

**Bi-Monthly Progress Report:**

**Project Number and Title:** 8.1: Enhancing Intelligent Compaction with Passive Wireless Sensors

**Research Area:** Thrust # 1, Monitoring and Assessment for Enhanced Life

**PI:** Ehsan Ghazanfari, University of Vermont

**Co-PI(s):** N/A

**Reporting Period:** 04.01.2019 to 05.31.2019

**Date:** June 28, 2019

**Overview:**

We met with the VTrans Technical Advisory Committee on April 22 and discussed the timing/schedule and involved challenges for field implementation of the passive wireless sensors in an Intelligent Compaction (IC) project currently underway in Route 117 in Vermont. In addition, we discussed IC testing plan for the upcoming construction season, and the tentative schedule for field testing. With regards to implementing passive sensors in the field tests, we started to investigate how to ruggedize the pressure sensors to survive the extreme pressure and temperature during compaction process. Finally, the PI started investigating other areas for potential IC improvement such as using Intelligent Compaction Measurement Value (ICMV) as a function of vibration amplitude, and frequency in the control system, and then adjust these parameters to optimize the compaction or designing a Kalman filter to improve consistency of ICMVs in order to minimize compaction variance. These steps can improve IC performance and benefit VTrans and transportation community in general.



(a)



(b)

Figure 1: IC compaction in the field, (b) IC compacted layer

**Planned Activities:**

Explore viable options to ruggedize the passive sensors to be implemented in IC compaction.