Installation Observations of Geosynthetic and Steel Reinforced SCP-MSE Walls: Lessons Learned

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Agenda

1. SCP-MSE Introduction

   Introduction of Segmental Concrete Panel Mechanically Stabilized Earth walls.

2. Case History #1

   Two backfill types cause installation challenges.

3. Case History #2

   Geosynthetics tackle backfill source challenges, accommodate obstructions.

4. Case History #3

   Complex site conditions, environmental concern calls for geosynthetics.

5. Case History #4

   Acute corner scenarios highlighting the flexibility of MSE technology.

6. Conclusion

   Final comments and Q&A.

SCP-MSE Introduction

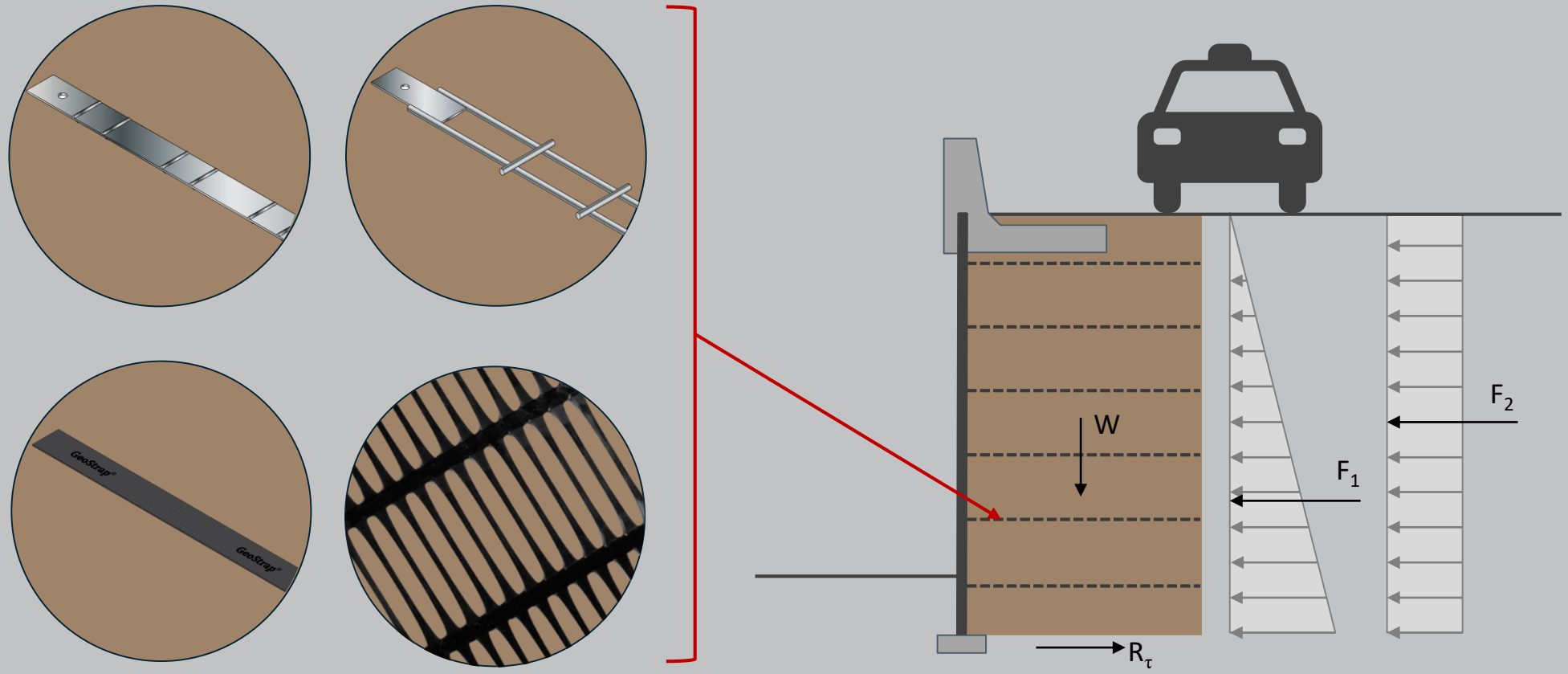
SCP-MSE Walls

Mechanically Stabilized Earth

A complex and innovative worldwide industry began with a simple concept…

SCP-MSE Walls

Mechanically Stabilized Earth



SCP-MSE Walls

Segmental Concrete Panel

photo credit: Tensar

Case History #1

Case History #1:
Two backfill types cause installation challenges.

