• The Materials and Tests Unit Chemical lab annually monitors and maintains corrosion data on 100 plus MSE walls throughout the state.

• These installations provide crucial data and research on the effects of backfill material and corrosion reaction to the supporting straps.

• This guide will cover installation of the corrosion monitoring kit for both the Reinforced Earth Type, SINE Wall type and the Vista wall type MSE wall.
Corrosion Monitoring Kit Contents

- **Steel Reference Bar**
  - Blue, 10 Gauge Strand Wire with approximately 15 feet of wire.

- **Zinc Reference Bar**
  - Red, 10 Gauge Solid Wire with approximately 15 feet of wire.

- **4 each strap attachments**
  - Black, Red, Blue Green 12 Gauge Wires with approximately 15 feet of wire.

- **1 Block of Duct Seal**

- **1 each installation instructions**
Installation Considerations

- In most cases, one corrosion monitoring kit per bridge structure; unless the Engineer and or Geo-Technical Unit requests an additional monitoring kit to be installed.

- For projects that utilizes the same quarry for 78 or 57 stone one corrosion monitoring kit will be installed per project.

- If one or more additional quarries are utilized to obtain backfill material an additional monitoring kit will be placed per structure.
Installation Considerations

- For projects that utilize screened backfill one corrosion monitoring kit will be placed on either side of the bridge structure.

- For the use of screened backfill there are additional sampling and testing requirements.

- [https://connect.ncdot.gov/resources/Materials/MaterialsResources/Mechanically_Stabilized_Earth_Wall_Fine_Aggregate_Sampling_and_Testing_Procedures.pdf](https://connect.ncdot.gov/resources/Materials/MaterialsResources/Mechanically_Stabilized_Earth_Wall_Fine_Aggregate_Sampling_and_Testing_Procedures.pdf)
Installation Considerations

Once the Contractor installs the kit and drills **ONE 7/8” hole** in the wall panel for all 6 wires; contact the M&T Corrosion Engineer at 919-329-4090 for installing the wall box.

DO NOT DRILL MORE THAN ONE 7/8” HOLE!
Installation Considerations

- The kit should not be installed on straps or cages that will be in contact with the steel piles.
- This will interfere with the annual readings.
Installation Considerations

- The kit should be installed at least 6 feet from the inside panel.
- The reference bar and lead wires are supplied with 10-15 feet of additional wire.
Installation Consideration

- Ideal locations for long walls are no more than 75 feet to the end of the wall.
Installation Consideration

- An alternative location is along the wing wall side of the MSE wall.
Installation Consideration

- Not an ideal location for a corrosion monitor kit.
- When taking annual readings the technician will be exposed to traffic volume while unrolling a spool of wire to obtain a soil ground for testing.
Installation Considerations

- Before installing take into consideration the final grade and any jersey barriers that may be installed.

- The kit should be installed at the lowest or near lowest area.

- The single hole for the wires coming from the wall should be 4-5 feet above final grade.
Installation Considerations

- Try to avoid extremely low or high placements of the corrosion monitoring kits.

- These can be corrected, however additional labor, money and equipment are needed to adequately install monitoring box.
RECO & SINE Wall Installation
RECO Wall Installation

- Utilizes straps that are bolted to panels and are backfilled with various stone sizes and or screened backfill.
SINE Wall Installation

- Utilizes “sine wave” style straps that are bolted to panels and are backfilled with various stone sizes and or screened backfill.
RECO & SINE Wall Installation

- For the use of screened backfill there are additional sampling and testing requirements.

- [https://connect.ncdot.gov/resources/Materials/MaterialsResources/Mechanically_Stabilized_Earth_Wall_Fine_Aggregate_Sampling_and_Testing_Procedures.pdf](https://connect.ncdot.gov/resources/Materials/MaterialsResources/Mechanically_Stabilized_Earth_Wall_Fine_Aggregate_Sampling_and_Testing_Procedures.pdf)
RECO Wall Installation

- Prior to installing the corrosion monitoring kit the Project Inspector will need to provide:
  - Type and size of backfill
  - Length & thickness of straps in which the corrosion monitoring kit is attached.

- This information is crucial to calculating the corrosion formula will need to be given to the M&T representative when performing the box installation.
Prior to installing the corrosion monitoring kit, the Project Inspector will need to provide:
- Type and size of backfill
- Length & thickness of straps in which the corrosion monitoring kit is attached.

