major route name of entering flow or U/N (unknown)
Viaduct	3	Crossing route name or U/N (unknown)
Railway Crossing	4	Crossing railway name or U/N (unknown)
Toll Gate	5	Toll Gate Name or U/N (unknown)

After all the data are entered, the widths of the columns need to be adjusted. The widths of the columns shall be set as in Table 2.29.

Table 2.29 Column Widths (Intersection Data)

Column	Width	Column	Width
A	4	H	4
B	2	I	5
C	3	J	4
D	2	K	5
E	1	L	1
F	1	M	100
G	1		

After adjusting the column widths, save as .prn file; the file name is 0105. Excel gives the file extension automatically. Remove the file extension manually and rename the file to 0105.

Figure 2.76 Road Management Data File (0105)

```

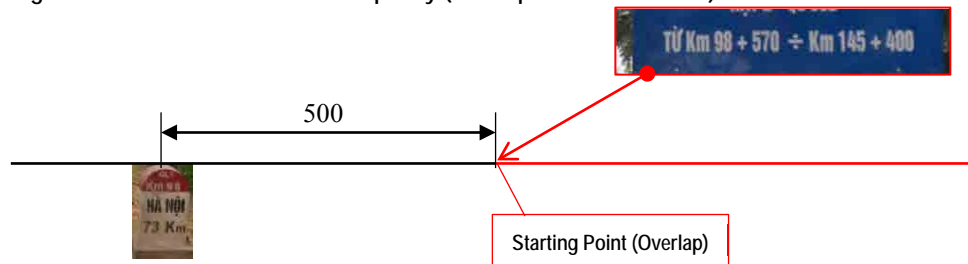
010501001 0399 3 215 1National Highway 4A
010501001 0399 4 185 1National Highway 1B
010501001 0399 5 125 1U/N
010501001 0399 15 625 1U/N
010501001 0399 16 580 1U/N
010501001 0399 20 1860 4U/N
010501001 0399 93 190 STRAM THU PHI CAU LUONG MET
010501001 0399 99 95 1National Highway 37
010501001 0399 114 75 1National Highway 31
010501001 0399 121 785 1U/N
010501001 0399 126 270 1National Highway 31
010501001 0399 135 760 3U/N
010501001 0399 138 480 4National Highway 38
010501001 0399 139 745 4Route Noi Bai Bac Ninh
010501001 0399 143 975 3U/N
010501001 0399 146 955 3U/N
010501001 0399 148 515 3U/N
010501001 0399 151 65 3U/N

```

I. Station Number Discrepancy (0005)

At certain locations of checking points, the station numbers currently managed and actually surveyed figures are different. At those locations, the station number discrepancy list is prepared. In the following example, the actual distance is 500 meters, but the station number indicates [98k+570].

Figure 2.77 Station Number Discrepancy (Conceptual Presentation)



The station numbers that do not correspond to the actual distances from kilometer posts are noted in a separate file.

Figure 2.78 Station Number Discrepancies - Excel Working Data (0005)

	A	B	C	D	E	F	G	H	I	J	K
1	0005	01	001	0	3	9	9	181	580		*181k+580(181k+570)
2	0005	01	001	0	3	9	9	234	1660		*234k+1660(234k+885)
3	0005	01	001	0	3	9	9	284	24825		*284k+24825(284k+900)
4	0005	01	021	0	3	9	9	400	480		*400k+480(400k+600)
5	0005	01	021	0	3	9	9	421	145		*421k+145(421k+150)
6	0005	01	005	0	3	9	9	11	176		*11k+176(11k+135)
7	0005	01	010	0	2	9	9	0	6800		*0k+6800(6k+500)
8	0005	01	010	0	1	9	9	0	6815		*0k+6815(6k+500)
9	0005	01	010	0	3	9	9	98	230		*98k+230(98k+360)
10	0005	01	010	0	3	9	9	93	5205		*93k+5205(98k+400)
11	0005	01	010	0	3	9	9	144	115		*144k+115(144k+200)
12	0005	01	010	0	3	9	9	144	27500		*144k+27500(173k+250)
13	0005	01	010	1	2	9	9	0	6420		*0k+6420(6k+414)
14	0005	01	010	1	1	9	9	0	6410		*0k+6410(6k+414)
15	0005	01	018	0	3	9	9	46	285		*46k+285(46k+300)
16	0005	01	018	1	3	9	9	-0	1595		*-0k+1595(-1k+593)
17	0005	01	037	0	3	9	9	60	970		*60k+970(61k+000)
18	0005	01	037	0	2	9	9	82	1485		*82k+1485(82k+1470)
19	0005	01							1505		*82k+1505
20	0005	01	Common Items						165		*96k+165
21	0005	01							3555		*3k+3555k
22	0005	01	038	0	3	9	9	11	1345		*11k+1345(12k+345)
23	0005	01	038	0	3	9	9	11	565		*11k+565(11k+555)
24	0005	01	038	0	3	9	9	11	1415		*11k+1415(12k+345)
25	0005	01	038	0	3	9	9	28	415		*28k+415(28k+235)
26	0005	01	038	0	3	9	9	28	445		*28k+445(28k+260)
27	0005	01	038	0	3	9	9	52	10		*52k+10(52k+000)
28	0005	01	038	0	2	9	9	52	13400		*52k+13400(67k+455)
29	0005	01	038	0	2	9	9	52	13445		*52k+13445(67k+455)