Border West Expressway

El Paso, TX

Constructed 2015-2019

900,000 sq. ft. SCP-MSE walls

500,000 sq. ft. reinforced with geosynthetics

Case History #1:
Two backfill types cause installation challenges.

Challenges:

- Two backfill types required for project.
- Miles in between installation crews and months/years between installation dates.

Table 2
Select Backfill Gradation Limits

Type	Sieve Size	Percent Retained
AS	3"	0
	1/2"	50–100
	#4	See Note
	#40	85–100
	#200	95–100
BS	3"	0
	#4	See Note
	#40	40–100
	#200	85–100
CS	3"	0
	#4	See Note
	#200	75–100
DS	3"	0
	3/8"	85–100
	#200	95–100

Note—Use No. 4 sieve for determination of rock backfill as described in this main paragraph, "Backfill."

from TxDOT Item 423

Case History #1:
Two backfill types cause installation challenges.

Lessons Learned:

- Pullout tests not indicative of reinforcement installation behavior.
- Higher compaction stresses behind SCP facing for coarse aggregate sections – facing misalignment?
- SCP pre-batter must be adjusted based on backfill type, may also require retraining of installation crew(s).
- Lightweight compaction equipment always required within 3 ft. zone behind facing.

photo credit: Tensar

Case History #2

Case History #2:
Geosynthetics tackle backfill source challenges, accommodate obstructions.

MCB Camp Lejeune

Jacksonville, NC

Constructed 2011-2013

- 50,000 sq. ft. SCP-MSE walls
- Reinforced with geogrids

photo credit: Wikipedia

photo credit: Pedelta

Case History #2:
Geosynthetics tackle backfill source challenges, accommodate obstructions.

Challenges:

- Limited availability of coarse aggregate.
- Bridge piles obstructing soil reinforcement.

HP14x73 spaced 6 ft. O.C., located 3 ft. from SCP facing

photo credit: Tensar

Case History #2:
Geosynthetics tackle backfill source challenges, accommodate obstructions.

Lessons Learned :

- Geosynthetics are compatible with a wide variety of backfill types.
- When properly detailed during design, geosynthetic SCP-MSE walls can accommodate a variety of obstructions.

photo credit: Tensar

Case History #3

Case History #3:
Complex site conditions, environmental concern calls for geosynthetics.

Los Vaqueros Reservoir Expansion [Increase Dam Height]

