Construction Aggregates

Moisture Measurement Probes

MESA Systems Co.

Introduction

MESA Systems Co.

MESA Systems Co., established in 1991, has over 25-years of expert moisture measurement technical experience and application engineering knowhow.

MESA supplies precision moisture measurement probes and accessories. In addition, we provide field and remote technical service and support.

MESA's SONO probes are engineered with the innovative TRIME® TDR technology for high repeatability and accurate moisture measurement for all your construction aggregates. The SONO solution will increase your product quality and operator confidence to maximize your plant's material and human resources.

Presentation Overview

- Product Summary
  - SONO-VARIO probes
- TRIME® TDR Measurement Technology
  - Introduction to TDR method
  - TRIME® TDR vs. Microwave method
- Installation and Interface
  - Flexible and straightforward installation

SONO-VARIO Probe Key Advantages:

With the SONO-VARIO probes you are able to…

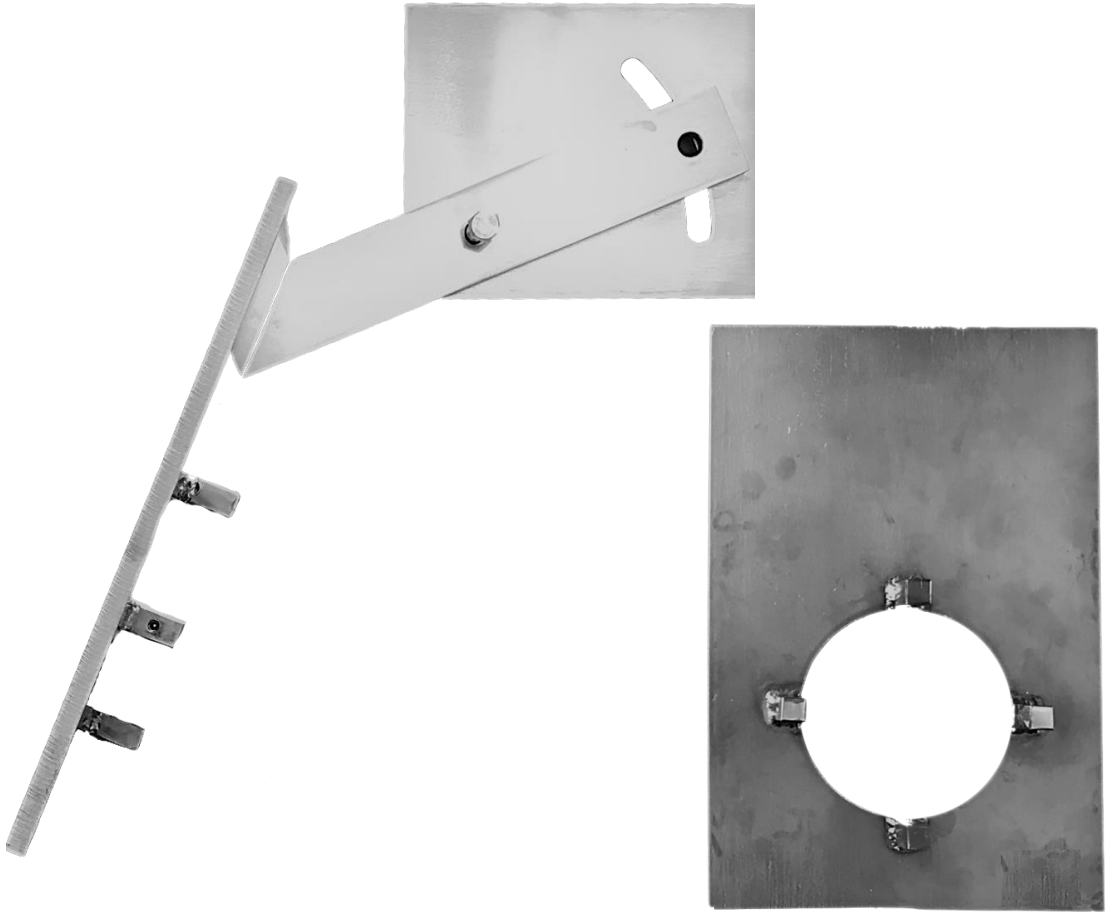
- **Measure** fine to course aggregates up to 1 ¼ inch
- **Achieve** long-term high repeatability and accuracy (0.1% for sand, 0.2% for rock)
- **Optimize** measurement accuracy for *every batch*, with installation below the hopper gate

SONO-VARIO Probes

- Accurate, real-time average moisture measurements
- Pre-installed material specific calibrations
- Straightforward commissioning
- Compatible with common batching systems (COMMANDBatch, etc.)
- Standard, Xtrem and Carbide versions
- Uses TRIME® TDR Measurement Technology

Forget periodic adjustments and calibrations!

