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16. ABSTRACT

Introduction

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The primary objective of the test was stated as the testing of four new traffic count devices. These were the Fischer-Porter Traffic Counter, the Kemco Detector, the Tapeswitch Detector, and the Traffonics Multi-Lane Detector.

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Materials and Research Department

March 1961

Lab. Auth. Proj. 81-R-6229
Work Order 61-13U51H14

Mr. George M. Webb
Traffic Engineer
Division of Highways
Sacramento, California

Dear Sir:

Submitted for your consideration is:

A PROGRESS REPORT ON

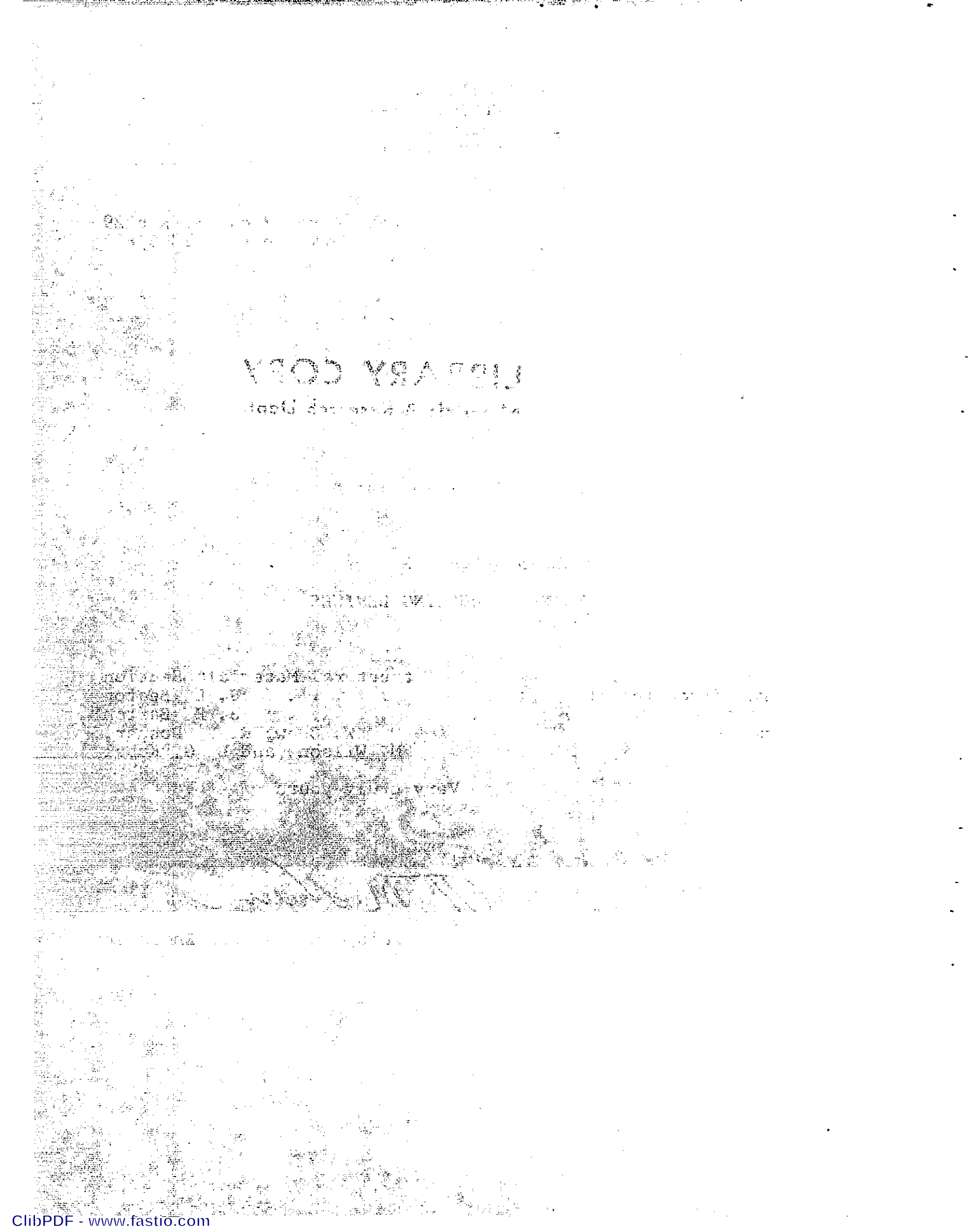
TESTING OF TRAFFIC COUNTING DEVICES

Study made by . . . . . Structural Materials Section
Under general direction of . . . . . J. L. Beaton
Work supervised by . . . . . J. E. Barton
Report prepared by W. Chow, R. L. Donner, M. Wilson, and L. G. Kubel