Livermore, CA

Constructed 2011-2012

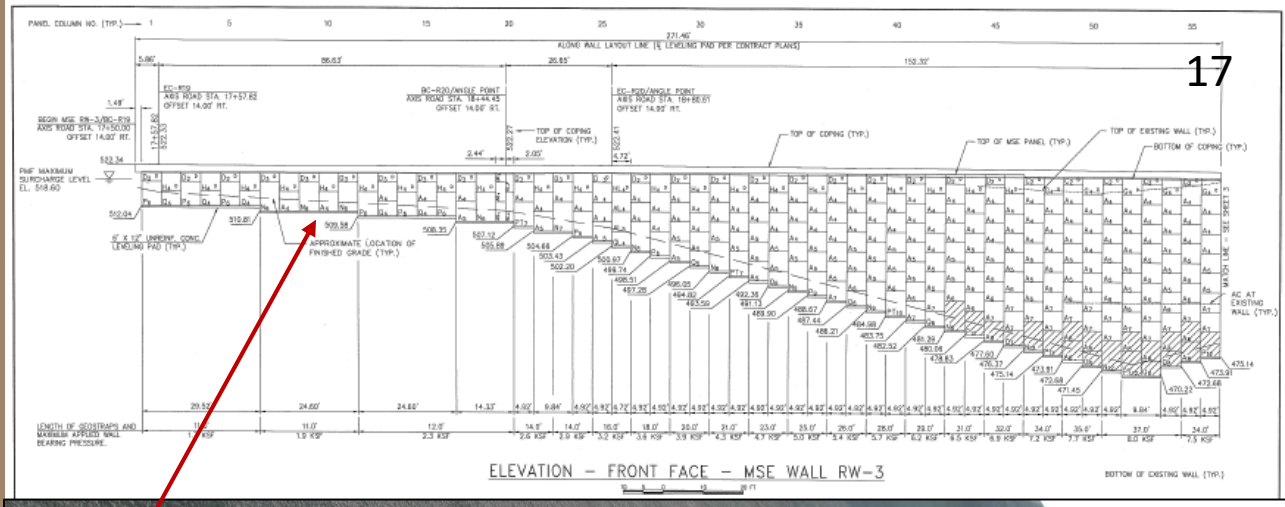
- 42,000 sq. ft. SCP-MSE walls
- Reinforced with geosynthetic strips

photo credit: Reinforced Earth Co.

Case History #3:
Complex site conditions, environmental concern calls for geosynthetics.

Challenges:

- Severely limited space to construct reinforced zone.
- State environmental concern [potable water] led to geosynthetic reinforcement.



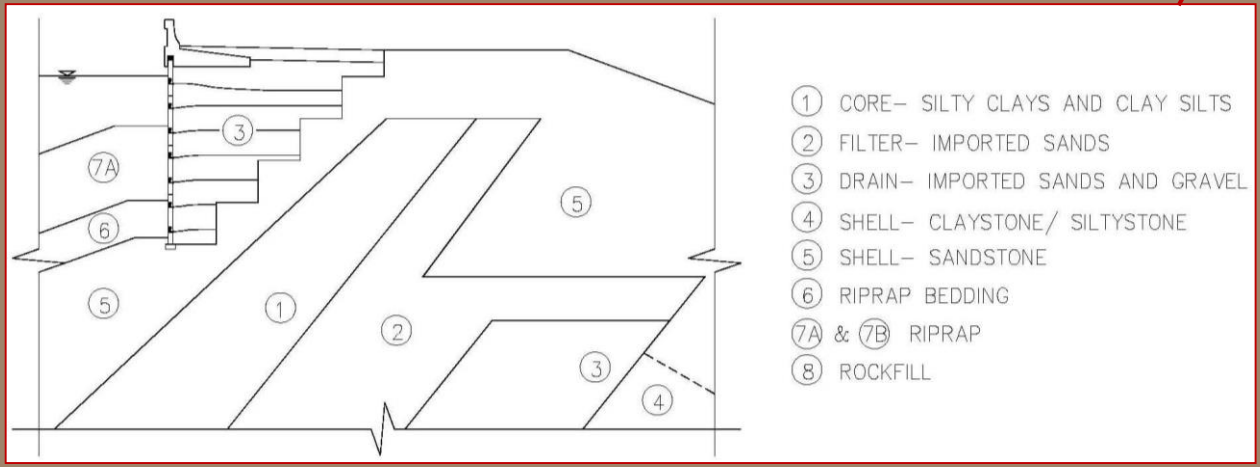


photo credit: Reinforced Earth Co.

Case History #3:
Complex site conditions, environmental concern calls for geosynthetics.

Lessons Learned :

- Confined working conditions between SCP facing and shotcreted backslope causes compaction energy to rebound.
- Joint geotextile type must be selected based on desired permittivity.

Flashlight (for scale)

photo credit: Reinforced Earth Co.

Case History #4

Case History #4:
Acute corner scenarios highlighting the flexibility of MSE technology.

Challenges:

- Acute corners formed by converging wall layout lines (or between wall and adjacent structure).
- Reinforced soil zone limited between opposing wall faces.
- Labor and equipment challenges.

