

Introduction to MSE Wall Construction Syllabus

Time: 40 hours

Maximum Class Size: 8

Prerequisites: None

Course Description: A retaining wall is used anywhere earth must be held or retained and prevented from moving downhill. An increasingly common technique is MSE, or Mechanically Stabilized Earth. Contractors are in need of workers who have a general knowledge of the systems and their installation. In this course, the participant will receive instruction on safety, minimum installation guidelines, material and system component properties, soils and compaction, site practices and equipment selection. The participant will also be given ample hands-on step by step practice in the construction and deconstruction of a MSE wall.

Goals/Objectives/Student Learning Outcomes:

- Identify all required PPE for this scope of work.
- Work safely in very close proximity to Heavy equipment.
- Communicate location and needs using hand signals.
- Use hand signals to control overhead loads.
- Safely operate small compaction tools efficiently.
- Explain how to read and comprehend typical Layout drawings, Standard Details, Standard specifications, Special Provisional Specifications, and “shop drawings”, as they pertain to MSE Earth Retaining Wall Structures.
- Explain Survey Control established to achieve the walls correct alignment and design height.
- Identify, and inspect all wall components, associated with the **MSEplus** retaining wall system.
- Form up and place “Minor” (unreinforced) Concrete, to the required alignment, and sub-grade elevation. Have the ability to strip and stack Leveling Pad forming materials so that they may be reused.
- Set up a Builders Level and a Laser Level, utilize a grade rod, utilize a linker rod, and utilize a hand level.
- “Check-in” to existing Survey and using basic arithmetic determine the H/I (height of instrument) and the elevation of the retaining wall as it is being built.

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- Utilize existing Survey Control, to establish FFW (Front Face of Wall).
- Measure and Mark Precast member “endoe” points, and step locations.
- Fabricate and safely modify Panel braces and securing blocks, (“squeeze blocks”)
- Identify and organize reinforcing steel.
- Install, wedge, and securely attach panel bracing on base course of Precast Concrete Panels.
- Identify and adjust each Precast member, to the appropriate “batter”
- Safely install engineered temporary hand rail system.
- Identify and attach the Reinforcing Mesh, (“Straps”) to back side of each precast member. The participant will also be required to have the ability to check the “straps”, prior to covering them to ensure they are still securely attached and without “play”.
- Identify and correctly install reinforcement corrosion inspection rods.
- Identify and address pinch points in advance to prevent injury
- Demonstrate use of Burke bars, 90 bars, and spud end wrenches in place of using hands or feet to manipulate panels as they are installed.
- Utilize a checklist in the field.
- Explain the difference between a “checkpoint” and a “Hold point” as they pertain to the checklist.

Standards

Cal Trans Standard Specifications:

- 19 Earthwork
- 51 Concrete structures
- 52 Reinforcement
- 75-1.05 Galvanization
- 90-10 Minor Concrete
- 405 SP-vol1-8-2.03 Precast Quality Control General Requirements
- 405 SP-vol1-10-1.50 Earth Retaining Structures

Classroom Rules and Procedures

- All classes begin at 6:30 am and end at 3:00 pm
- Upon entering classroom, all participants must sign in and be seated by 6:30 am
- Class will consist of a combination of lecture, video, demonstration, coached group exercises, individual exercises and assessment.
- Students are required to report to class ready to work and maintain the provided PPE

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Textbooks/Readings/Materials

- Introduction to MSE Walls PowerPoint
- “Example Page” Handout
- Complete set of SSL Main Office Plans
- Sequence Block Placement handout
- Wedge Placement for Mesh handout
- Plan Flip Cover Page handout
- Introduction to MSE Walls Exit Exam & Answer Sheet
- LIUNA: Subpart E PPE PG/IG
- LIUNA: Hand Tools PG/IG
- LIUNA: Fall Protection PG/IG
- LIUNA: Subparts H & N PG/IG
- Wall Drawings and Standard details
- Job Hazard analysis
- Work Plan
- Daily Outline
- MSE Wall Components (handout)
- Material inventory sheet
- MSE Wall Overview (handout)
- Wall drawings, Standard details, Shop drawings (handout)
- CTSS (handout)
- SP (SPECIAL PROVISIONS 405) (handout)
- Dig Alert (dig permit)
- Hands-on Assessment Evaluation form