Mounting Plate and Bracket



SONO-VIEW and Probe Cable

- Menu driven operation
- Select, verify and adjust all parameters
- Display real-time average moisture measurements for up to 12-probes
- Flexible 2-wire communication data bus
- Simulate the analog interface moisture in the batching panel
  - (4…20mA or 0…5/10 VDC = 0….20%)

SONO-VARIO Summary

- Long-term accurate moisture values
  - Eliminate constant adjustment or recalibration
- Interfaces to the batch control system
- Simple to install and visually inspect
- For all aggregates to 1-1/4”

Create confidence - not questions.

SONO-VARIO Xtrem

SONO-VARIO Standard

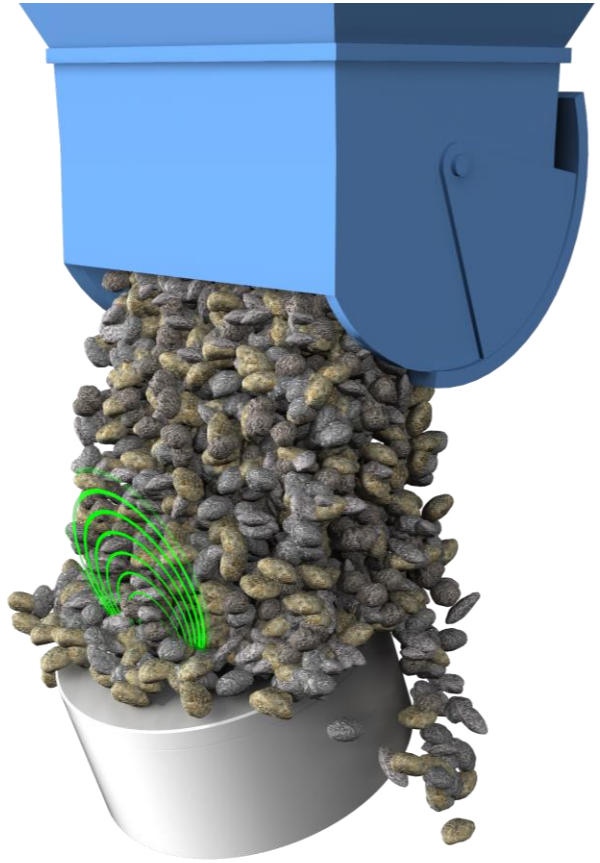
TRIME® TDR Measurement Technology Intro

TRIME® TDR Technology has been widely used for 30-years in the process industry.

TRIME® is based on the TDR-technique (Time-Domain-Reflectometry), developed to measure the dielectric constant (water content) of common materials.

The TRIME® TDR method is a guided radar pulse that travels along a radar track at nearly light speed, measuring a large volume above the probe's surface.