Very truly yours,

F. N. Hveem
Materials and Research Engineer

WC/RLD/MW/LGK/mw



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FINDINGS

The data does not lend itself to summary form, so the findings concerning each counter are discussed in the narrative concerning each device.

PROCEDURE

Ten Tapeswitch Detectors were applied to the pavement with Pliobond and commercial adhesive tape.

As of February 6, 1961, four Traffonics Multi-Lane Detectors had been installed by representatives of Homer-Long Associates and Traffonics. Two 24 ft. sections were installed with industrial tape only, and two 24 ft. sections with epoxy and industrial tape. One Kemco Detector was imbedded in a slot cut in the pavement. The groove filler used was a Thikol mixture manufactured by Coast Pro-Seal. One Kemco Detector was installed at Tahoe City in cooperation with District III using the standard Kemco compound.

Five pneumatic tubes were placed across the roadway for use with the Streeter-Amet and Fischer-Porter Traffic Counters.

Two imbedded Controflex Type RB-E tapeswitches were installed. One slot was filled with Kemco compound and the other with Coast Pro-Seal. Two imbedded Controflex Type RB-E tapeswitches were also installed at Tahoe City.

All wires from the detectors were terminated in a junction box mounted on the bridge. Cables were strung from the junction box over to the trailer. All counters were placed in the trailer except for a few short duration counts with Streeter-Amet RC Counters at the roadside.

Two Berkeley Electronic Counters, Model 5001 and one Model 5010, were used as our basic standards. Frequent hand counts were taken to confirm the accuracy of the counts. Comparison checks were frequently made between the three Electronic Counters in the same lane.

FISCHER-PORTER

Comparison counts were run between the Fischer-Porter Counters and the Streeter-Amet RC counters. The majority of tests were taken using the pneumatic tubes as detectors. These results were found quite comparable when pneumatic tubes were interchanged during the tests.

The optimum pneumatic switch gap settings for the counters tested were 0.015" for the Fischer-Porter Counters and 0.010" for the Streeter-Amet RC Counters.

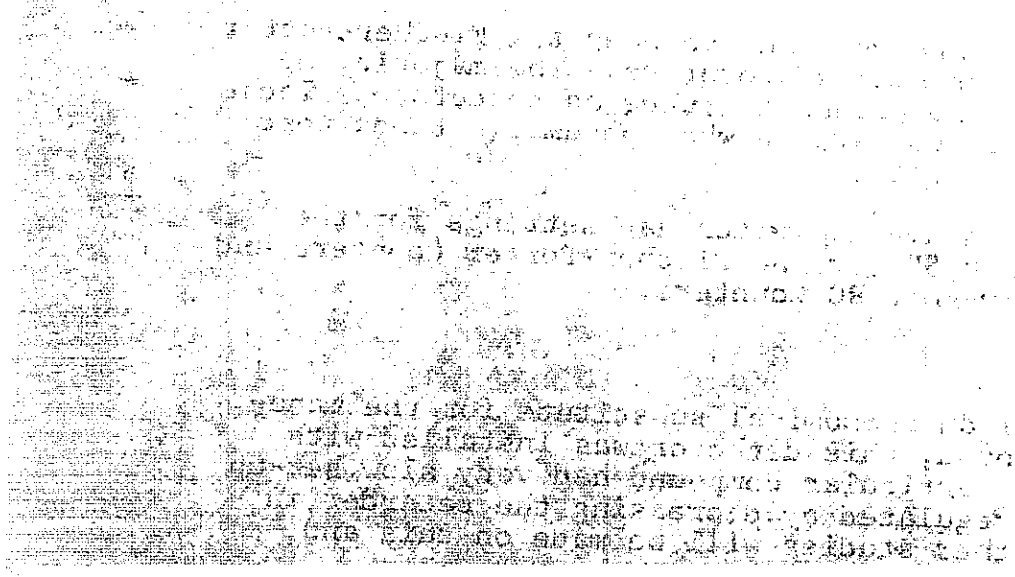
KEMCO DETECTOR

In search of an economical substitute for the manufacturer's Kemco Compound, this detector was installed with Coast Pro-Seal. This particular compound had very slow set-up time but this can be regulated by decreasing the retarder in the accelerator. Further studies will be made on this and cheaper compounds.