Tools/Equipment/Other Materials

Precast Facing Panels:

6-B2 Panels

8-A Panels

6-X Panels

Reinforcing Wire Mesh:

15-5W11x0.50W11 total

10-4W11x0.50W11 total

15-60W11x2.00W11 total

50-Securing pins

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Inspection Rods Other Misc. Permanent Materials:

4-Inspection Rods w/accessories
20-HDPE Bearing Pads
20-Seismic Spacers
300'x1' Filter Fabric
1-Liquid Nail Adhesive (large tube)
3-Shovels (square)
3-Shovels (round)
1-Asphalt lute 3' edge
3-sets 2 leg bridle w/1-1/2" Master link w/attached locking hooks inside flemished eye
2-sets Locking lifters
100-ft. 5/8" nylon rope
1-Builders level w/grade rod (engineering)
1-Tripod
2-4' hand level 2
2-Wheel Barrow
2-Burke Bar
2-90 Bar
2-Cordless impact w/spare battery
2-Large Knack tool box
6-Master locks w/keys
4-box hard wood wedges 100 count, stubbed end
12- 5/8"x14" coil rod
50- 3/4" coil rod nut
50- 3/4" I.D. washers
10-Prefabricated engineered (temp.) handrail
100-Douglas Fir (DF) 2" x4" wood wedges rip-cut down center
1-box per color marking paint (red, white, and blue)
10- 2" x 4"x 12' DF
10-2"x6"x10' DF
10-Adjustable bracing brackets
20-2' round steel stakes
24-Re-bar caps
1-Skil saw (cordless) w/extra blades
1-Sawzall (cordless) w/extra blades
2-Saw horses
1-sheet 1"x4'x8' plywood
24-Leather welding gloves
1-Box black marker
3-Spools String-line

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1-150 ft. chalk line
1-Walk-behind vibrating tamper
4-Klein canvas tool bucket
1-box #16 duplex nails
4-pairs metatarso guards (toe guards)
2-5 gallon water jugs
6-boxes paper cups
2-E-Z up shelter
1-box Duct tape
6-Deep well 3/8" drive x 3/4" impact socket
2-6 lb. sledge hammer w/protective rubber on handle
1-box red Kiel
1-1/4"x10' aluminum straight edge
12-Screen type face shield
4-Face shield mounting bracket
2-Standard hard hat w/face shield mounts
1-Box ear plugs
6-Engineers tape
2-pairs industrial scissors
6-metal claw hammer
6-torpedo level
6-tool bags w/suspenders
200-plastic shims
Quality control checklists for level pad, installing panels, installing reinforcing straps, placing and compacting MSE material

Personal Protective Equipment

- 12 pairs of gloves
- 12 pairs of Safety Glasses
- 20 pairs of Ear plugs
- 12 hard hats

Course Requirements

In order to receive credit for the course, participants must:

- Be present for full forty hours
- Participate in all classroom exercises
- Pass a written exam

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- Pass a hands-on exam

Course Policies

- Participants must be on-time and ready to work.
- Participants must return from breaks on-time.
- Participants must participate in each exercise and assignment
- Participants who are on “light duty” are not allowed to take this course due to the physically demanding requirements.

Assessment and Grading

Participants will be assessed on the following:

- All written exams must be passed with a score of 80% or above.
- All hands-on exercises are graded on performance and participation. They are pass/fail and must be passed with a score of 80% or above.

Safety

Failure to maintain and use PPE may result in dismissal from the course.