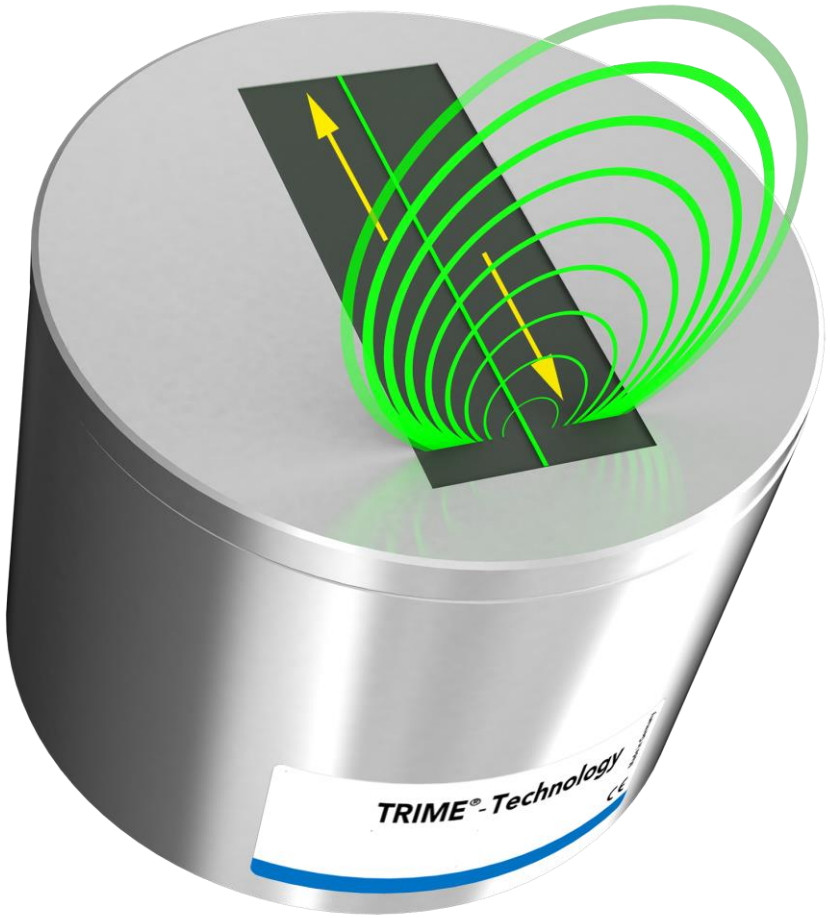
This innovative technology had proven highly effective for applications in concrete production over the last decade.



TRIME® TDR – Taking a Measurement

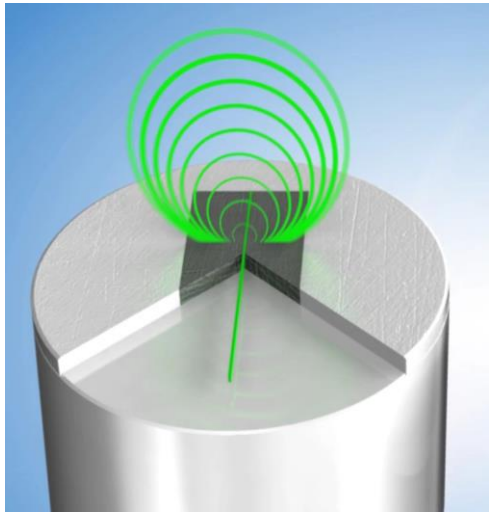
1. TRIME® device generates a high-frequency-pulse
2. Pulse transmits along wave-guide, located in the probe's face-plate
3. The transmission generates an electromagnetic field around the TRIME®-probe,
4. At the end of the wave-guide, the pulse is reflected back to its source, at close to the speed of light.

The resulting **transit time** and **dielectric constant** (water content), which are dependent on the moisture content of the material, **provide an accurate measurement** of material moisture.



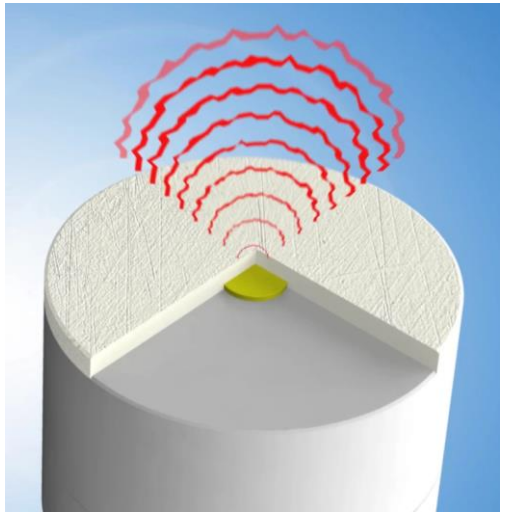
TRIME® TDR SONO Probes

- **Direct** material contact
- Simple **linear** material calibrations
- Large field of measurement
- Measurement field adapts itself to the shape of material, for all aggregates to 1-1/4 inch
- Undisturbed by dripping water, air and dirt
- Extremely rugged probe construction for exceptionally long operational life



