

CHAPTER 10
MEASUREMENT OF ROAD SURFACE
CONDITIONS

10.1 INTRODUCTION

The four types of measurement devices used by the Pavement Group for its road surface condition surveys included a rut depth gauge, a loose material container, a skid meter and a texture meter.

10.2 RUT DEPTH GAUGE

The rut depth gauge is shown in Figure 10.1 and was used by the Pavement Group and the Traffic Experiments Group. The Pavement Group measured rut depth as a performance parameter of paved and unpaved roads. The Traffic Experiments Group measured rut depth to evaluate its influence on vehicle speed and fuel consumption.

Four gauges were used during the research. The prototype was constructed at a local machine shop. The Instrumentation Group produced the other three in its own workshop. Construction details for the gauge are covered in a Project Instrumentation Memo (Buller, "Rut Depth Gauge").

The instrument consists of a triangular aluminum frame with a graduated aluminum or steel bar which slides vertically through the center of the frame.

Scale accuracy is ensured by using a steel rule recessed into the sliding bar. The scale has a range of 0-30 centimeters and can be read to the nearest millimeter. The base length is 1.10 meter.

Figure 10.2 shows a cross-sectional view of the device on a road. Figure 10.4 is an actual example of its use. The device was made in two sizes since the original instrument was too large to be carried in small cars.

10.3 LOOSE MATERIAL SAMPLING DEVICE

The equipment used to measure gravel looseness is shown in Figure 10.3. It includes a rectangular steel angle frame, which was used to define the area from which loose material was to be collected,