The station number discrepancy notation shall follow the following notation standards:

Table 2.30 Station Number Discrepancy Notation

Explanation	*	kilometer post number	k	actual distance from the kilometer post in meter	(kilometer post number currently being managed	k	distance currently managed)
Example	*	181	k	580	(181	k	570)

The example would be expressed: *181k580(181k570)

After entering all the data, adjust the column widths. The column widths are specified in Table 2.31.

Table 2.31 Column Width Specifications (0005)

Column	Width	Column	Width
A	4	G	1
B	2	H	4
C	3	I	5
D	2	J	4
E	1	K	5
F	1	L	100

After adjusting the column widths, save as .prn file; the file name is 0005. Excel gives the file extension automatically. Remove the file extension manually and rename the file to 0005.

Figure 2.79 Road Management Data (0005)

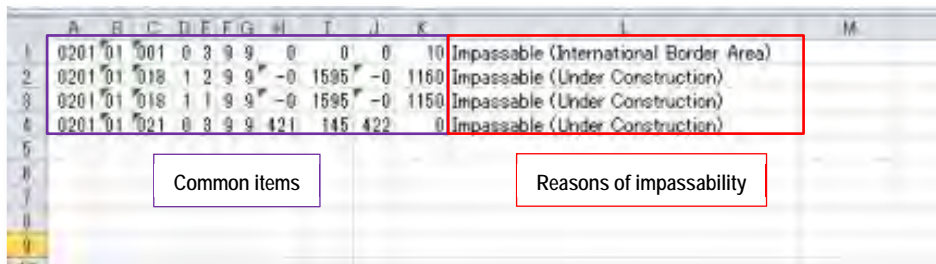
```

000501001 0399 181 580 *181k+580 (181k+570)
000501001 0399 234 1660 *234k+1660 (235k+885)
000501001 0399 23424825 *234k+24825 (258k+900)
000501021 0399 409 480 *409k+480 (409k+600)
000501021 0399 421 145 *421k+145 (421k+150)
000501005 0399 11 175 *11k+175 (11k+135)
000501010 0299 0 6800 *0k+6800 (6k+500)
000501010 0199 0 6815 *0k+6815 (6k+500)
000501010 0399 93 230 *93k+230 (93k+360)
000501010 0399 93 5205 *93k+5205 (95k+400)
000501010 0399 144 115 *144k+115 (144k+200)
000501010 0399 14427500 *144k+27500 (173k+250)
000501010 1299 0 6420 *0k+6420 (6k+414)
000501010 1199 0 6410 *0k+6410 (6k+414)
000501018 0399 46 285 *46k+285 (46k+300)
000501018 1399 -0 1595 *-0k+1595 (-1k-593)
000501037 0399 60 970 *60k+970 (61k+000)
000501037 0299 82 1485 *82k+1485 (82k+1470)
000501037 0199 82 1505 *82k+1505 (82k+1470)
000501037 0399 95 165 *95k+165 (95k+180)
    
```

J. Impassable Road Segments (0201)

There are segments of road in the survey route that cannot be entered. Generally there are two reasons: under construction areas and international border areas.

Figure 2.80 Impassable Road Segment Data – Excel Work File (0201)



To clarify "under construction," "Impassable (Under Construction)" shall be entered. For the international border areas, "Impassable (International Border Area)" shall be entered at the remark section. For those reasons that are not identifiable "Impassable (Other)" shall be encoded.

Following table shows how to encoded data to the column L of an Excel sheet.