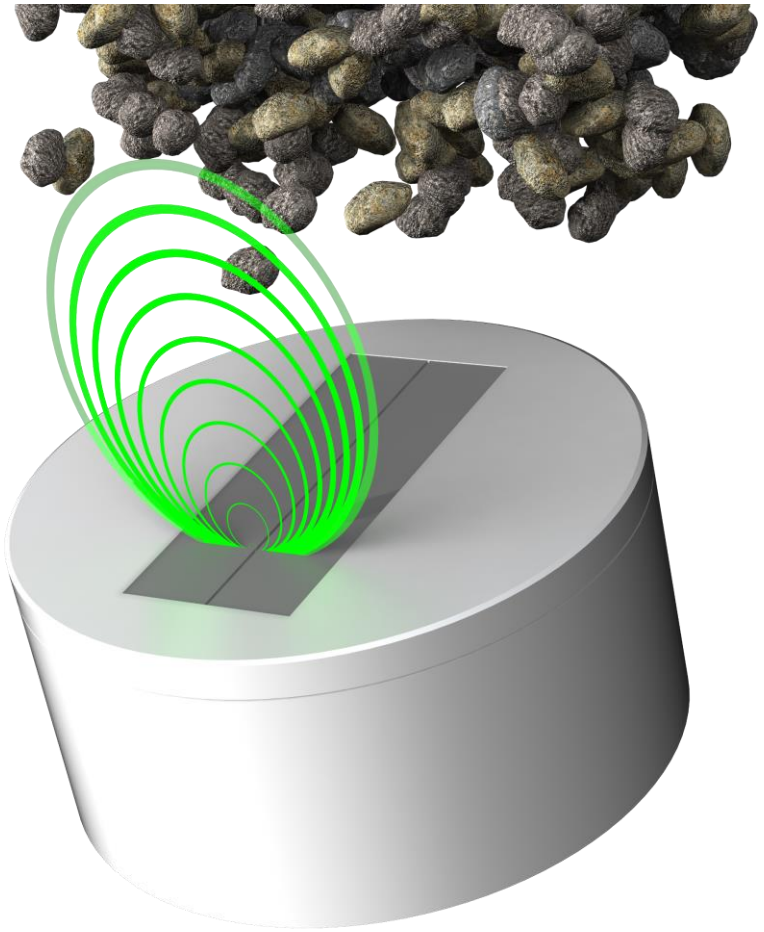
Microwave Probes

- **Indirect** material contact
- Complex polynomial **(non-linear)** calibrations
- Electrical field flows out and back in through a thick ½" ceramic plate, influencing the signal
- Cannot be calibrated for non-uniform and course materials
- Due to abrasion the probe has to be frequently adjusted and recalibrated



TRIME® TDR Technology Summary

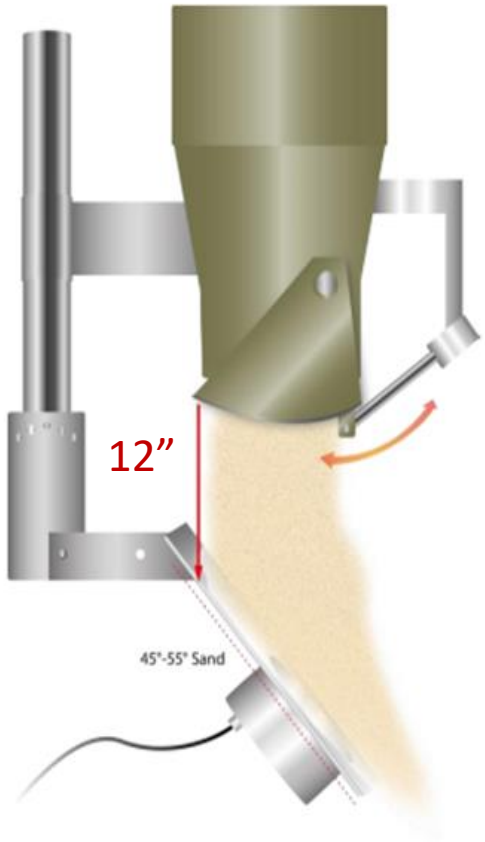
- Easy to install and operate
- Consistent production results every batch
- Achieve high precision (0.1%) regardless of the material type, temperature or texture
- No maintenance required