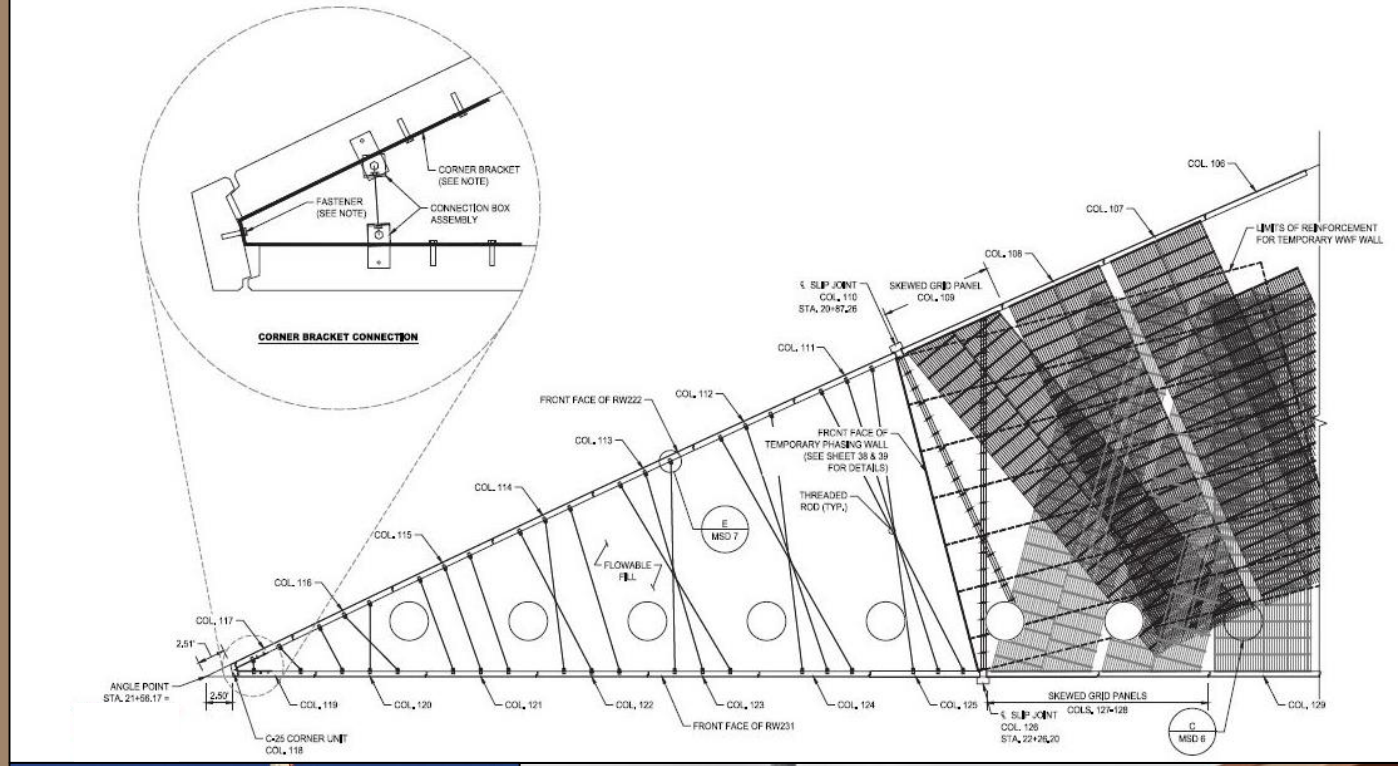
Green lines parallel to reinforcement locations

photo credit: Reinforced Earth Co.

Case History #4:
Acute corner scenarios highlighting the flexibility of MSE technology.

Lessons Learned :

- Although they can be built properly, acute corners are a challenge for everyone.
- For successful installation, detailing is critical.
- Wall system, soil reinforcement type drive final solution but may have unexpected cost implications.



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Thank you for attending!

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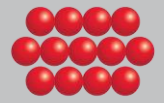

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