

# Tech Brief

## Evaluation of SHRP Equipment

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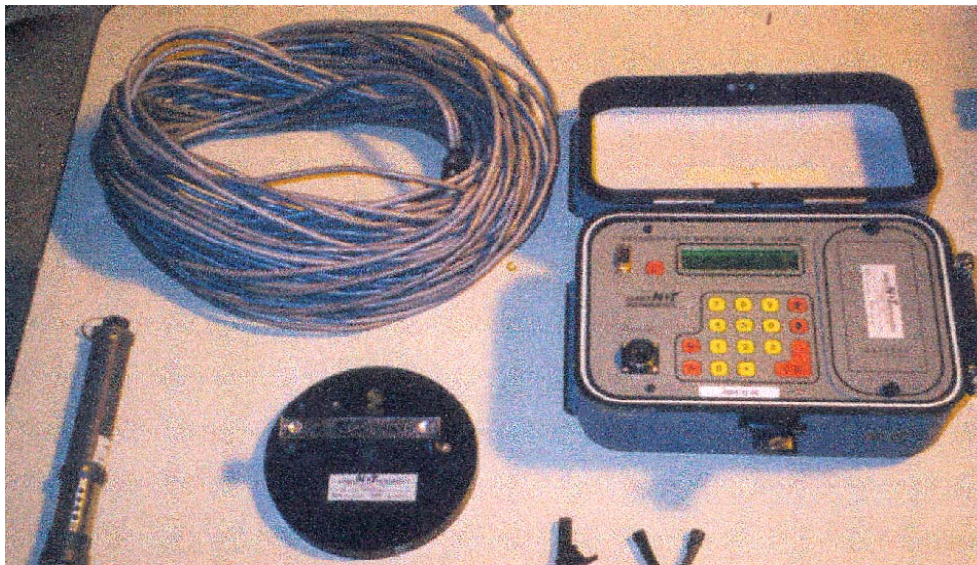
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### HERE'S THE PROBLEM

Repair and rehabilitation of transportation infrastructure is becoming a major part of the maintenance program. It is necessary to be able to determine the condition of the existing structure as a prerequisite for repair and rehabilitation. Thus, a method of testing corrosion of reinforcing steel in concrete and surface deterioration of concrete resulting from spalling and loss of cross section of structural elements is needed.

### AND, HERE IS THE SOLUTION...

To conduct non-destructive evaluation of the condition of a structure, and determine possible solutions to improve the life of the structure.



## BUT, HOW CAN IT BE DONE?

By using two instruments developed as part of the SHRP program that have the potential for widespread use in the Transportation Infrastructure field: the Air Permeability Meter and the Corrosion Meter. Non-destructive testing will not contribute to the damage of the structure.

## THESE ARE OBJECTIVES OF THE STUDY...

- To evaluate the performance of the Corrosion Meter and Air Permeability Meter.
- To determine reproducibility and reliability of non-destructive testing procedures.

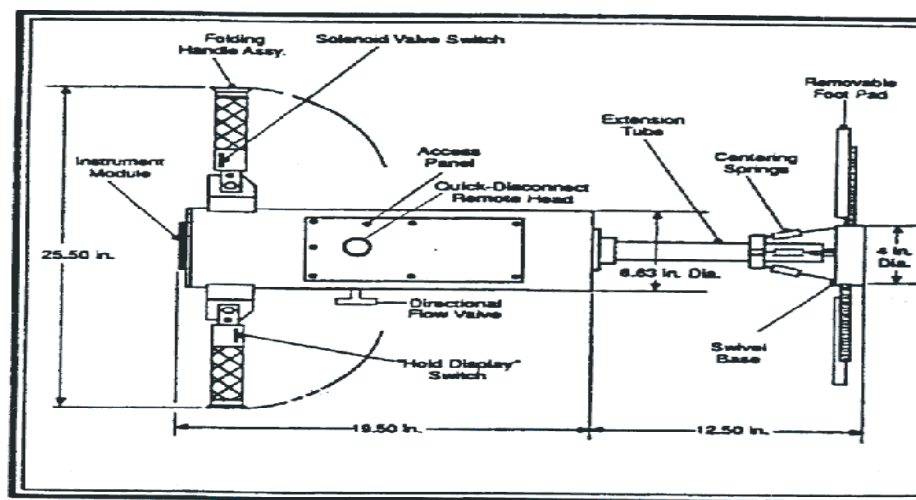
## AND, HERE'S WHAT WE DID...

A large number of readings were taken using both the Corrosion Meter and the Air Permeability Meter.

With the Corrosion Meter, the reading sites were chosen in order to evaluate whether the instruments could distinguish between good and deteriorated surface, and provide repeatable and consistent readings. Two operators were used at various times, with no variation between operators. The instruments were evaluated using five new bridge decks on Route 133 in New Jersey.

Electrical connections were made to the top-reinforcing mat of each bridge deck before the placement of the concrete. Connections were observed during placement of the concrete, and were tested after the concrete had hardened to check for broken connections. The connections were found to be working at all locations.

The Air Permeability Meter was used at six different sites consisting of surfaces with good concrete, surfaces with damaged or rough concrete, and a painted concrete surface. These six sites were located in Central New Jersey.



Approximately five hundred readings were taken on each type of surface. These surfaces were chosen to verify that the machine will be able to distinguish between deteriorated and good surface, and if it works well with both good and deteriorated surfaces.

The data collected was analyzed using a statistical software program called Arena. The averages and the standard deviations were computed for all of the data sets for both the Corrosion and Air Permeability Meters.

## CONCLUSION...

Based on the experimental results and their analysis, as well as observations made during the testing, it can be concluded that both meters are easy to operate and their instructions are adequate for operating them properly. The non-destructive testing meters can distinguish between good and deteriorated surfaces.

The Corrosion Meter is able to provide consistent results and variations. There was no relationship found between corrosion rate and corrosion potential during this research.

The instruments used were able to confirm that the decks analyzed in this research would have little corrosion activity because they were new.

## WHAT IS THE NEXT STEP?

Based on the results obtained and the experience of the operators of the equipment, it is recommended that the use of both instruments be used for measuring the permeability and corrosion of structures. The results from the Air Permeability Meter should be used only as a semi-quantitative measure.

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A final report is available online at <http://www.state.nj.us/transportation/research/research.html>

If you would like a copy of the full report, please FAX the NJDOT, Bureau of Research, Technology Transfer Group at (609) 530-3722 or send an e-mail to [Research.Bureau@dot.state.nj.us](mailto:Research.Bureau@dot.state.nj.us) and ask for:  
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