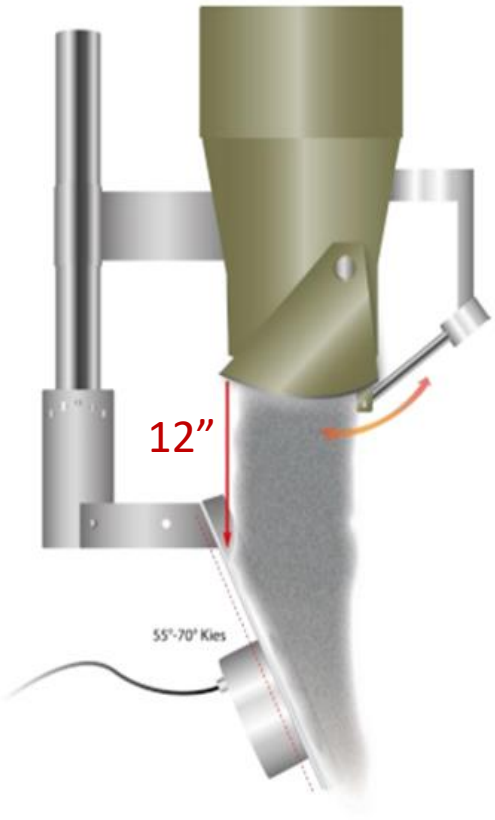
Proven and effective solution for concrete production

Product Installation Summary

- Proven installation for all plant types and material types
- Ideally located 12”, directly under the gate
- Straightforward commissioning including:
  - Mounting plate and bracket,
  - Step-by-step wiring guide
  - Batch panel compatible.



Sand: Angle sensor holder 45° to 55°



Gravel: Angle sensor holder 55° to 70°

Installation Process: Bracket and Mounting Plate

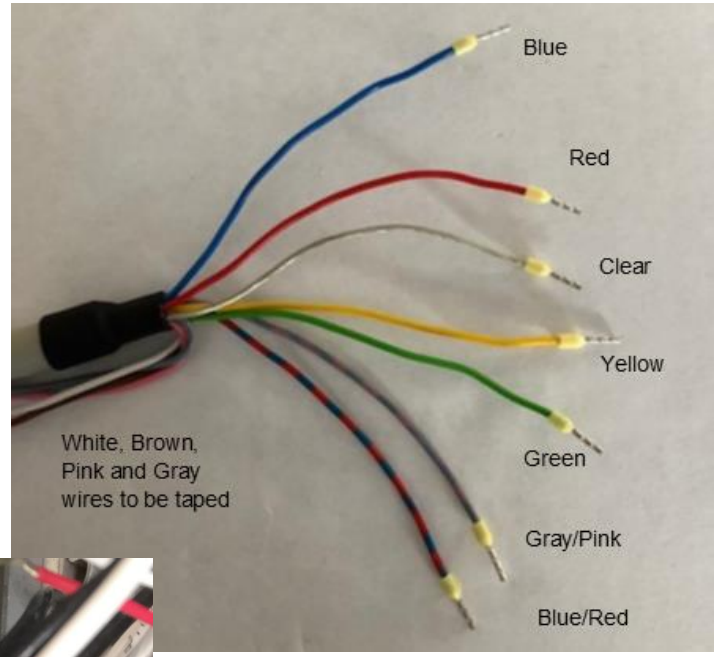
- Designed to rigidly hold any SONO-VARIO probe
- Supports installation for all aggregates directly under the hopper gate
- On the back-side of the stainless steel mounting plate set-screws, securely hold the probe face flush with the front-side of the mounting plate
- The bracket can be welded to the back of the mounting plate, at 45 and 55 degrees

