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SCOPE

- This work shall consist of embankment construction with approved material from roadway excavation or borrow pits.

REFERENCE

- IRC:SP:84-2014
- MoRTH Specifications, Clause No. 305
- IRC:36
- Technical Specifications of Contract

EQUIPMENT

- Excavator / Backhoe
- