

New Tests: SAM and Surface Resistivity

Jeffrey S. Elliott, PE, F. NSPE, F. MSPE
And Gregory Bushey
TTL Associates, Inc.

Durability...What is it and where do I get some?

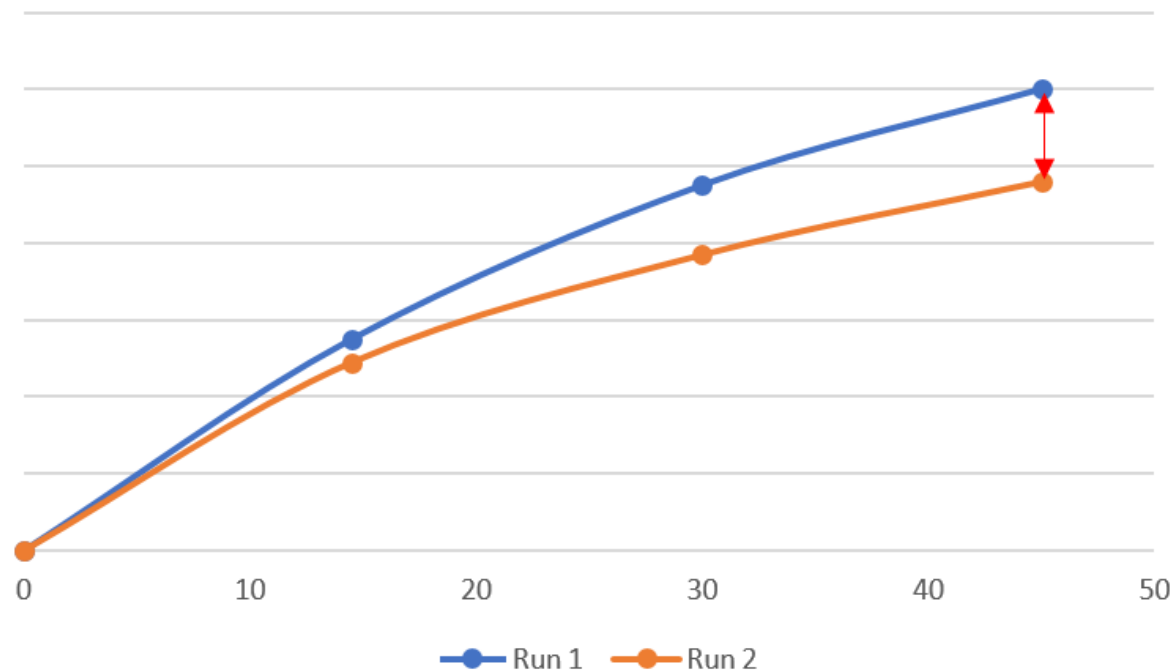
- Freeze-Thaw Resistance
- Premature Reinforcing Steel Corrosion
- Overall Length of Service

Super Air Meter (SAM)