Table 2.32 Impassable Road Segment Data – Three Reasons

Reason	Description to be selected
Close the international border area	Impassable (International Border Area)
Under construction	Impassable (Under Construction)
Others	Impassable (Others)

After the encoding work is finished, the column widths need to be adjusted as in Table 2.33.

Table 2.33 Impassable Road Segment Data

Column	Width	Column	Width
A	4	G	1
B	2	H	4
C	3	I	5
D	2	J	4
E	1	K	5
F	1	L	100

After adjusting the column widths, save as .prn file; the file name is 0201. Excel gives the file extension automatically. Remove the file extension manually and rename the file to 0201.

Figure 2.81 Road Management Data File (0201)

```
020101001 0399 0 0 0 10Impassable (International Border Area)
020101018 1299 -0 1595 -0 1160Impassable (Under Construction)
020101018 1199 -0 1595 -0 1150Impassable (Under Construction)
020101021 0399 421 145 422 0Impassable (Under Construction)
```

(7) Survey Quantity Table (After Reconnaissance Survey)

The purpose of preparing the Survey Quantity Table is to organize information on road segments of: under construction, overlapping, changes in jurisdiction and management company. The table is recorded digitally in an Excel file.

Figure 2.82 Survey Quantity Table (An Example)

Route Name	Direction	Location		Section Length (m)	Route Total (m)	Remarks
		From (km,m)	To (km,m)			
National Highway 1	Down	0 ⁰	0 ⁰	10 ⁰	10 ⁰	Cannot survey (border to China)
National Highway 1	Down	0 ⁰	10 ⁰	171 ⁰	172,350 ⁰	
National Highway 1	Down	181 ⁰	580 ⁰	234 ⁰	1660 ⁰	54,700 ⁰
National Highway 1	Down	234 ⁰	1660 ⁰	234 ⁰	24825 ⁰	23,165 ⁰
National Highway 1	Down	234 ⁰	24825 ⁰	285 ⁰	400 ⁰	25,945 ⁰
National Highway 1	Up	0 ⁰	0 ⁰	10 ⁰	10 ⁰	Cannot survey (border to China)
National Highway 1	Up	0 ⁰	10 ⁰	171 ⁰	550 ⁰	172,515 ⁰
National Highway 1	Up	181 ⁰	580 ⁰	211 ⁰	0 ⁰	29,845 ⁰
National Highway 1	Up	211 ⁰	0 ⁰	211 ⁰	1870 ⁰	1,870 ⁰
National Highway 1	Up	211 ⁰	1870 ⁰	234 ⁰	1660 ⁰	23,670 ⁰
National Highway 1	Up	234 ⁰	1660 ⁰	234 ⁰	24825 ⁰	23,165 ⁰
National Highway 1	Up	258 ⁰	900 ⁰	285 ⁰	400 ⁰	25,970 ⁰
Southern Ring Road No.3 to Cau Dau	Down	159 ⁰	545 ⁰	171 ⁰	550 ⁰	12,180 ⁰
Southern Ring Road No.3 to Cau Dau	Down	171 ⁰	550 ⁰	174 ⁰	310 ⁰	2,770 ⁰
Southern Ring Road No.3 to Cau Dau	Up	159 ⁰	545 ⁰	171 ⁰	550 ⁰	12,185 ⁰
Southern Ring Road No.3 to Cau Dau	Up	171 ⁰	550 ⁰	174 ⁰	310 ⁰	2,770 ⁰
National Highway 2	Down	30 ⁰	600 ⁰	312 ⁰	375 ⁰	274,930 ⁰
National Highway 2	Down	312 ⁰	375 ⁰	312 ⁰	500 ⁰	125 ⁰
National Highway 2	Up	30 ⁰	600 ⁰	312 ⁰	375 ⁰	274,935 ⁰
National Highway 2	Up	312 ⁰	375 ⁰	312 ⁰	500 ⁰	125 ⁰
National Highway 3	Down	33 ⁰	300 ⁰	51 ⁰	0 ⁰	17,850 ⁰
National Highway 3	Down	51 ⁰	0 ⁰	63 ⁰	90 ⁰	12,175 ⁰

The data to be recorded are: route name; direction; location (from, to); section length; route total; and remarks. The table is prepared from the Trip Meter data.