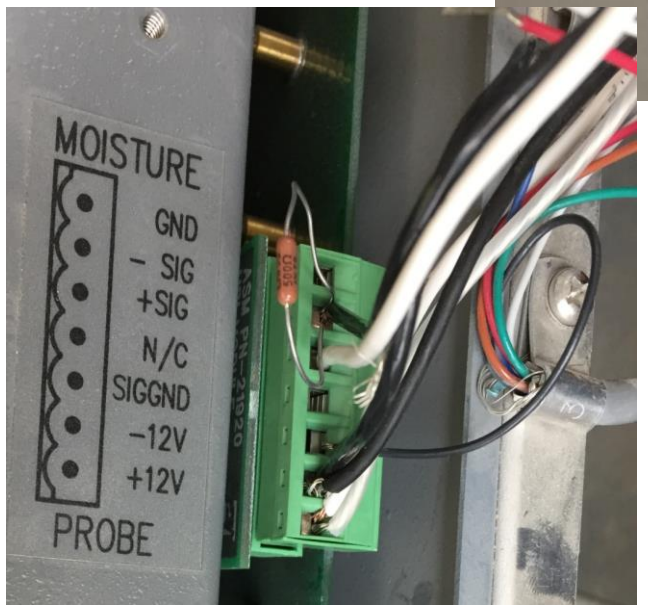
45° = sand and aggregates up to 5/32”

55° = rock, stone, and gravel having a diameter greater than 5/32” up to 1-1/4”

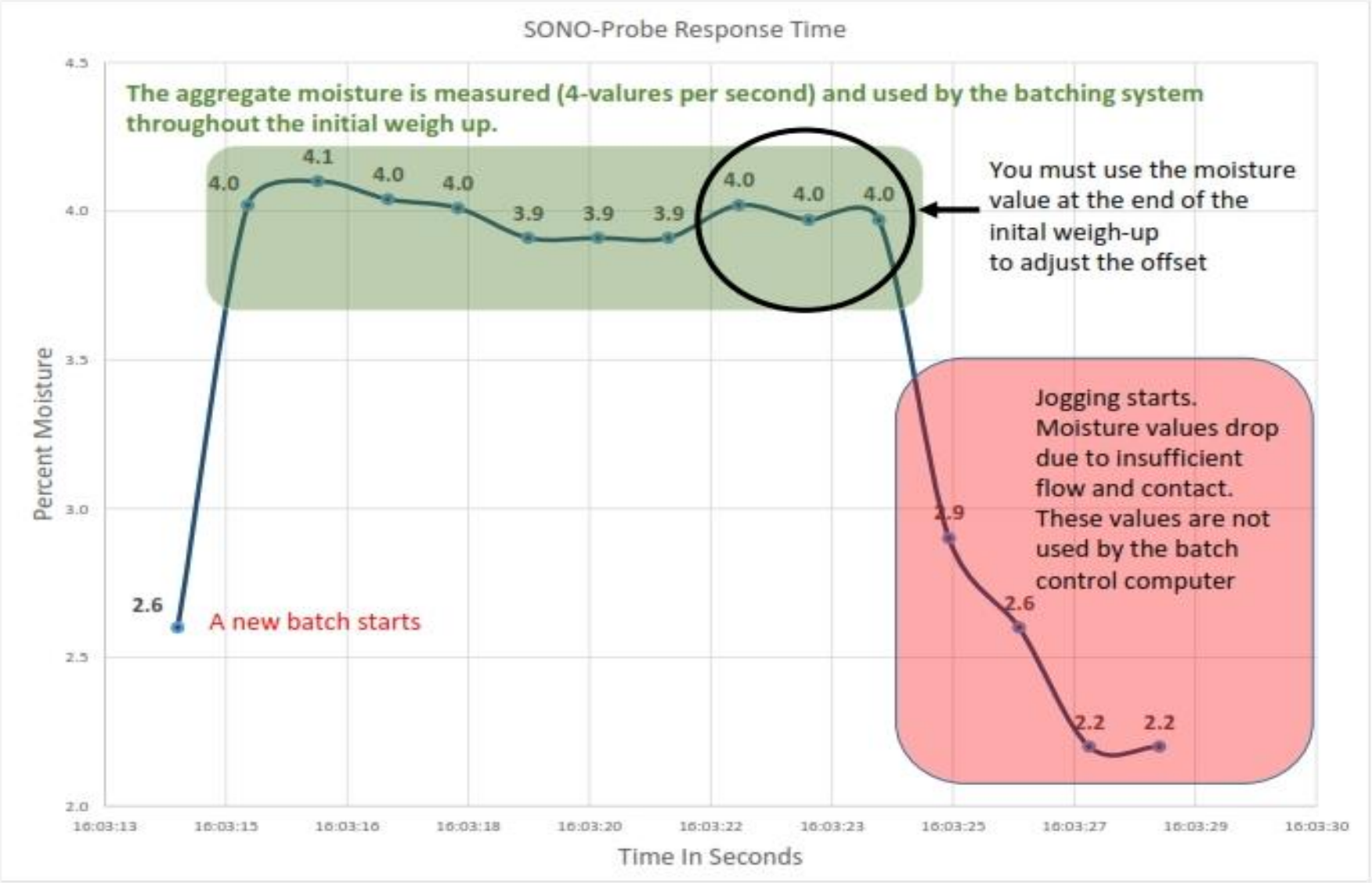
Installation Process: Wiring

- Connect SONO-VARIO probe using the 13-foot long SONO cable, with a MIL-style bayonet connector
- The termination end of the cable, having cable tails, will be pulled to a local Junction box (J-Box)
- From the J-Box, pull the required wires back to the Batch control panel
- Step-by-step instructions included