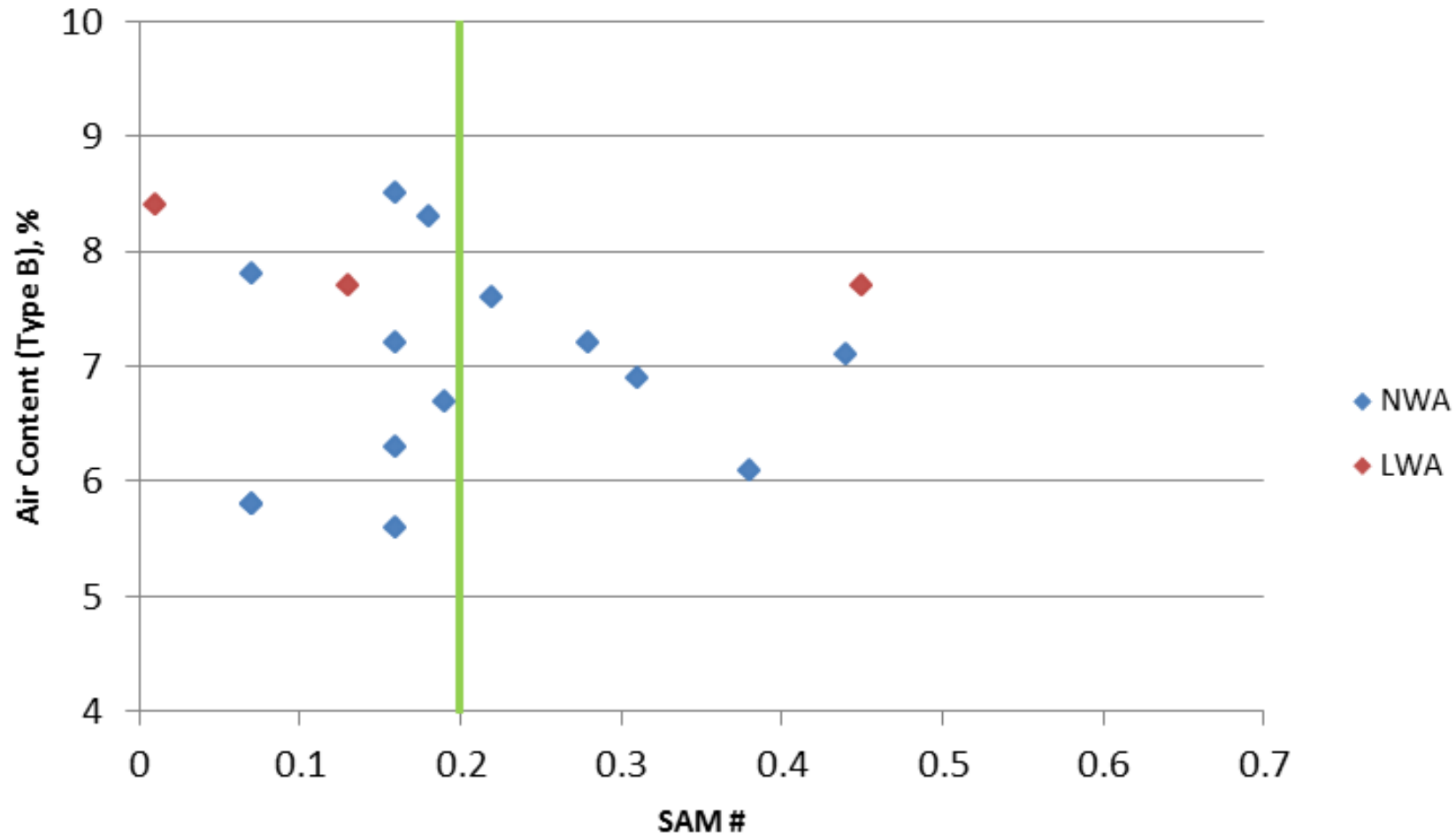


Super Air Meter (SAM) - Continued

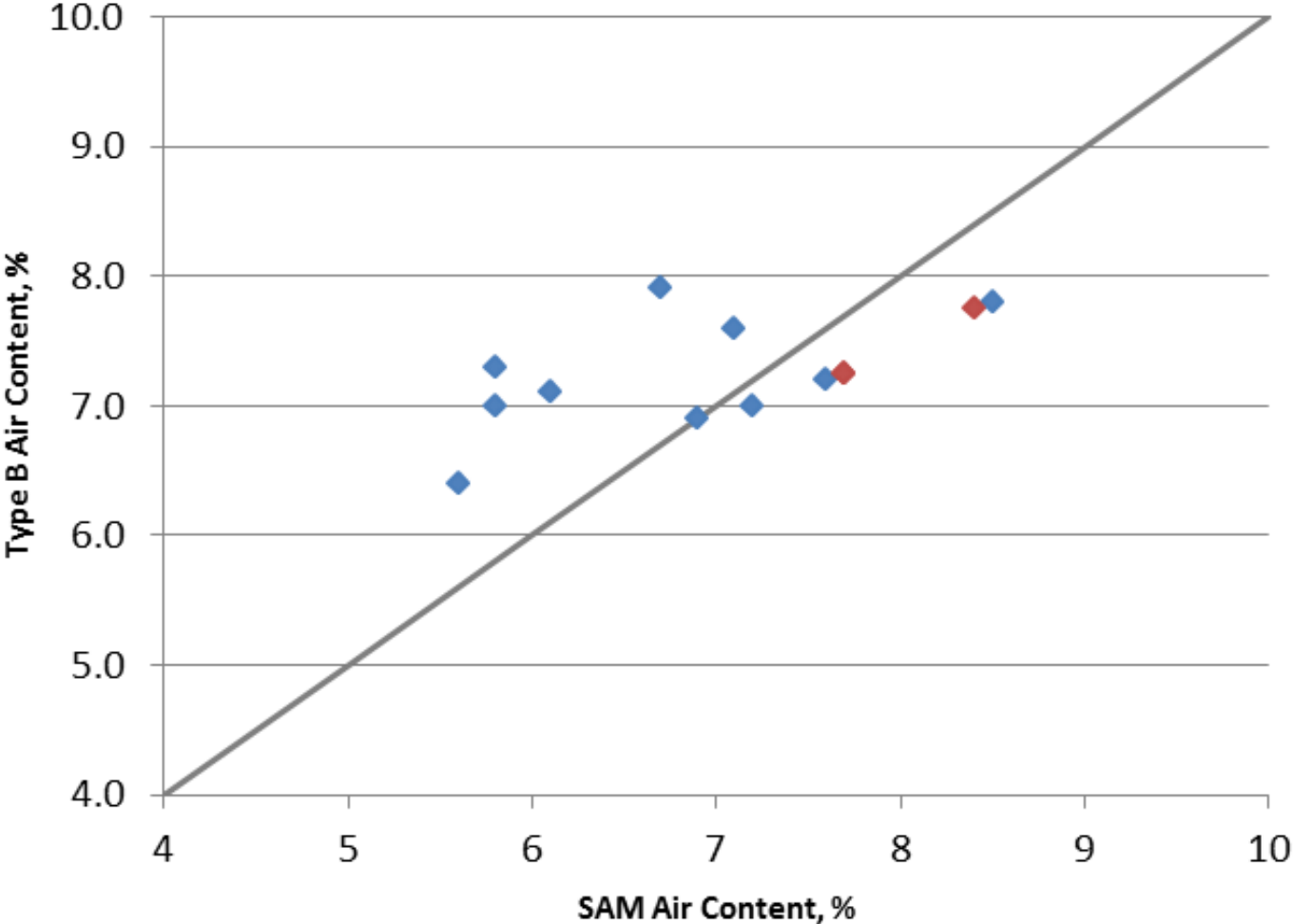
- ▶ Sequential Pressure Determination
- ▶ 14.5, 30 and 45 psi
- ▶ Run 2 times



SAM Readings -vs- Air Content



SAM -vs- Type B



- ◆ NWA
- ◆ LWA

Run Test

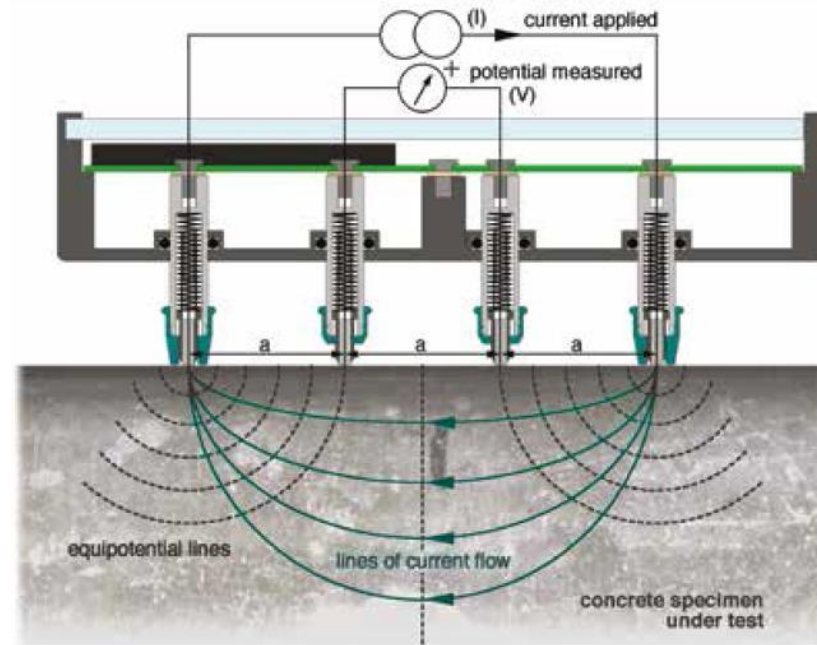
Surface Resistivity

- ▶ Test method being evaluated by MCA and MDOT
- ▶ Resipod by Proceq
- ▶ 4-Point Wenner Probe style



Surface Resistivity

- Concrete resistance measured in $k\Omega\text{ cm}$
- Correlates to Rapid Chloride Permeability



$$\text{Resistivity } \rho = 2\pi aV/I \text{ [k}\Omega\text{cm]}$$

Surface Resistivity

- Testing of cylinders (4x8 or 6x12)
- Testing of in-place elements
- Not labor intensive
- Lower cost



Surface Resistivity

- ▶ Louisiana DOT established acceptance resistivity as acceptance test
- ▶ Florida DOT utilizes resistivity for mix design submittal

TABLE 1 Louisiana DOTD Surface Resistivity and Permeability Classes for 4-x-8-in. Cylinders

Permeability Class	56-Day Rapid Chloride Permeability Charge Passed (coulombs)	28-Day Surface Resistivity (k Ω -cm)
High	>4,000	<12
Moderate	2,000–4,000	12–21
Low	1,000–2,000	21–37
Very Low	100–1,000	37–254
Negligible	<100	>254

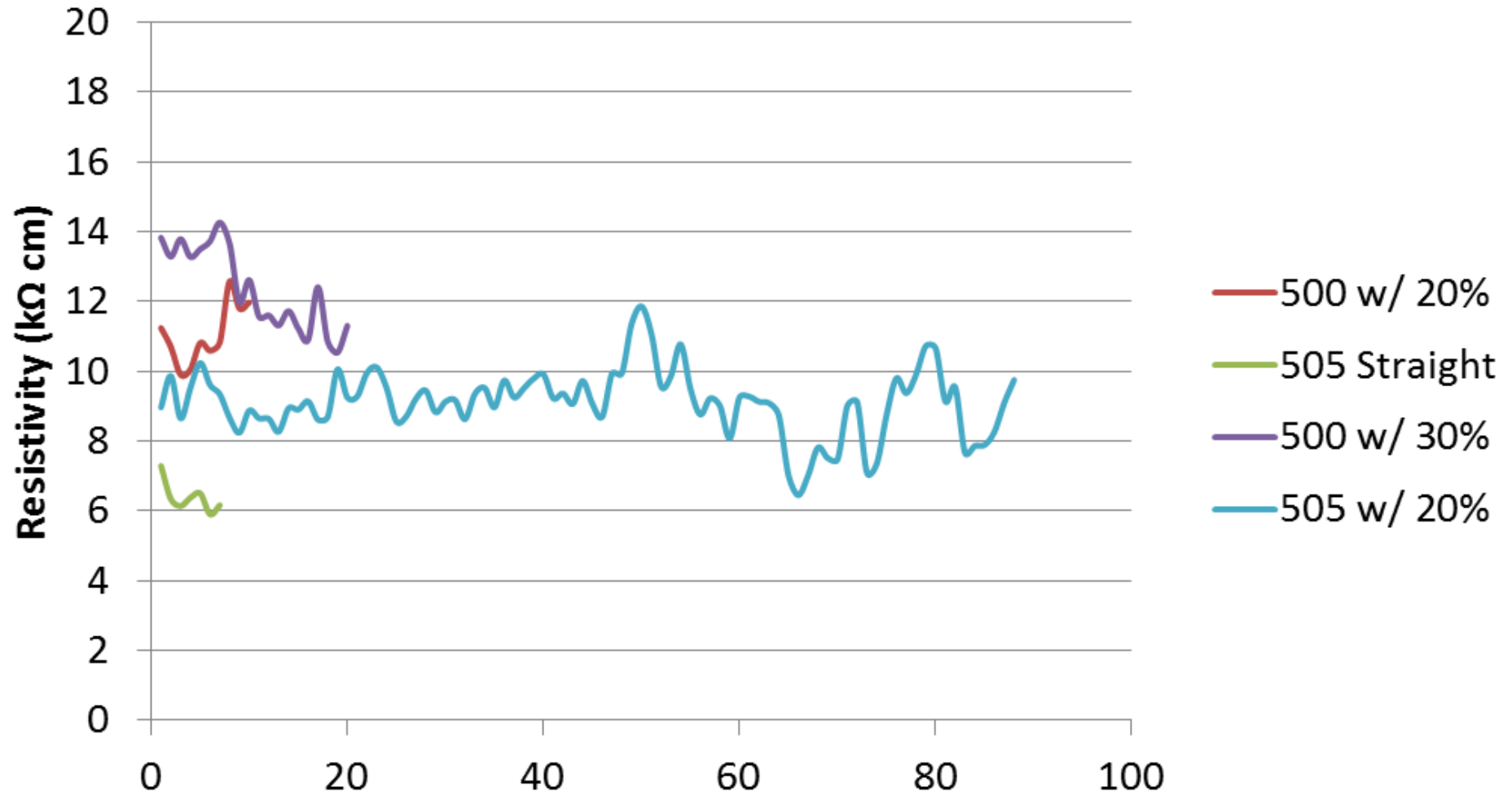
Tyson D. Rupnow, Concrete Research Engineer, Louisiana Transportation Research Center