This information is crucial to calculating the corrosion formula will need to be given to the M&T representative when performing the box installation.
RECO & SINE Wall Installation

- The zinc and steel should be approximately 3-6 feet apart, 6 feet from the inside face of the wall and not touching the straps or other steel components.

- Both reference bars lay directly on the aggregate or screened backfill.
RECO & SINE Wall Installation

- The wire connector is slid on the strap and tightened down.
- Once tightened the C-clamp is completely covered in duct seal.
- Consolidate wires with electrical tape before feeding through panel hole.
- Any wire with damaged insulation shall have five wraps of electrical tape on and around damaged area.
RECO & SINE Wall Installation

- Each C-clamp designated for top and bottom strap can attach to each strap as shown in this diagram.

- Black
  - Top Strap

- Red
  - Top Strap

- Blue
  - Bottom Strap

- Green
  - Bottom Strap

Reference Bars are not in contact with wire panels & approx. 3 feet apart
Each C-clamp attaches to a separate strap as shown in this diagram.

- Black
  - Top Strap
- Red
  - Top Strap
- Blue
  - Bottom Strap
- Green
  - Bottom Strap
RECO & SINE Wall Installation

- Any damage to the galvanizing shall be repaired with two coats of an organic zinc rich paint on the approved list.

- Both the Contractor and Project Inspector shall assure that the zinc dust is agitated prior to application. No partial kits are permitted.

- The Materials and Tests Unit maintains a list of approved paint suppliers:

VISTA Wall Installation
VISTA Wall Installation

- Utilizes welded wire grids that attach to the panels with a pin and are backfilled with various stone sizes and or screened backfill.

- For the use of screened backfill there are additional sampling and testing requirements.

- [https://connect.ncdot.gov/resources/Materials/MaterialsResources/Mechanically Stabilized Earth Wall Fine Aggregate Sampling and Testing Procedures.pdf](https://connect.ncdot.gov/resources/Materials/MaterialsResources/Mechanically Stabilized Earth Wall Fine Aggregate Sampling and Testing Procedures.pdf)
VISTA Wall Installation

Prior to installing the corrosion monitoring kit, the Project Inspector will need to provide:
- Type and size of backfill
- Length, width & thickness of wire cage in which the corrosion monitoring kit is attached.

This information is crucial to calculating the corrosion formula, which will need to be given to the M&T representative when performing the box installation.
VISTA Wall Installation

- The zinc and steel should be approximately 3-6 feet apart, 6 feet from the inside face of the wall and not touching the straps or other steel components.

- Both reference bar lay directly on the aggregate or screened backfill.
VISTA Wall Installation

- The wire connector is slid on the strap and tightened down.

- Once tightened the C-clamp is completely covered in duct seal.

- Consolidate wires with electrical tape before feeding through panel hole.

- Any wire with damaged insulation shall have five wraps of electrical tape on and around damaged area.
VISTA Wall Installation

- Each C-clamp designated for top and bottom strap can attach to the same grid as shown in this diagram.
  - Black
    - Top Strap
  - Red
    - Top Strap
  - Blue
    - Bottom Strap
  - Green
    - Bottom Strap

Reference Bars are not in contact with wire panels & approx. 3 feet apart
VISTA Wall Installation

- Each C-clamp can attach to separate grids as shown in this diagram.

- Black
  - Top Strap

- Red
  - Top Strap

- Blue
  - Bottom Strap

- Green
  - Bottom Strap

Reference Bars are not in contact with wire panels & approx. 3 feet apart.
VISTA Wall Installation

- Any damage to the galvanizing shall be repaired with two coats of an organic zinc rich paint on the approved list.

- Both the Contractor and Project Inspector shall assure that the zinc dust is agitated prior to application. No partial kits are permitted.

- The Materials and Tests Unit maintains a list of approved paint suppliers:
  
M&T Contact Information For MSE Wall Installation

- **State Field Operations Manager**
  - Todd Whittington, PE
  - (919) 329-4220
  - twhittington@ncdot.gov

- **Metals Engineer**
  - Randy Porter
  - (919) 329-4202
  - srporter@ncdot.gov

- **Manufactured Products Engineer**
  - Cabell Garbee, II, PE
  - (919) 329-4224
  - cgarbee@ncdot.gov

- **Coatings and Corrosion Engineer**
  - Aaron Dacey
  - (919) 329-4102 Office
  - ahdacey@ncdot.gov