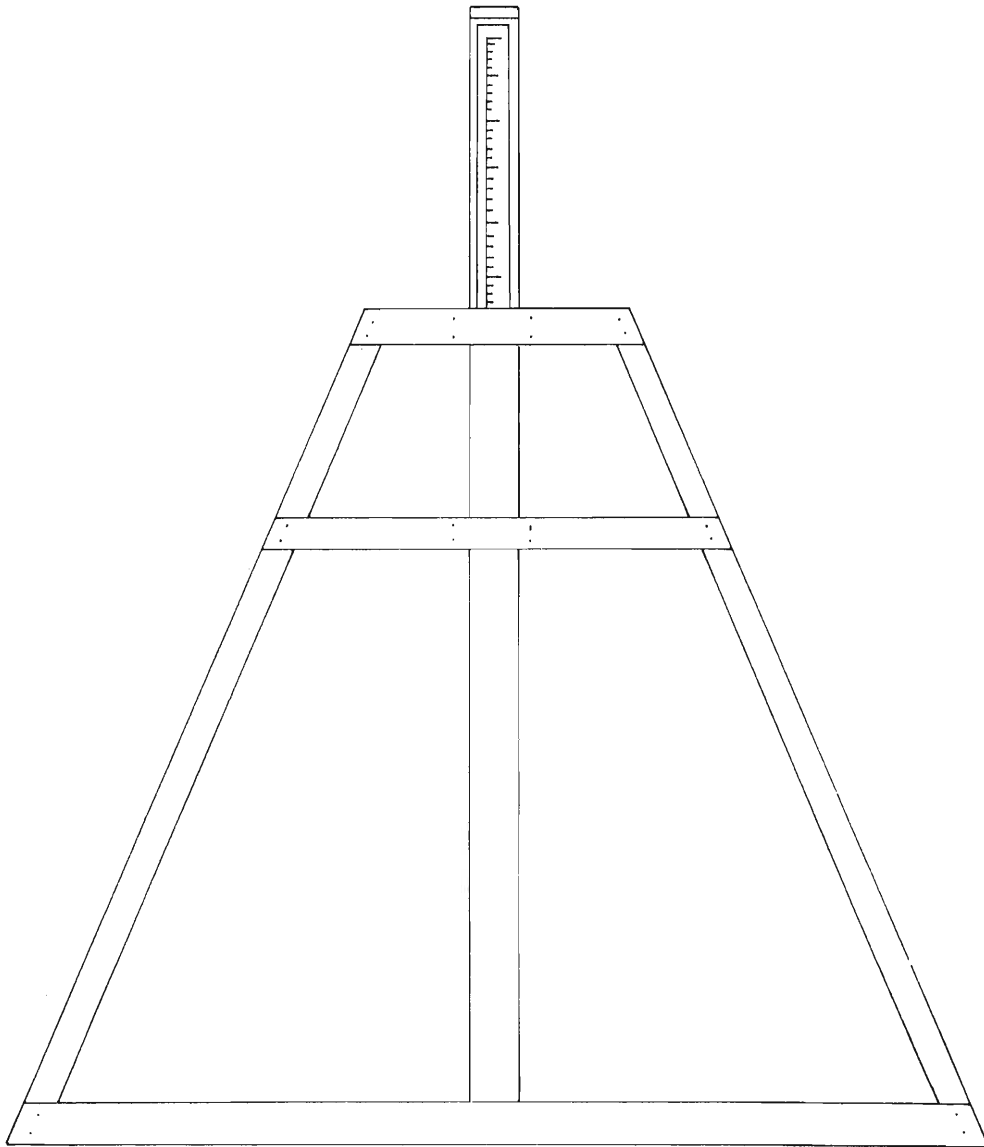


FIGURE 10.1 - RUT DEPTH GAUGE

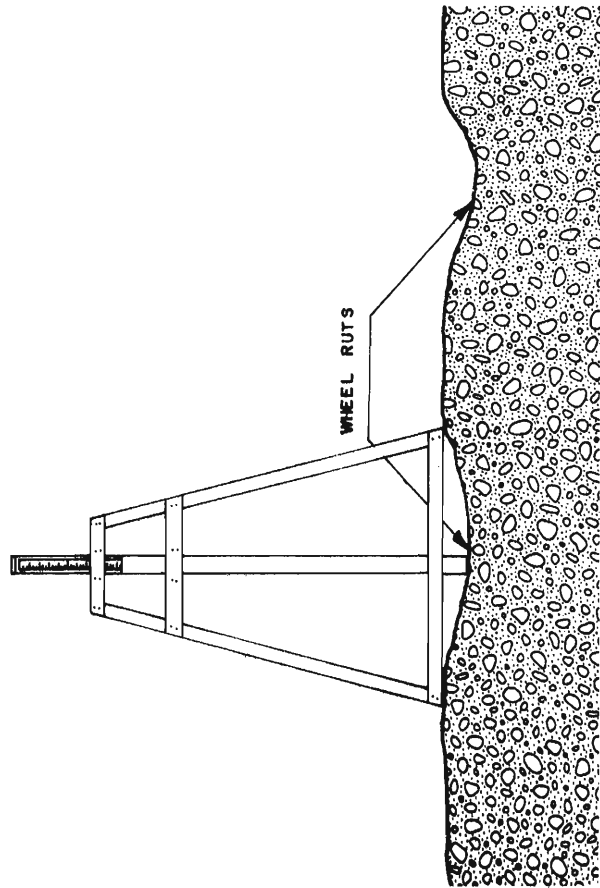
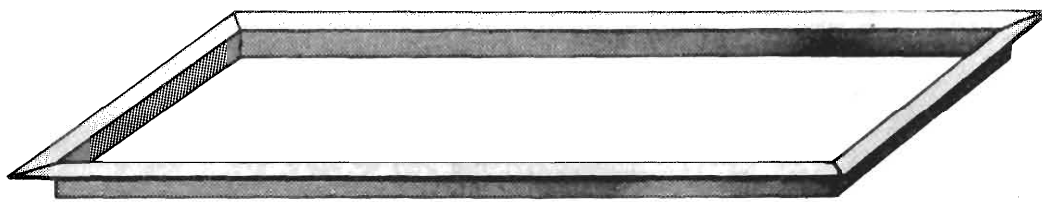
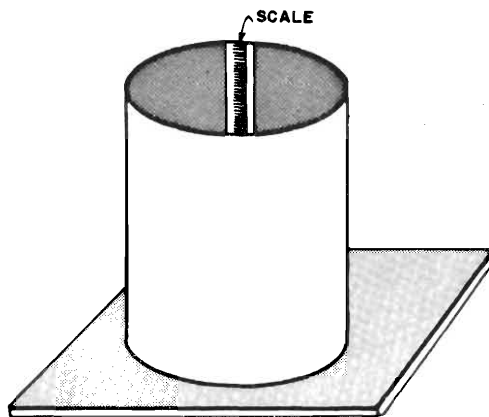


