

# Infrastructure: Challenges for Pavement Integration of Dynamic Charging

Marvin W. Halling, Ph.D, P.E., S.E.  
Trevor Gardner, Graduate Researcher

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Sustainable Electrified Transportation Center  
A transformational, holistic approach to transportation electrification.



# Outline

- ⌘ Infrastructure Challenges
- ⌘ Component Testing
- ⌘ Full Scale Pad Testing
- ⌘ Integration in Test Track
- ⌘ Integration in Pavement

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# Challenges

- integration into existing infrastructure
- durability
- maintenance issues
- cost
- materials that can be used that will not adversely affect the transfer of power
- safety
- standardization for various vehicles
- standardization from state to state
- flexibility to account for changing technology
- distance from primary to secondary coils

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# Component Testing



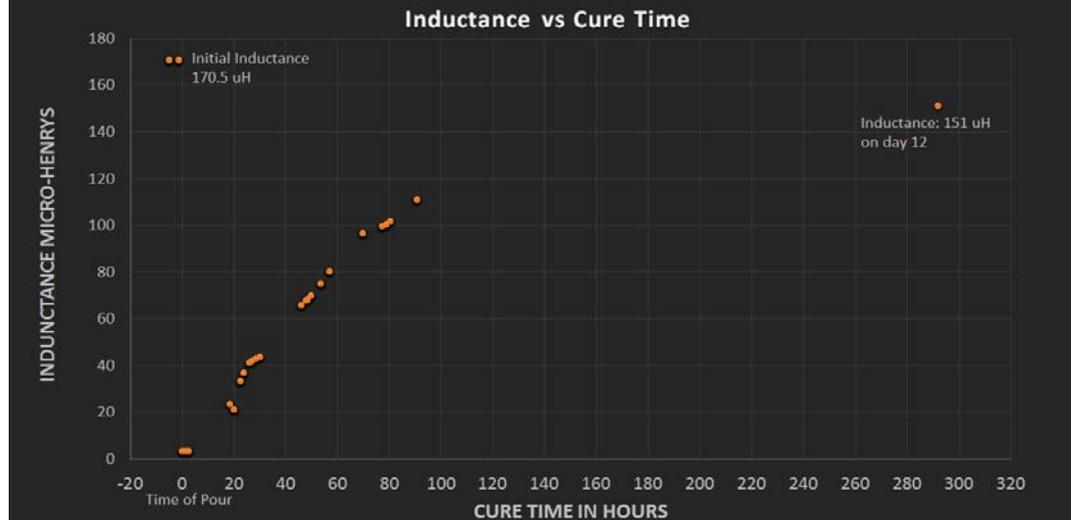
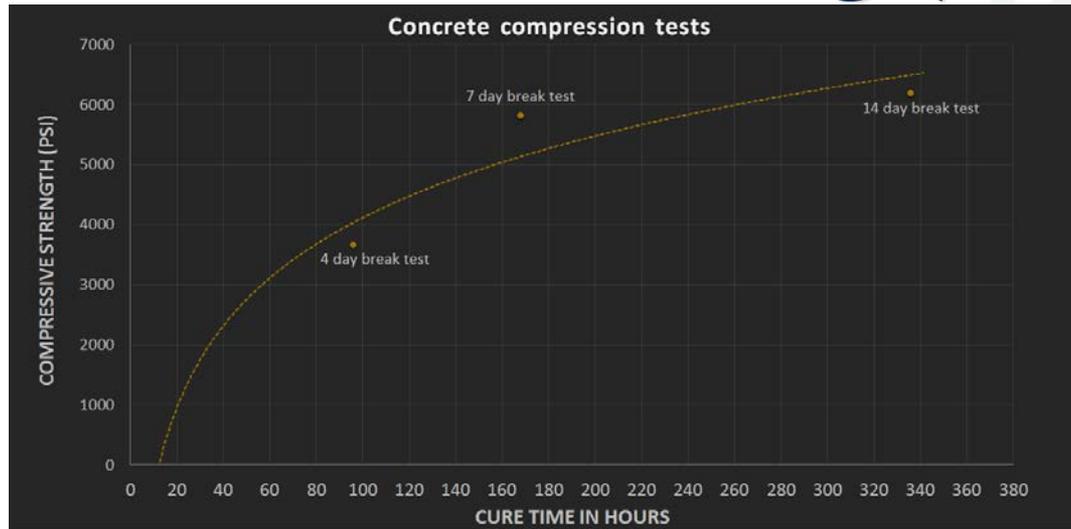
# Full-Scale Pad Testing



# Full-Scale Pad Testing



# Full-Scale Pad Testing (cont.)



# Full-Scale Pad Testing (cont.)

- ☞ All components will be subjected to structural fatigue testing in the
- ☞ Systems, Materials, and Structural Health (SMASH) Laboratory

# Integration in Test Track



# Integration in Test Track (cont.)



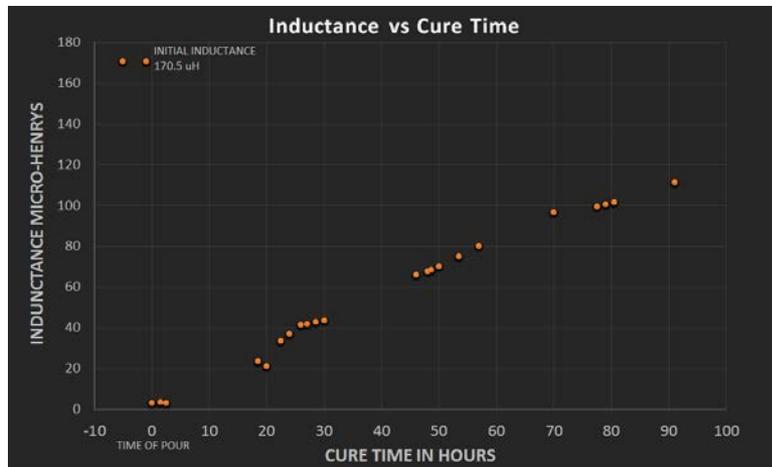
# Integration into Pavement

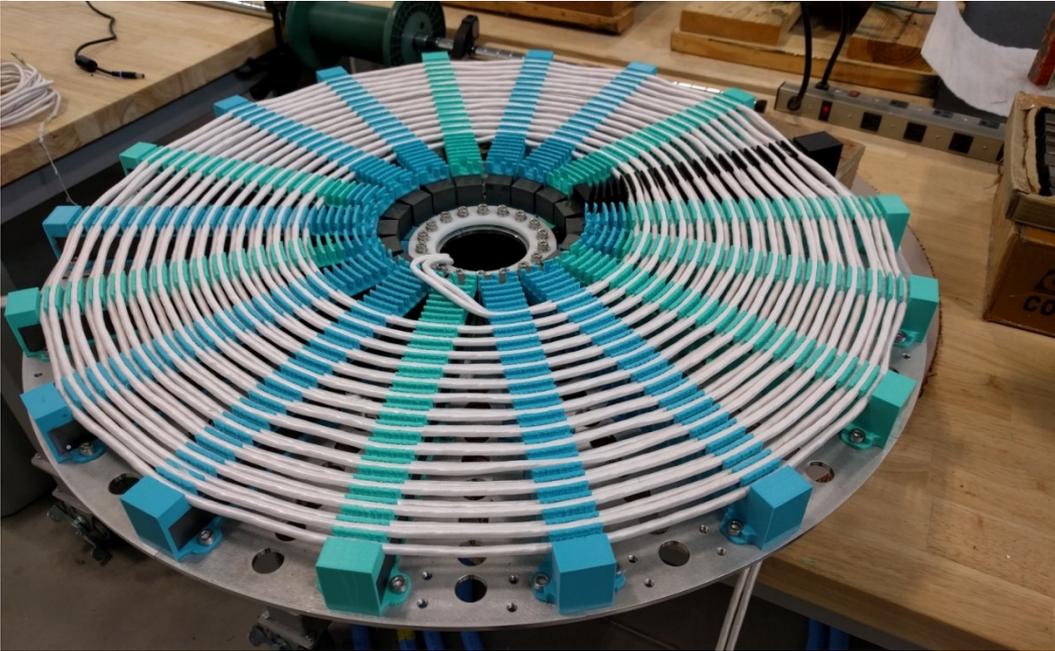
- ❧ Future integration into the actual pavement sections of the test track
- ❧ (rather than located in the pre-cast trench)
- ❧ Future integration into test sections of pavement in actual highway applications

# Thank You









“...once a road integrates charging solutions for EVs, standard maintenance procedures and material recycling principles utilized today may be in need of severe modifications to ensure the sustainability of the integrated system.” (Chen, et.al)



eRoads must provide the following:

1. allow for acceptable charging of EV's
2. integration of these technologies into practical civil infrastructure
3. acceptable functionality and maintenance over the life of the pavement

## Questions to be answered:

What are the mechanism, current achievement and limitations of non-contacting charging technology?

What are the challenges for successful integration of the charging facilities into real roads?

What will be the potential challenges that will emerge after the integration?

What will be the environmental effects of the new infrastructure?

## Efficiency of coupling for Power Transfer (Yilmaz, et al)

Max Distances between power source and receiving unit  
(vehicle)

Types of materials that can be between the transfer gap

Lateral alignment

Longitudinal Configuration

Long Wire Loop

Sectioned Loop

Spaced Loop

Power Leakage



Photo Credit Nguyen, et.al