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Wim + response appendices, March 1986

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WIM+RESPONSE APPENDICES

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METRIC CONVERSION FACTORS

Approximate Conversions to Metric Measures

Symbol	When You Know	Multiply by	To Find	Symbol
LENGTH				
in	inches	2.5	centimeters	cm
ft	feet	30	centimeters	cm
yd	yards	0.9	meters	m
mi	miles	1.6	kilometers	km

AREA

in ²	square inches	6.5	square centimeters	cm ²
ft ²	square feet	0.09	square meters	m ²
yd ²	square yards	0.8	square meters	m ²
mi ²	square miles	2.6	square kilometers	km ²
	acres	0.4	hectares	ha

MASS (weight)

oz	ounces	28	grams	g
lb	pounds	0.45	kilograms	kg
	short tons (2000 lb)	0.9	tonnes	t

VOLUME

tsp	teaspoons	5	milliliters	ml
Tbsp	tablespoons	15	milliliters	ml
fl oz	fluid ounces	30	milliliters	ml
c	cups	0.24	liters	l
pt	pints	0.47	liters	l
qt	quarts	0.95	liters	l
gal	gallons	3.8	liters	l
ft ³	cubic feet	0.03	cubic meters	m ³
yd ³	cubic yards	0.76	cubic meters	m ³

TEMPERATURE (exact)

°F	Fahrenheit temperature	5/9 (after subtracting 32)	Celsius temperature	°C
----	------------------------	----------------------------	---------------------	----

Approximate Conversions from Metric Measures

Symbol	When You Know	Multiply by	To Find	Symbol
LENGTH				
mm	millimeters	0.04	inches	in
cm	centimeters	0.4	inches	in
m	meters	3.3	feet	ft
m	meters	1.1	yards	yd
km	kilometers	0.6	miles	mi

AREA

cm ²	square centimeters	0.16	square inches	in ²
m ²	square meters	1.2	square yards	yd ²
km ²	square kilometers	0.4	square miles	mi ²
ha	hectares (10,000 m ²)	2.5	acres	

MASS (weight)

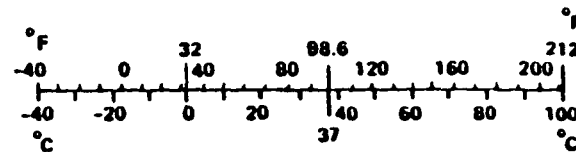
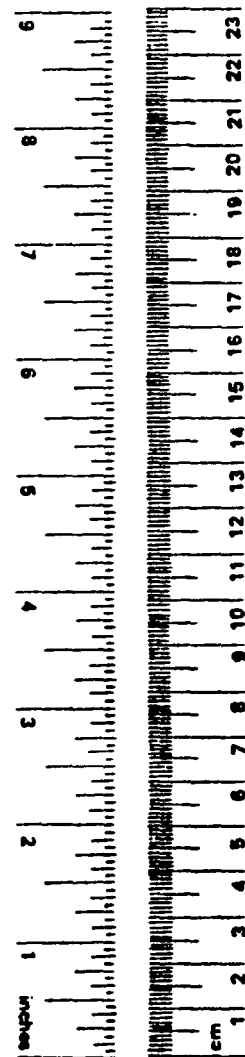
g	grams	0.035	ounces	oz
kg	kilograms	2.2	pounds	lb
t	tonnes (1000 kg)	1.1	short tons	

VOLUME

ml	milliliters	0.03	fluid ounces	fl oz
l	liters	2.1	pints	pt
l	liters	1.06	quarts	qt
l	liters	0.26	gallons	gal
m ³	cubic meters	35	cubic feet	ft ³
m ³	cubic meters	1.3	cubic yards	yd ³

TEMPERATURE (exact)

°C	Celsius temperature	9/5 (then add 32)	Fahrenheit temperature	°F
----	---------------------	-------------------	------------------------	----



* 1 in = 2.54 (exactly). For other exact conversions and more detailed tables, see NBS Misc. Publ. 286, Units of Weights and Measures, Price \$2.26, SD Catalog No. C13.10:286.

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1. FIELD TIPS AND NOTES

1.1 Cable Arrangements:

- a. Short gray cables (5 conductor) connect the WIM transducers either to the junction box or S-Box, which is connected to the WIM conditioner through a larger cable(19 conductor), or directly to the WIM conditioner.
- b. White cables connect strain gages directly to the RESPONSE conditioner.
- c. Long gray cables (5 conductor) connect tapeswitches (T-Box) to the WIM conditioner.
- d. Numbering of the cables (gray or white), at both ends, which corresponds to the number of the channel will be helpful in locating the gages on the bridge and possible errors that might occur such as bad connections.
- e. All of the connectors must be inspected before connection, and care must be taken to ensure that they are free of dirt and moisture (especially if they are left overnight).