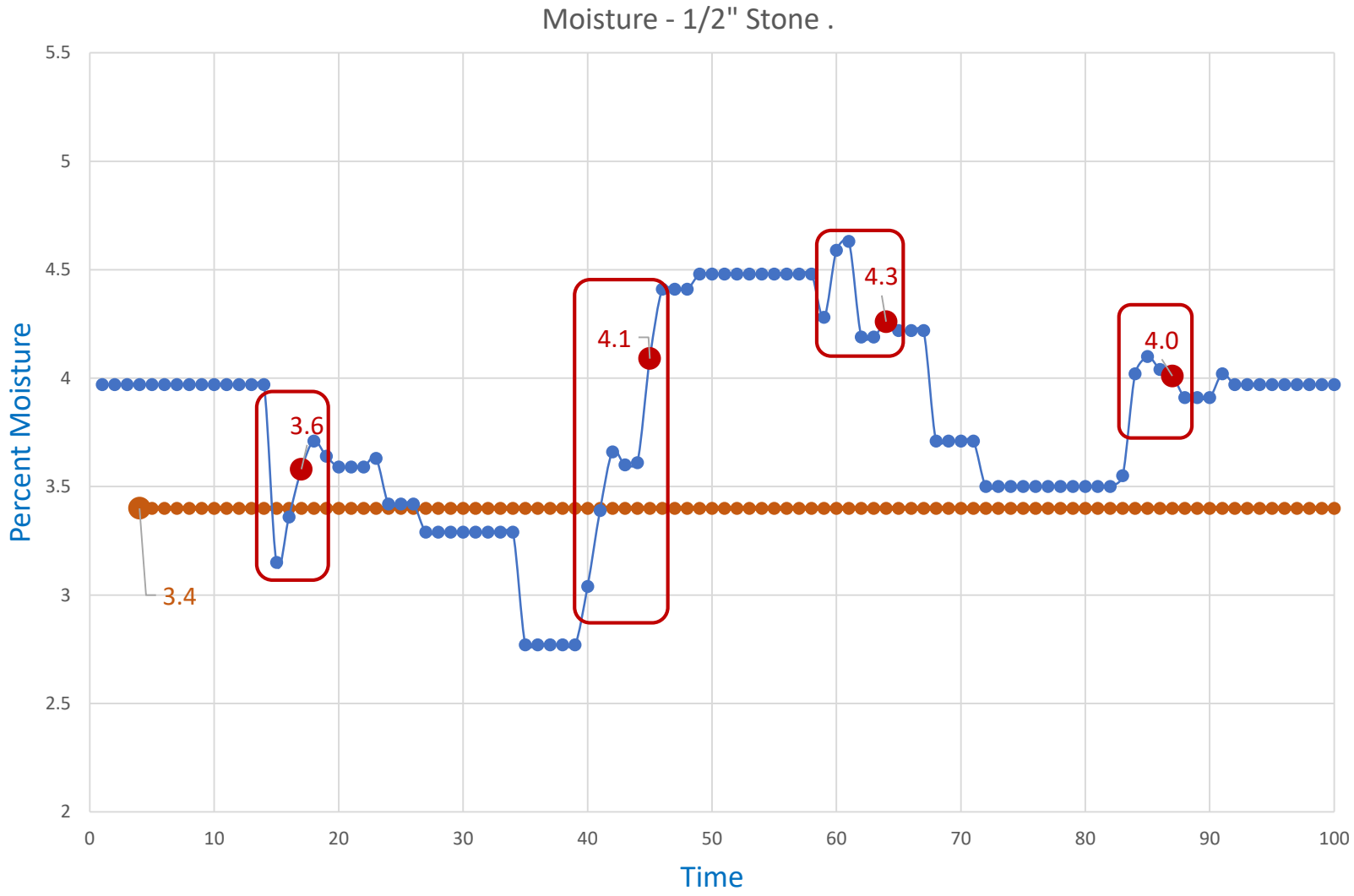




TYPICAL SONO BATCHING CYCLE



FOUR BATCH CYCLES



The Batching Computer uses the aggregate's moisture value at 70 percent of the target weight.

A new moisture value is used to calculate the correct aggregate weight and hold-back water for each new mix design.

One Bake-off moisture cannot give accurate moistures for each mix design.

Installation Summary

Get on-line quickly and without frustration, with MESA's verified commissioning for SONO-VARIO probe:

- SONO mounting plate and bracket
- SONO-VIEW display
- SONO cable with step by step wire guide
- Direct connection to batching control system
- support@mesasystemsco.com

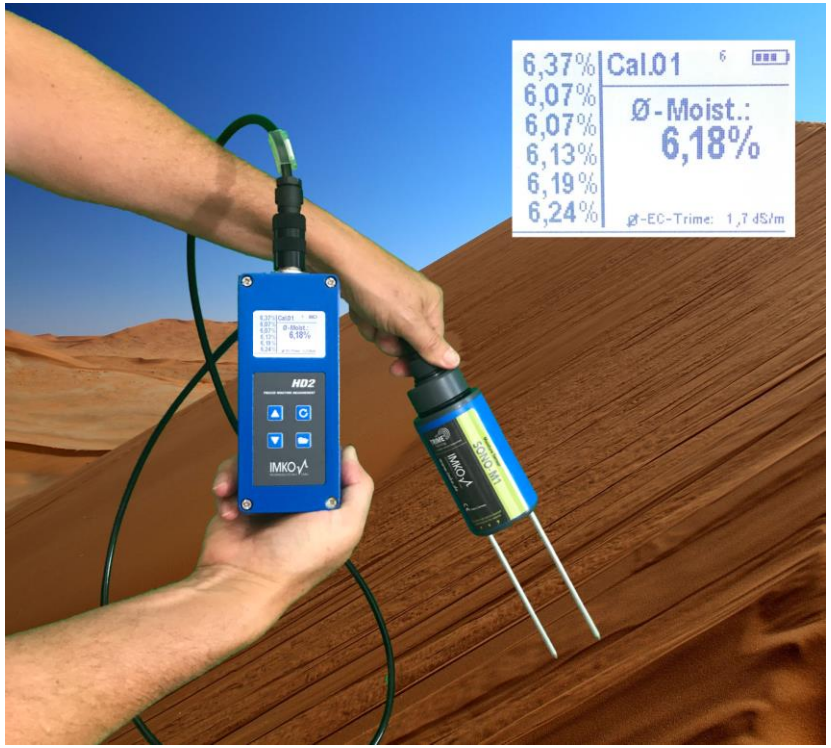
Summary of Presentation

- SONO-VARIO probes
  - Long-term accurate moisture values without adjustment or recalibration
- TRIME® TDR Measurement Technology
  - Proven high precision and repeatable solution, with no maintenance
  - Ensure product quality without material or time sacrifices
- Installation and Interface
  - Demonstrated successful installations and reliable interfacing for all your plants

Also available…

Portable Solutions

Aggregates



HD2-Kit

Fresh Concrete

SONO-WZ

On-line Solutions

Fresh Concrete

SONO-MIX

MESA Systems Co.

Thank you!

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