Surface Resistivity

- ▶ MCA and MDOT both collecting data
- ▶ Evaluation of data is on-going

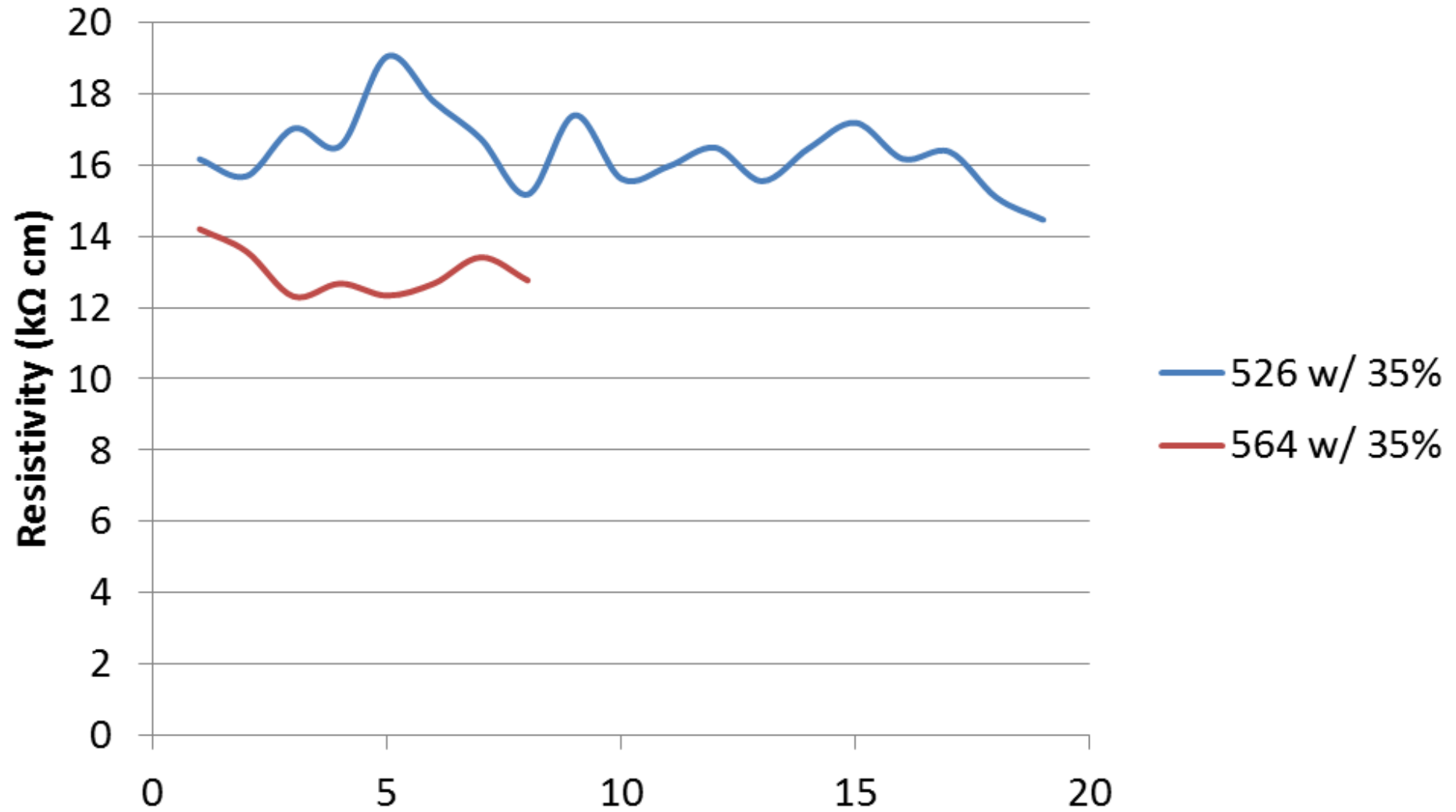
Project 1

Surface Resistivity



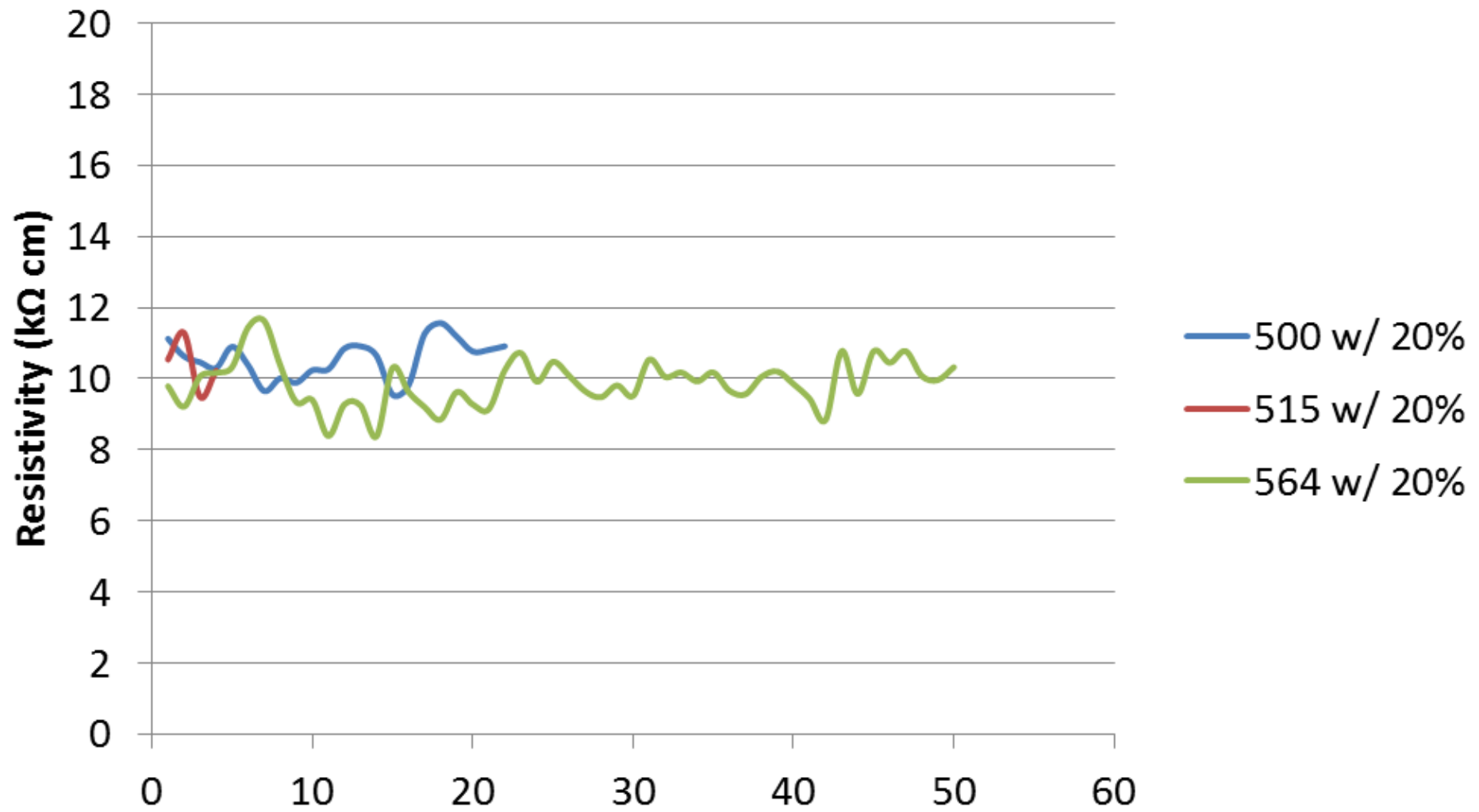