1.2 Tapeswitches:

- a. In placement of the tapeswitches on the pavement, the distance between tapeswitch one (TS1) and tapeswitch two (TS2) in lane one, and tapeswitch three (TS3) and tapeswitch four (TS4) in lane two should be greater than 4.0 feet for accurate velocity determination.
- b. Tapeswitches are always put on the roadway perpendicular to the direction of traffic. For a skew bridge, the distance between tapeswitch 1 and bridge is defined as the average distance of those at both ends of a tapeswitch.
- c. Test all of the tapeswitches to ensure they work properly. This is done by stepping on the connected tapeswitches to see if the corresponding LED lamp inside the van lights on.
- d. If you are getting different number of axles from TS1 and TS2, adjust the PULSE WIDTH dial on the WIM conditioner (clockwise gives a longer pulse).
- e. The tapeswitches are connected to the connector as shown in Figure 1.

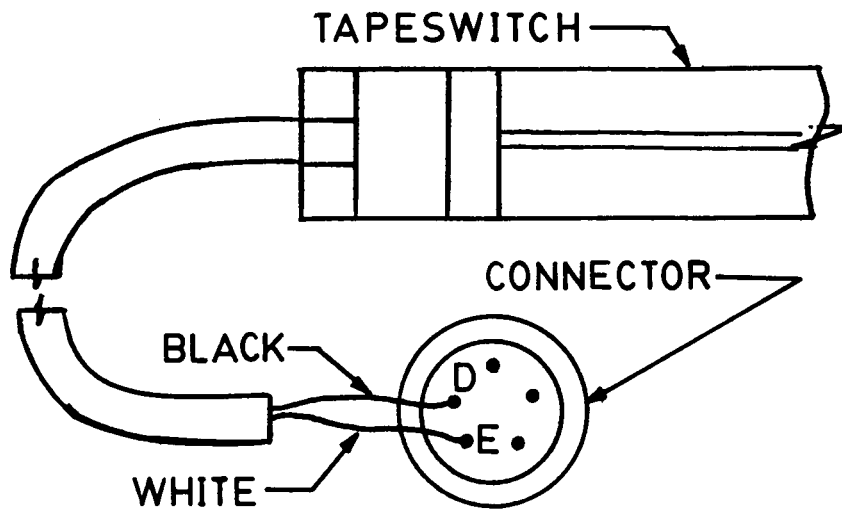


Figure 1 - Connection of Tapeswitch to the Connector

f. Mounting of tapeswitches on the pavement.

1. Sweep the pavement's surface carefully to remove dust and dirt.
2. If the pavement is not dry, remove as much moisture as possible with a propane burner.
3. Stick a double-sided tape on the back of the tapeswitches to help secure them to the pavement.
4. Cover the tapeswitches with heavy-duty tape, twice. First, right on top of the tapeswitch so it holds the tapeswitch to the deck. Second, move about an inch toward the traffic so it protects the first layer of tape.
5. Application of a gummy substance around the tape will prevent the intrusion of moisture under the tape.

1.3 Truck weight calculation:

- a. A negative front axle weight as determined by field processing may be due to a vehicle in an adjacent lane or a vehicle that is changing lanes. Also, in the case of a skew bridge, you may want to disregard some of the initial samples.

1.4 Transducers:

- a. For prestressed concrete girders, the door clamps should be used to mount the transducers.

1.5 Conditioners:

- a. Check if all channels are working properly by the flashing of lights for each channel on the conditioner when vehicles pass over the bridge.

1.6 Power Frequency Meter:

- a. Be sure that the power frequency is approximately 60 Hz.

1.7 Keypad:

- a. Make sure buttons operate properly by checking the readout from the CRT screen as the buttons are pressed (activated).
- b. In case that keypad is used to choose specific trucks for data collection, the keypad operator must make sure that when a button is pressed, another vehicle will not activate the tapeswitches before the chosen truck.

2. Modifications and Up-Dates to the WIM+RESPONSE System

The Master Program Library (MPL) has the primary purpose of maintaining the integrity of the computer programs and associated data undergoing any evaluation. This entails ensuring that the current computer program code is verified and that it accurately represents the capabilities in the released documents. Version integrity is maintained by controlling the progressive construction (or reconstruction) of the computer program versions by FHWA or other personnel by conducting integrity checks over the code.

Integrity checks on constructed versions of computer programs are performed by the person in charge of the MPL for two reasons:

- (1) to provide assurance that the version has remained unchanged from the time it was tested and certified as an authorized version; and
- (2) to demonstrate a continuous record of version development.

To help ensure integrity of the WIM+RESPONSE programs, the following procedure (checklist) is suggested.

Accounting and Reporting to the MPL

Typical information includes (for each program affected).

1. Date of the change.

2. Number of the version of the software release.
3. Name of the person making and validating the change.
4. Name of the person approving the change.
5. The previous version number that can be used as a back-up if problems occur.
6. Type of change - including capabilities affected.
7. Related programs that are affected.
8. Checklist of WIM+RESPONSE documentation manuals affected.
9. Changes to listings of Software and modifications to the Software Reference Manual or System User's Guide.

This log file should be included in the Appendices Manual to the WIM+RESPONSE documentation.