This unit has been operating satisfactorily for six weeks and counted approximately half a million vehicles with an accuracy of better than 96.5 percent.

One difficulty anticipated with this type of transducer was possible carbon packing in the microphone. No indication of packing has occurred yet.

Further studies are continuing to develop a less expensive transducer, imbedment compounds, and a portable transistor amplifier.



TAPESWITCH DETECTOR (Surface)

Of the ten Tapeswitch Detectors, six detectors were either partially or totally destroyed before 367,000 vehicle counts. One detector pulled-off the pavement after approximately one million vehicle counts. However, during its last week, this detector was missing counts, apparently the result of broken conductor contact strips. The three detectors still down on the pavement are among the eight detectors that developed shorts and leakage, after 294,000 vehicles, and would not operate the counters.

In fairness to the manufacturer it should be noted that the workmanship on the first tapeswitch was not up to standards. The end cap had a poor epon application resulting in shorting 10 days before destruction. The other Tapeswitches were sealed with Tapeswitch Sealant as per instruction sheet.

All surface tests were made with regular type RB Tapeswitch recommended by the manufacturer for moderate temperatures. For cold weather counting (below 41 degrees fahrenheit) type RB-W is recommended. Type RB-W is a new product and although on order has not yet been received. During the tests all detectors were subjected to temperatures ranging from 80° F. to several weeks of near freezing weather. Several rainy periods occurred during the test.

It was noted that a pulse adapter was necessary on Streeter-Amet RC Counters to accept the short pulses from the Tapeswitch.

The main disadvantages of the surface Tapeswitch appear to be:

(1) Moisture leakage through loose end caps.

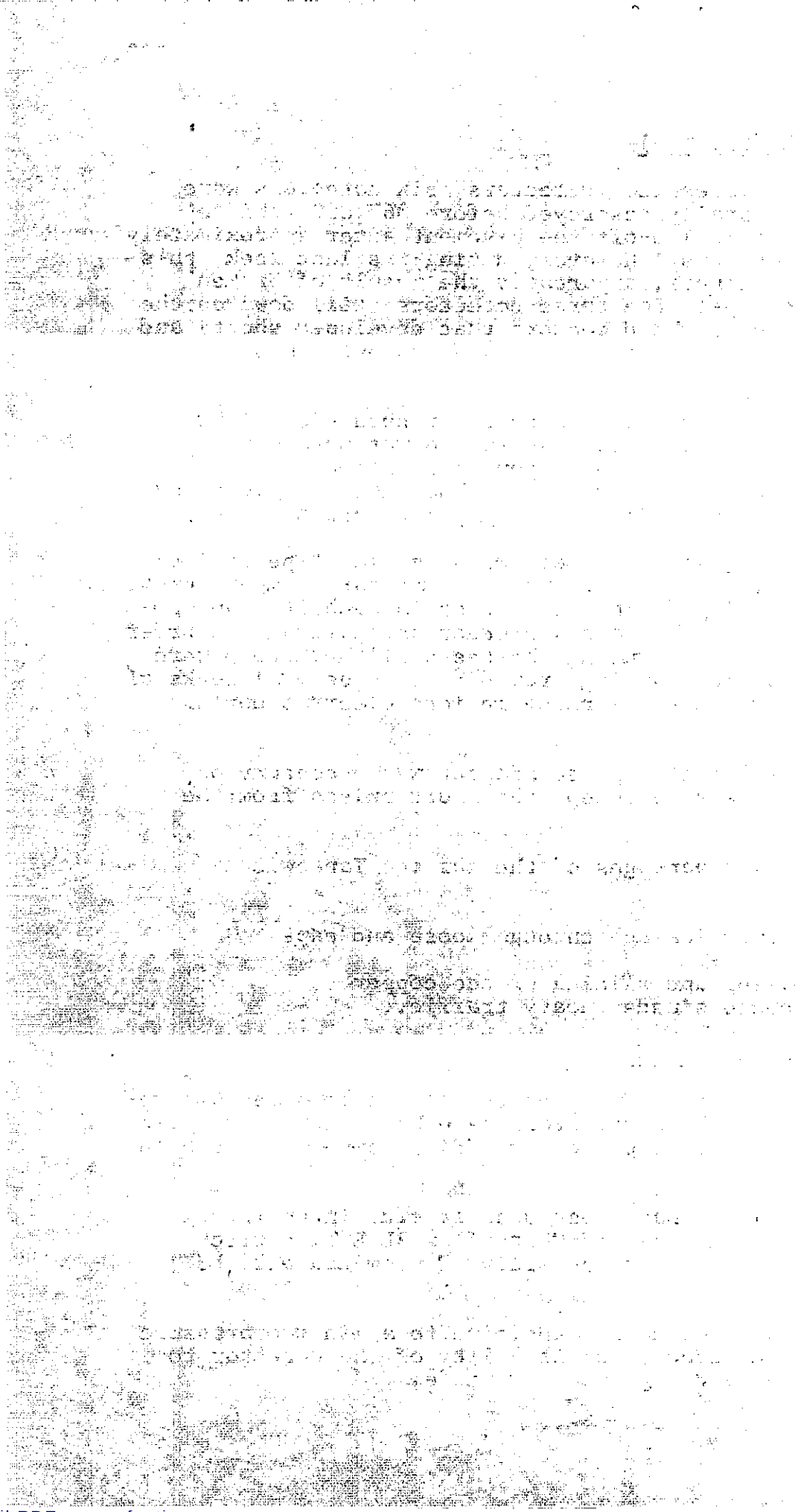
(2) Breaking and sliding of the copper conductors under heavy traffic.