Project 2

Surface Resistivity



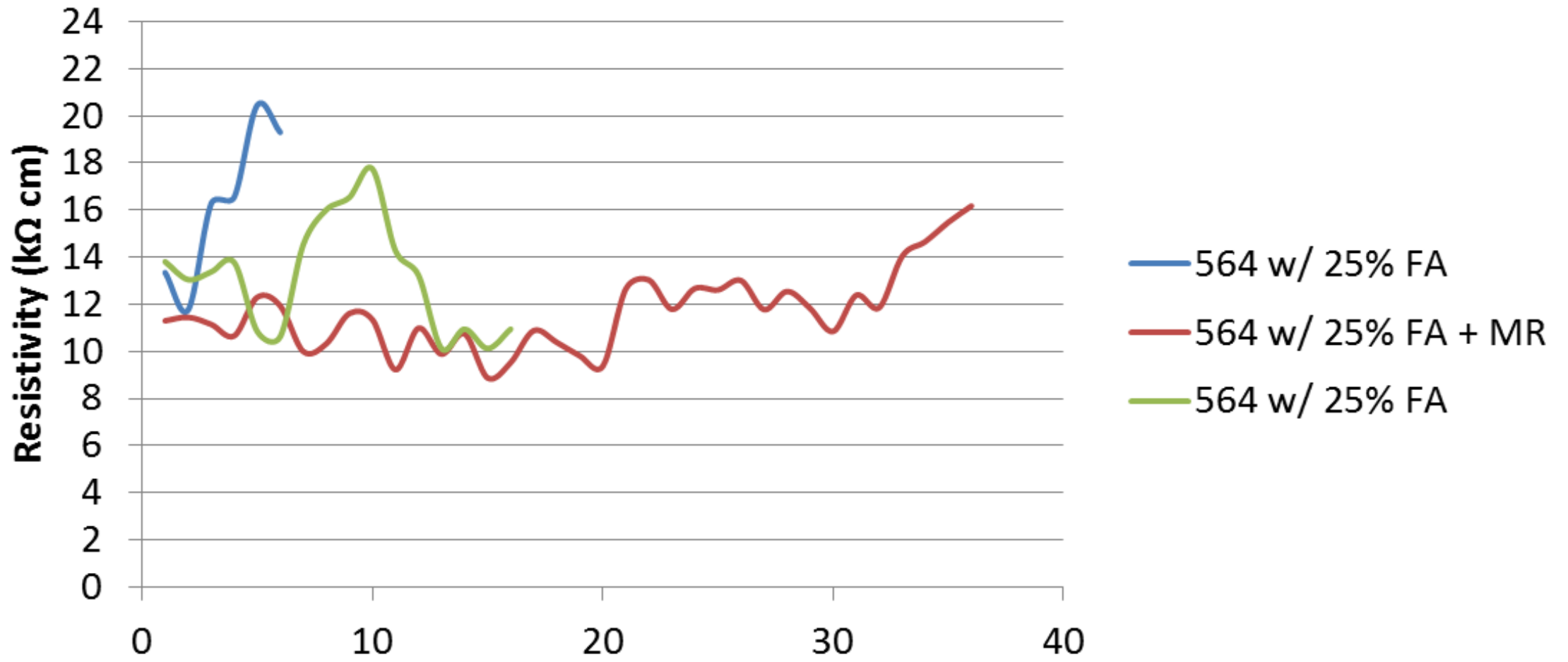
Project 3

Surface Resistivity

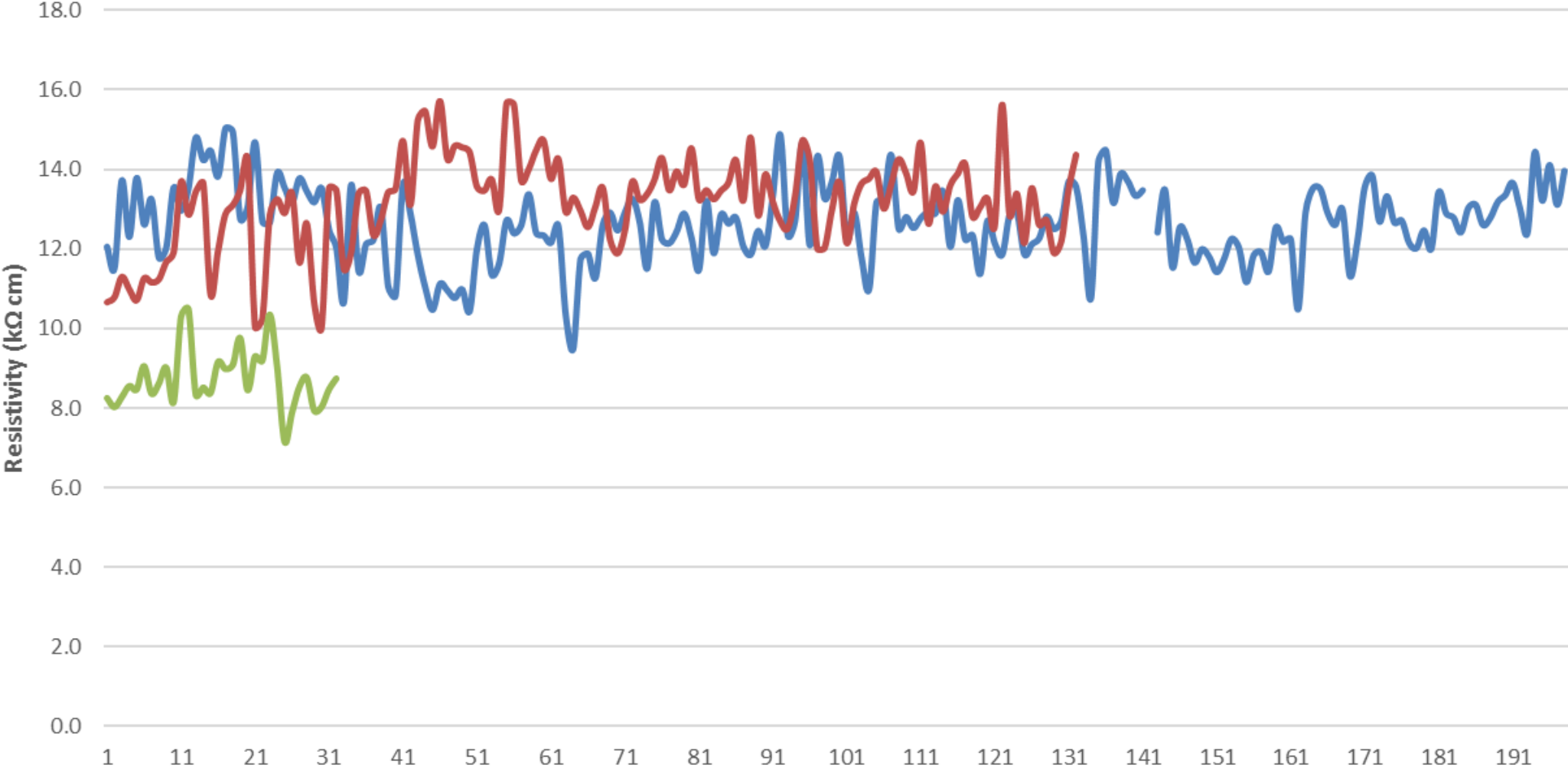


Project 4

