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## Problem Statement

Intelligent Compaction (IC) is an innovative technology (Figure 1) that has the potential to overcome some of the issues associated with conventional compaction techniques (Kamali-Asl et al., 2016). However, more information on the use of IC is needed to gain confidence and experience in the technology and to develop robust QA/QC specifications in Vermont projects.

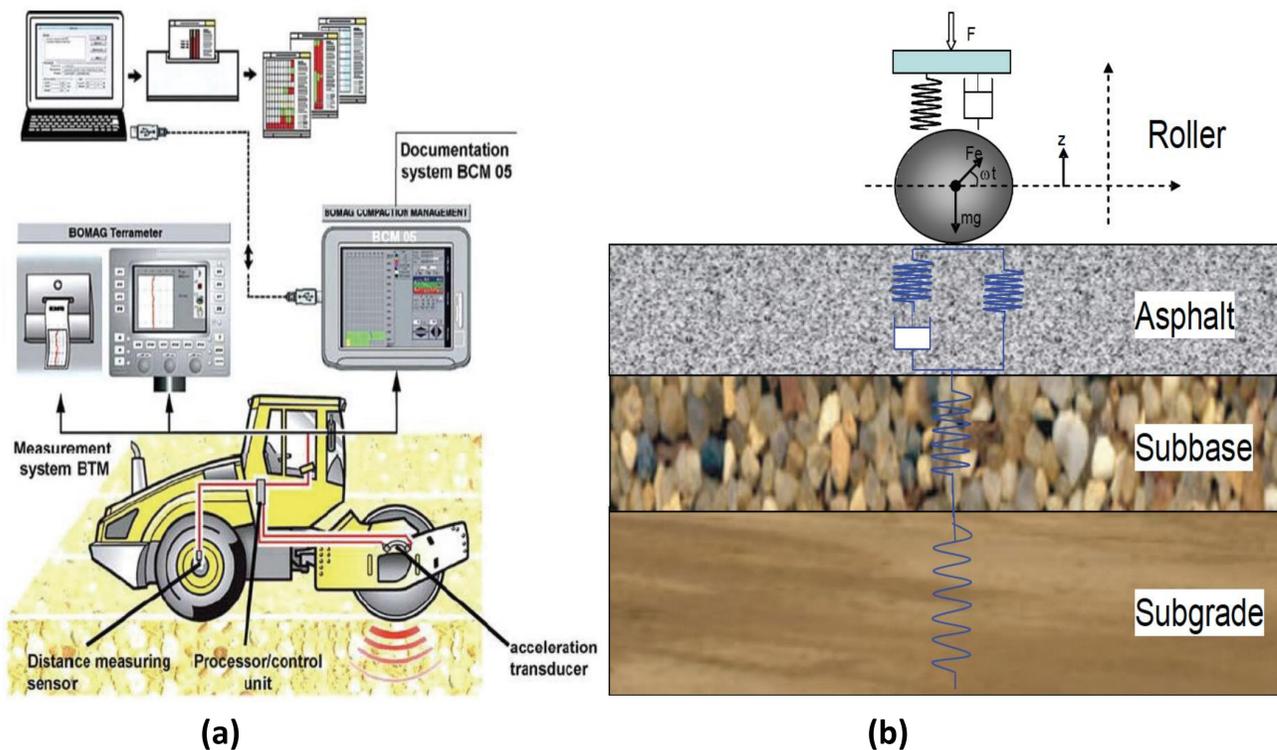


Figure 1. Schematic of (a) IC components (source: Bomag) and (b) Roller-pavement interaction (Chang et al., 2011)

## Background and Introduction

The use of IC rollers (1) increases the compaction uniformity; (2) provides a system wide stiffness-based inspection practice; and (3) allows for real-time monitoring, identification of weak areas, and making informed decisions on proper course of action during compaction (Mooney et al., 2010).

Currently, IC tests and spot test measurements are being conducted at Rive road (VT Route 117) project. Initially, 4" of distressed pavement was removed and the base layer was reclaimed up to 10". Then, a 6" layer of emulsion mixed with reclaimed material was injected. Finally, a 3" layer of cold mix and a 5" layer of hot mix will be placed.

## Data Collection and Results

IC testing and spot measurements were performed upon completion of the first 10" reclaiming to investigate the correlation between compaction measurement values (CMV) and dynamic cone penetration index (DCPI). The preliminary results indicated weak correlation between CMV data and DCP index.



Figure 3. IC and spot test measurements

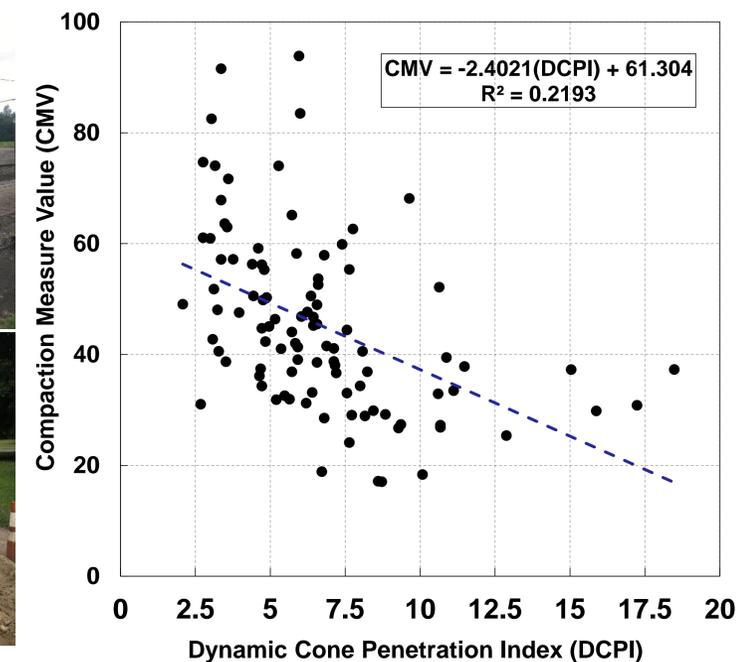


Figure 4. Correlation between CMV and DCP

## Conclusion and Recommendation

The next step in the project is to implement IC testing on the other layers of the VT Route 117 pavement. The goal of this project is to develop IC guidelines and robust QA/QC specifications for future IC implementation in the state of Vermont.

## Acknowledgments

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## References

- Chang et al., 2011. "Accelerated Implementation of Intelligent Compaction Technology for Embankment Subgrade Soils, Aggregate Base, and Asphalt Pavement Materials," FHWA-IF-12-002, Federal Highway Administration, Washington, DC.
- Mooney et al., 2010. "Intelligent Soil Compaction Systems," National Cooperative Highway Research Program, TRB, National Research Council, Washington, D.C.
- Kamali-Asl, A., Ghazanfari, E., & Dewoolkar, M. M. (2016). Suitability of intelligent compaction for relatively smaller-scale projects in Vermont. Final report: Vermont Agency of Transportation