Each piece of information required for reporting should be directly entered into the disks for system software and documentation so that users know the current status accurately and correctly.

3. Operating System

The present configuration of the WIM+RESPONSE system utilize V5.1c of the DEC operating system. The reason for this update was that the previous version is no longer supported by DEC.

The procedures for generating the operating system (SYSGEN) can be found in DEC Manual RT-11 Installation Guide (AA-H376E-TC) as contained in the Master Program Library for the WIM+RESPONSE system.

The advantages of the new operating system include a graphics capability, and more efficient memory management.

It is important to note though that the following options are no longer supported under the new DEC operating system V5.1C.

1. The original plotting routine PLOT55 is not applicable any longer.
2. The PRINT command is not applicable to the new system. In order to get a hard copy, program PRINTQ must be executed prior to any program. Then, all the information shown on the screen will be transferred to the line printer and a hard copy will be obtained. When hard copy is no longer needed, simply execute the program STOPRI.

4. System Power Up - Booting the System

The MINC system can be started by turning all the components of the system on. The MINC system consists of a CPU with lab modules, disk drives, a terminal and the MINC cart. Each of these components has an ON/OFF switch and can be powered individually. Usually, these components are plugged in at the MINC cart and can be powered up simultaneously by the ON/OFF switch on the MINC cart.

Booting of the system is now set in manual mode. The procedure required to boot the system is as follows:

(a) turn on the ON/OFF switch to ON on the cart

(b) the system will respond with:

```
28
STARTS?
```

(c) The user should now input "DY0" or "DY1" depending on which drive the system disk resides.

(d) If the system responds with:

```
RT-11SJ V05.01C
.SET TT SCOPE
.SET USR SWAP
.ASS DY1: 14
.ASS DY1: 15
```

then the system has been successfully booted.

(e) If the system responds with:

```
?BOOT - U - I/O error
```

the system booting has not succeeded. The user should push the "BREAK" key on the keyboard and then start step (c) again.

5. File Maintenance

5.1 Initializing and Formatting Disks

With an operating system on DY0: and a new blank disk on DY1: the procedure required to format and initialize the blank disk is as follows:

(a) The user should enter:

```
R FORMAT
```

(b) The system will respond with

*

(c) The user should then enter:

DY1:

(d) The system will respond with:

DY1: FORMAT - Are You Sure?

(e) The user should enter a "Y" if the disk is drive 1 is the right one to be formatted.

(f) The system will start to format the disk in drive 1. As soon as the formatting is finished, the system will respond with:

?FORMAT -I-Formatting complete
*

(g) The user should enter a CTRL C when the formatting is finished. The user should now enter:

INIT/BAD DY1:

This procedure is to initialize the disk and search for any bad blocks that may be contained on the disk. If no bad blocks are found, the system will respond with:

? DUP-I-No bad blocks detected DY1:

and the initializing is finished.

5.2 Copying Files

(1) System file copying

System file copying can be done by using the following command:

```
COPY/SYS < filespec 1> < filespec 2>
```

Where <filespec 1> is the file to be copied from and <filespec 2> is the file to be copied to. The filespec should contain the disk where the file is on, the file name and type of the file. For example:

```
COPY/SYS DY0: LP.SYS    DY1: LP.SYS
```

the command will copy system file LP.SYS from DY0: to DY1:

(2) Ordinary file copying

The following command can be used to copy data files and program files:

```
COPY <filespec 1> <filespec 2>
```

The filespec is same as mentioned in (1).

(3) Two disk copy

To copy files between the disk in drive 1 and the disk other than the system disk in drive 0, the following procedure must be followed.

(a) The user should enter:

```
COPY/WAIT <filespec 1> <filespec 2>
```

where filespec is same as mentioned in (1). For example, if a file TEST.SAV on a 3rd disk is to be copied to the disk in drive 1, the following command must be entered:

```
COPY/WAIT DY0: TEST.SAV DY1: TEST.SAV
```

(b) The system will then respond with:

```
MOUNT input volume in DY0:; CONTINUE?
```

(c) The user should now replace the system disk in DY0: with the 3rd disk on which the input file resides, and then enter

Y

(d) The system will respond with:

```
MOUNT output volume in DY1:; CONTINUE?
```

(e) The user should put the disk to accept the output file in DY1, and enter:

Y

(f) The system will respond with:

```
MOUNT system volume in DY0: CONTINUE?
```

(g) The user should put the previous system disk back into DY0: and enter:

Y

Then the copying will be completed.

5.3 Deleting Files

A file can be deleted from the disk by the following command:

```
DELETE <filespec>
```

where, an example of filespec is: DYO:TEST.SAV

5.4 Listing Files

'TYPE' command is the only command available for listing a file. To get a hard copy of the listing, PRINTQ must be executed prior to using the TYPE command. An example of getting a listing is as follows:

```
TYPE DYO:TEST.FOR
```

Note: The binary form files cannot be listed.

For further information regarding file maintenance, please see the DEC manual RT-11 V.5 Volume 2A, System User's Guide.