TAPESWITCH DETECTOR (Imbedded)

We have installed five sections of the imbedded Controflex RB-E Tapeswitch. These detectors have been laid at varying depths in a slot and three types of imbedding compound have been tried to date.

At this time we have been unsuccessful in obtaining accurate counts with the imbedded Controflex RB-E Tapeswitch. Additional compounds and a more sensitive Tapeswitch will be tested.

The RB-E Tapeswitch is sensitive to a minimum pressure of 20 psi which would account for inability of the detector to detect small vehicles and high speed vehicles.



TRAFFONICS

The first two Traffonics Detectors placed across both lanes were losing counts within 10 days and had pulled up by the 19th day. Early destruction occurred when rain loosened the industrial tape.

The second two Traffonics Detectors were secured to the pavement with epoxy compound. The detectors were losing counts within 13 days and had stopped counting in three weeks. During the 4th week after several storms, the two detectors in the slow lane became dislodged from the pavement.

The highest total vehicle count reached before leakage became excessive was 192,500 cars.

A pulse adapter furnished by Traffonics was connected to a Streeter-Amet RC Counter and was used to count two detector segments. This adapter has been superseded by Model 100 Traffonics Pulse Adapter. The new adapter is a solid-state device and is now under test.

The accumulator for accepting calls from four detector segments was not tested.

The main difficulties with the Traffonics Detectors tested were:

(1) Moisture leakage -- the encapsulation has been wearing through on the bottom surface. Moisture penetration is also evident at the plug-in connectors.