Table 2.34 Trip Meter Data to Survey Quantity Table (An Example)

code	route	bru	dir	lane	location			length		
0003	100	0	2	9	9	0	0	1	0	1000
0003	100	0	2	9	9	1	0	2	0	1000
0003	100	0	2	9	9	2	0	3	0	1000
0003	100	0	2	9	9	3	0	4	0	1000
0003	100	0	2	9	9	4	0	5	0	1000
:	:	:	:	:	:	:	:	:	:	:
:	:	:	:	:	:	:	:	:	:	:
0003	100	0	2	9	9	29	0	30	0	1000
0003	100	0	2	9	9	30	0	31	0	1000
0003	100	0	2	9	9	31	0	32	0	1000
0003	100	0	2	9	9	32	0	33	0	1000
0003	100	0	2	9	9	33	0	34	0	1000
0003	100	0	2	9	9	34	0	35	0	1000
0003	100	0	2	9	9	35	0	36	0	1000
0003	100	0	2	9	9	36	0	37	0	1000
0003	100	0	2	9	9	37	0	38	0	1000
0003	100	0	2	9	9	38	0	39	0	1000
0003	100	0	2	9	9	39	0	40	0	1000
0003	100	0	2	9	9	40	0	41	0	1000
:	:	:	:	:	:	:	:	:	:	:
0003	100	0	2	9	9	90	0	91	0	1000
0003	100	0	2	9	9	91	0	92	0	1000
0003	100	0	2	9	9	92	0	93	0	1000
0003	100	0	2	9	9	93	0	94	0	1000
0003	100	0	2	9	9	94	0	95	0	1000
0003	100	0	2	9	9	95	0	96	0	1000
0003	100	0	2	9	9	96	0	97	0	1000
0003	100	0	2	9	9	97	0	98	0	1000
0003	100	0	2	9	9	98	0	99	0	1000
0003	100	0	2	9	9	99	0	100	0	1000

Figure 2.83 Trip Meter Data to Survey Quantity Table (An Example)

National Highway100

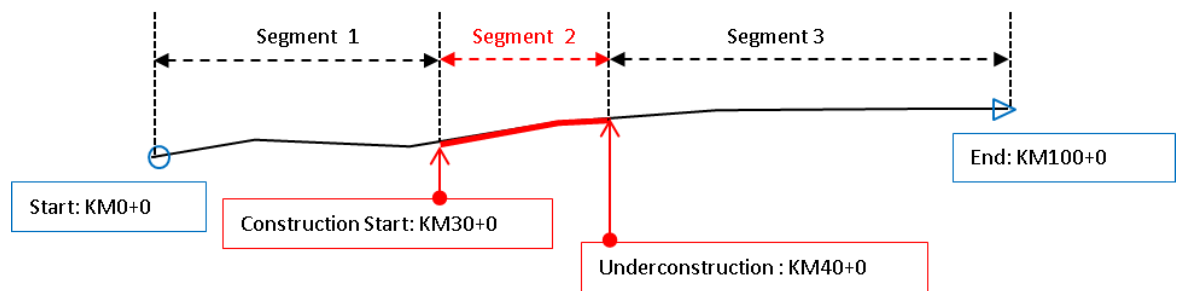


Figure 2.84 Organization of Survey Quantity Table

	Route name	Direction	Location		Section Length (m)	Route Total (m)	Remarks
			From (km,m)	To (km,m)			
Segment 1	National Highway 100	down	0	30	30,000		
Segment 2	National Highway 100	down	30	40	10,000		under construction
Segment 3	National Highway 100	down	40	100	60,000	100,000	
Segment 1	National Highway 100	up	0	30	30,000		
Segment 2	National Highway 100	up	30	40	10,000		under construction
Segment 3	National Highway 100	up	40	100	60,000	100,000	

2.6 Outputs of Field Reconnaissance

The outputs of the field reconnaissance are summarized in Table 2.35:

Table 2.35 Outputs of Field Reconnaissance

Output Type	Media	File Format	Item	Storage
Forms	Paper	A4	Form_FR01 Work Material Check List	Paper folder
	Paper	A4	Form_FR02 Vehicle Inspection	
	Paper	A4	Form_FR03 Safety Management Record	
	Paper	A4	Form_FR04 Field Note	
	Paper	A4	Form_FR05 Daily Activity Record	
Photographs	Digital	jpeg		Hard Disk
Trip Meter Data	Digital	Excel		
Road Management Data	Digital	text	Jurisdiction, Management Company	
	Digital	text	Kilometer Post	
	Digital	text	Overlapping Road Segment	
	Digital	text	Lane Structure	
	Digital	text	Road Structure	
	Digital	text	Intersection	
	Digital	text	Station Number Discrepancies	
Digital	text	Impassable Road Segment		
Survey Quantity Table	Digital	Excel		