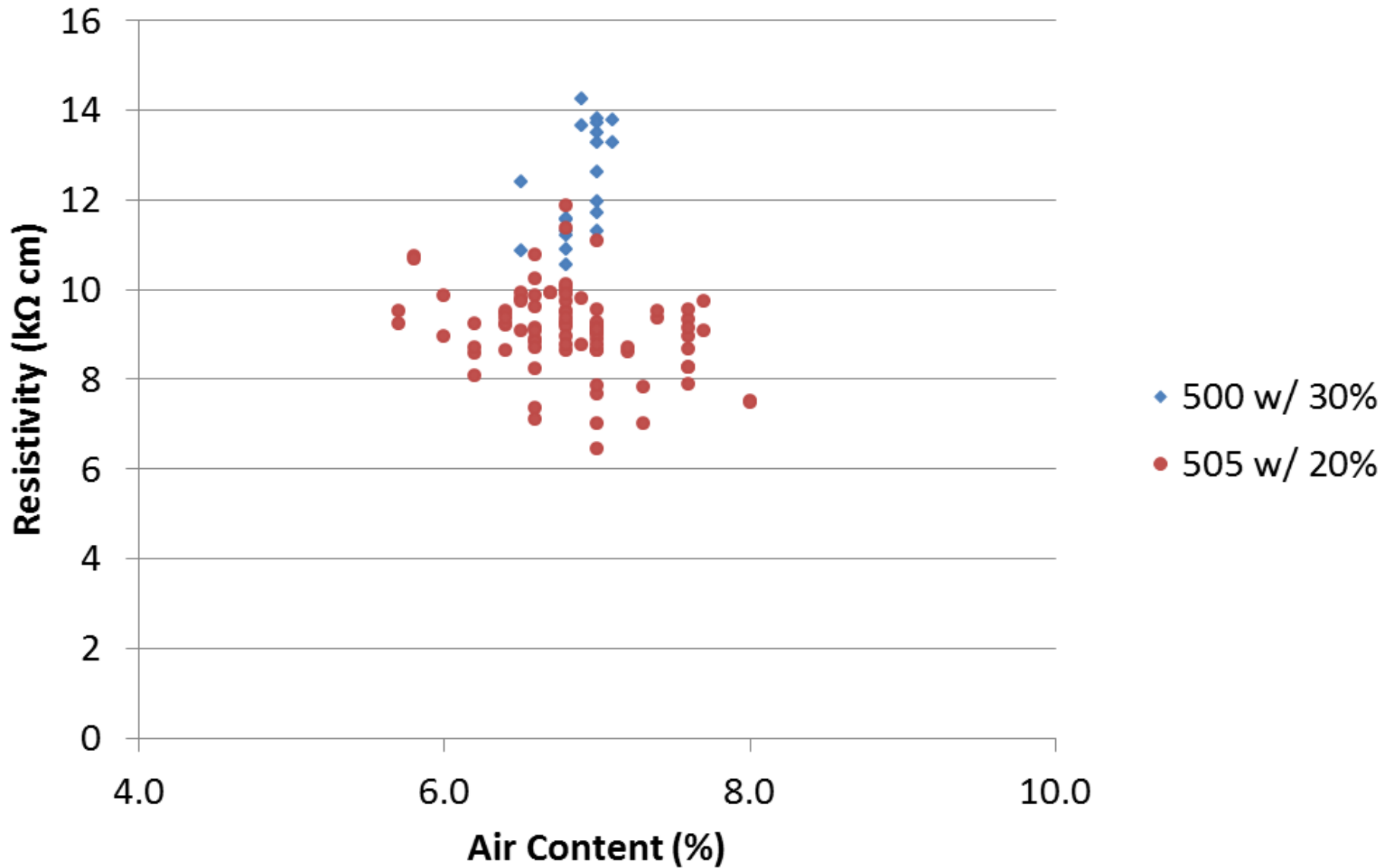
Surface Resistivity



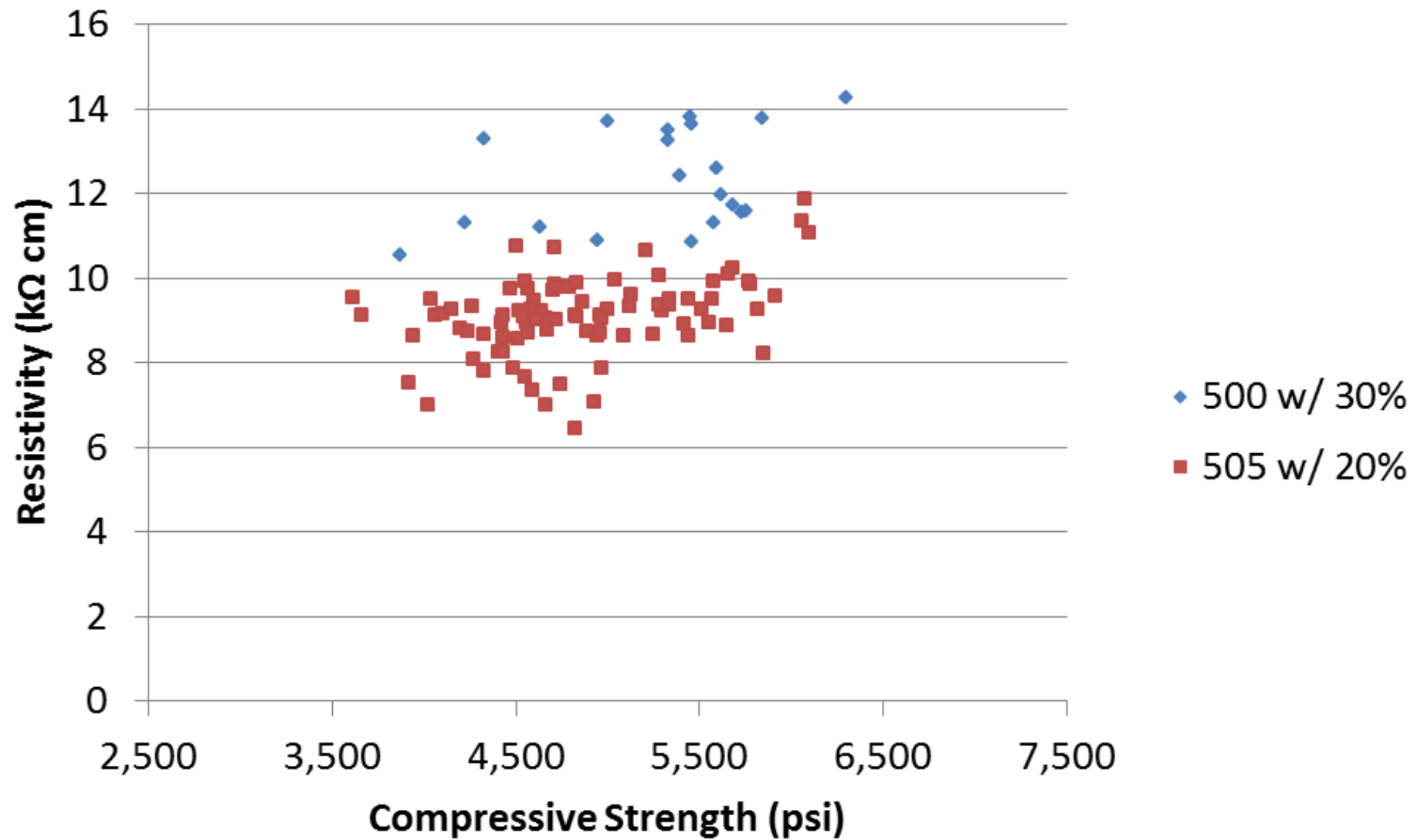
Project 5 Surface Resistivity



Resistivity -vs- Air Content



Resistivity -vs- Compressive Strength



Run Test

Where do we go from here?

- Further evaluation of current data
- Collection of additional data including varying concrete constituents.

Surface Resistivity Testing

Questions?