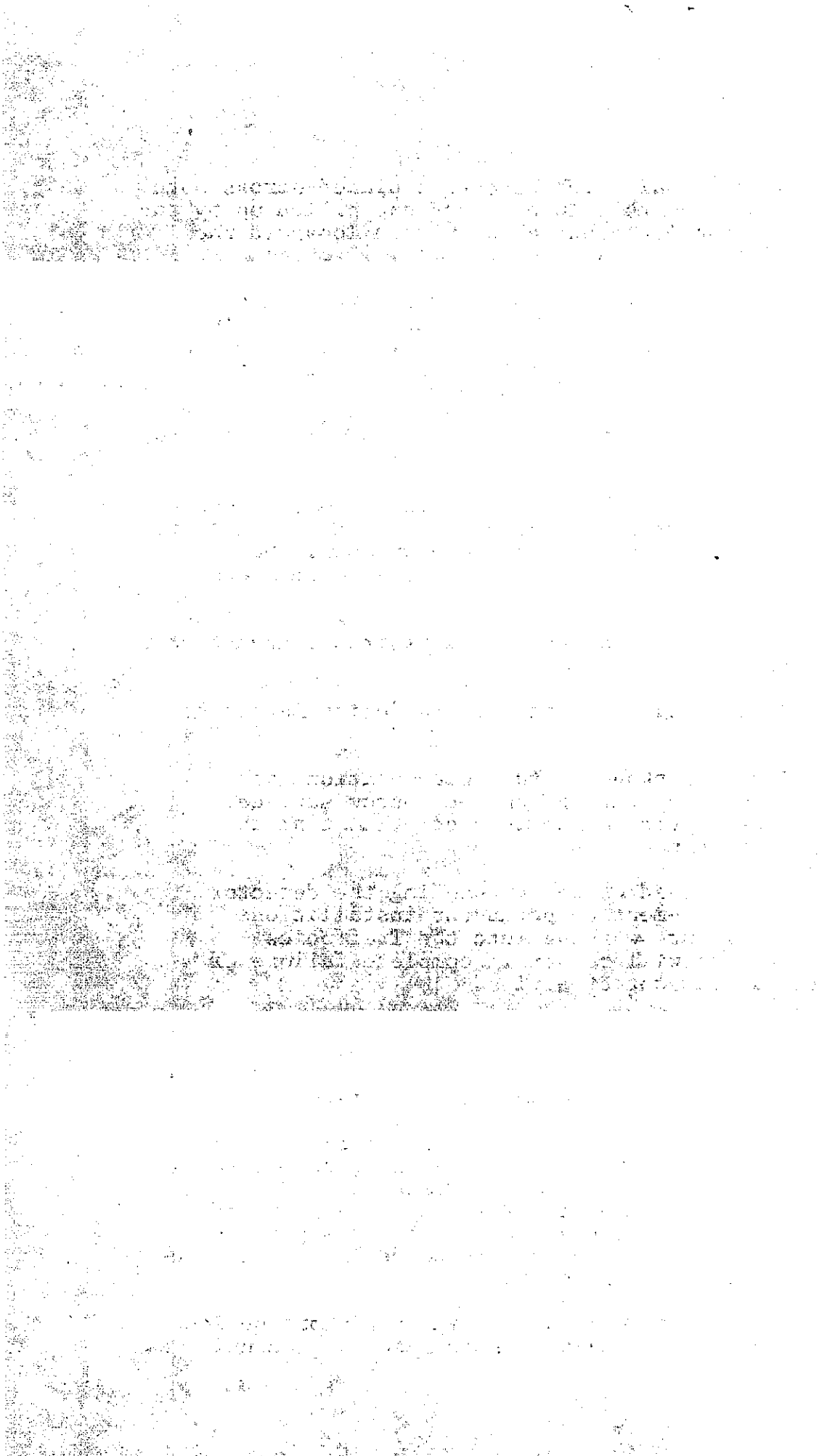
(2) A suitable adhesive for bonding the detector to the pavement on permanent installations. Any moisture working into the Traffonics Detectors will result in complete failure of the steel contact strips.

TRAFITROL INFRA-RED DETECTOR

During the course of the detector study, two Honeywell Model D 101 Trafitrol Infra-Red Detectors were tested.

Both units were inoperative when received. Investigation revealed that the "factory adjusted" gain potentiometer in both units had to be readjusted. No adjustment procedure was outlined in the Instruction Manual. This adjustment proved to be highly critical and therefore a long and tedious process. More information on this adjustment would be desirable if practical use is to be made of this instrument.

Once adjusted the devices counted (for short periods) all cars passing under their beams at slow speeds. One unit was



installed at the test site, where vehicle count was checked against electronic counters connected to Tapeswitch, Traffonics, and Kidder detectors. The Infra-Red Detector compared within ± 5% of these counts and also with hand counts.

Under a simulated stable maximum reflecting surface change (simulated rainfall), the units recovered and began counting again after about 20 seconds time lapse.

A more drastic change, such as changing to the reflectance from a car parked under the unit long enough to balance to the new reflectivity base then back to the pavement might result in a recovery time of 20 seconds to a couple of minutes. While the unit is recovering, the counting device will "see" a closed circuit.