FIGURE 10.2 - RUT DEPTH GAUGE IN OPERATION



FRAME



SCALE

MEASURING CYLINDER



DUST PAN AND WIRE BRUSH

FIGURE 10.3 - LOOSE MATERIAL SAMPLER

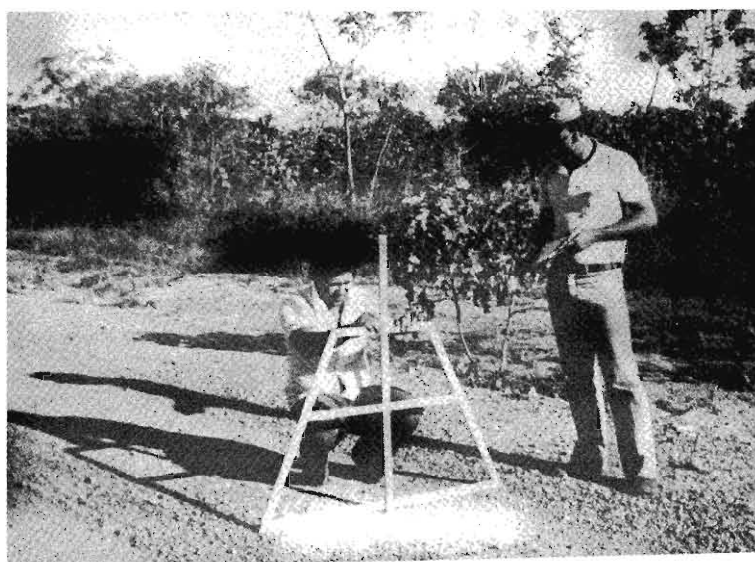


FIGURE 10.4 - TECHNICIANS MEASURING RUT DEPTH AND GRAVEL LOOSENESS ON AN UNPAVED ROAD

a measuring cylinder and a small household-type dust pan and brush. The frame and measuring cylinder were constructed in a local machine shop. The latter two items were purchased locally. Figure 10.4 shows loose material being measured in the field.

10.4 SKID RESISTANCE TESTER

The skid resistance tester model Mark IV, manufactured by DIE-A-MATIC, INC., was used by the Pavement Group to study the skid resistance of selected road sections in the Federal District of Brazil. The results from these tests are presented in a Project Technical Memo (Visser, Technical Memo No. 22/76).

Only one of these instruments was purchased for project use. It received limited usage and required no maintenance.

The instrument was developed for quick checks of skid resistance at selected spots and is illustrated in Figure 10.5. The tester measures the drag force developed between a rubber-heeled shoe and a wet surface at low sliding speeds. Since the former is proportional to the skid resistance of automotive tires, the tester permits the relative rating of a pavement's skidding potential.

The unit is pushed by its operator at a brisk and uniform pace over a wet pavement. The drag force acting on the rubber shoe is converted into a proportional hydraulic signal and displayed by the indicator shown in Figure 10.6.

10.5 TEXT-UR-METER

The texture meter, shown in Figures 10.7 and 10.8, was used to measure the textural roughness of the pavement surface in vehicle wheel paths. It is manufactured by the Rainhart Company. Only one unit was purchased for project use.

The Pavement Group used this instrument in conjunction with the skid tester to study textural properties of roads in the Federal District.

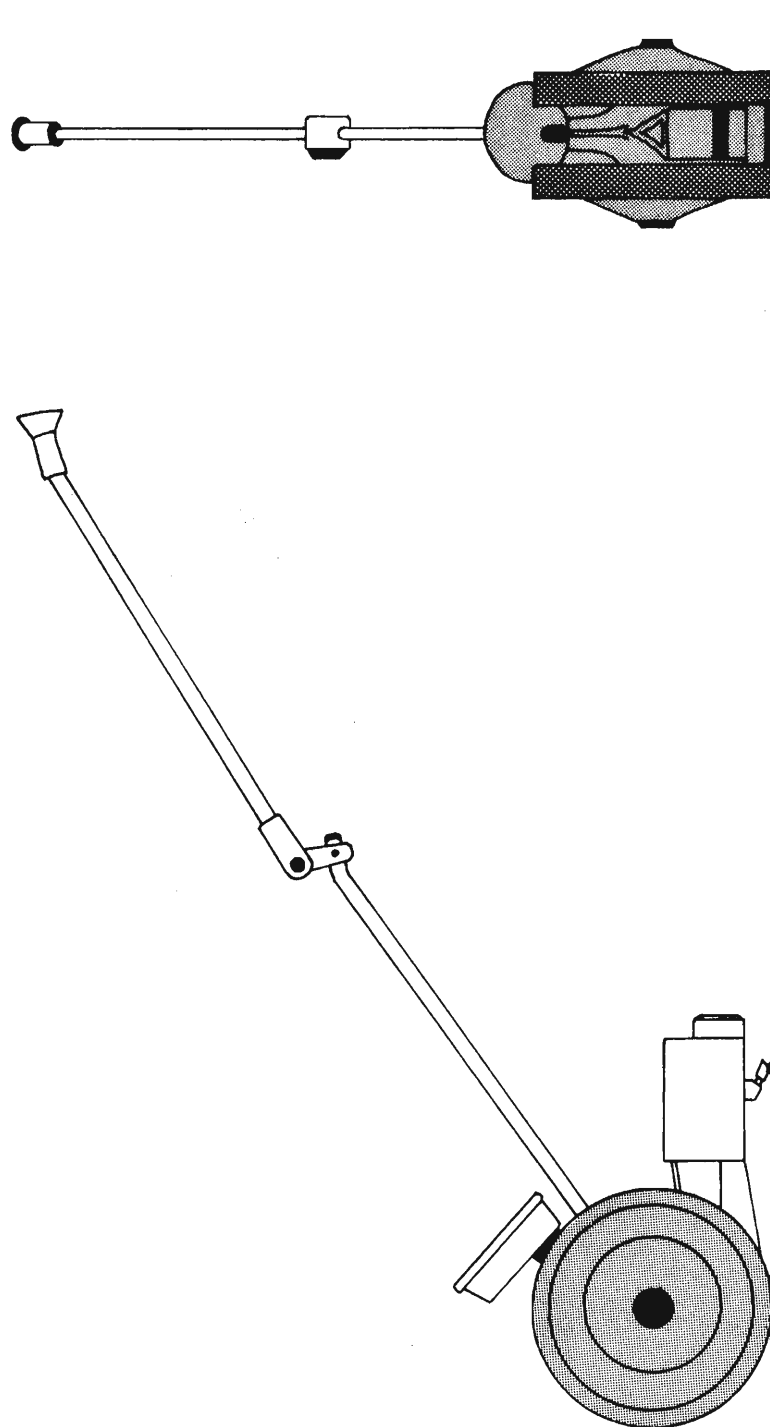


FIGURE 10.5 - SKID-RESISTANCE TESTER

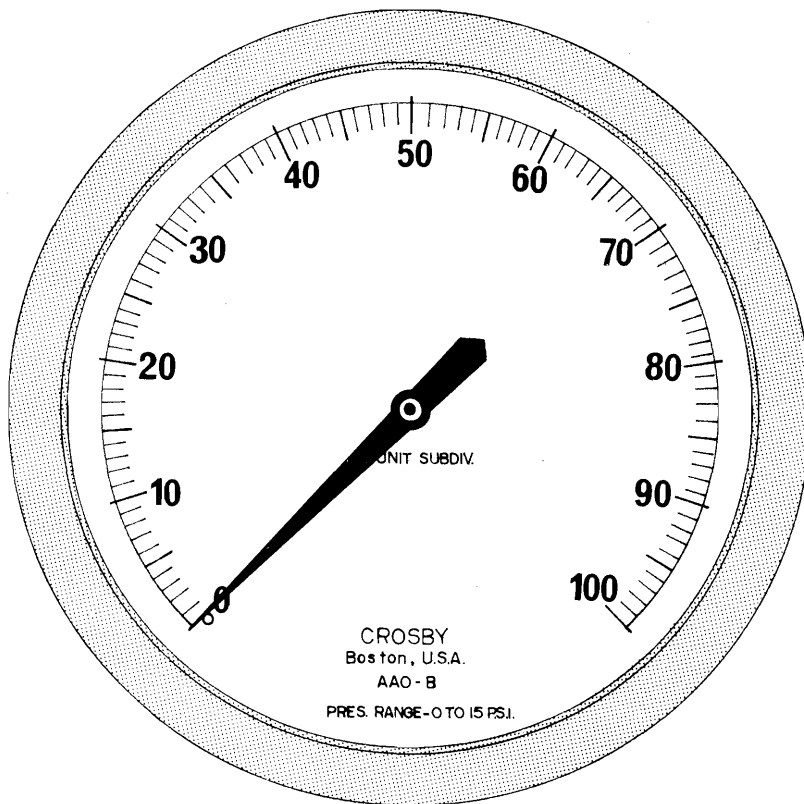


FIGURE 10.6 - INDICATOR OF SKID TESTER

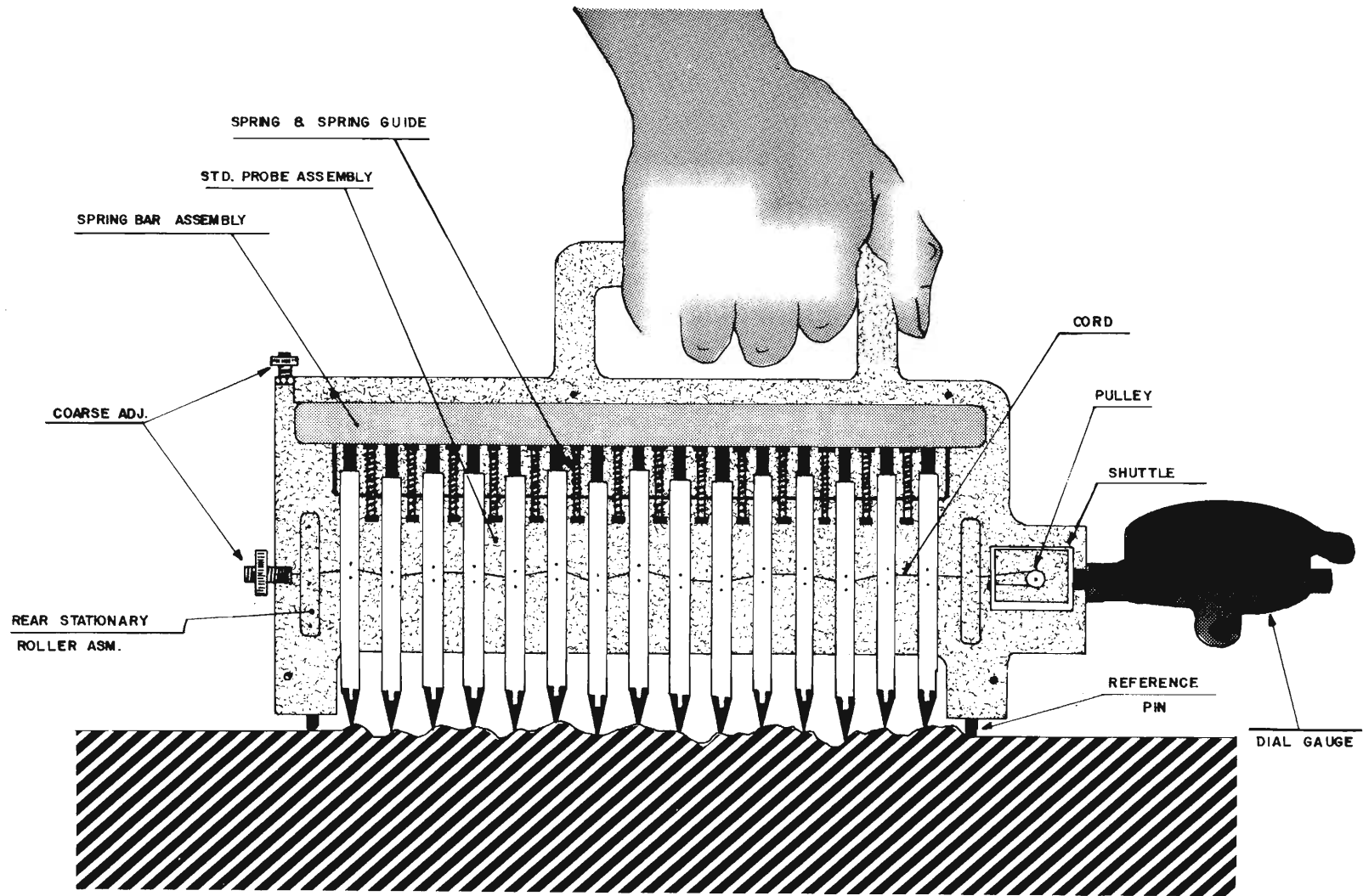


FIGURE 10.7 - TEXT-UR-METER



FIGURE 10.8 - TEXT-UR-METER IN USE

The Text-Ur-Meter is an apparatus which measures the macrotexture of a surface by means of a dial gauge attached to a string that passes through 29 pointers along the profile of the surface. For additional information consult the manufacturer's literature.

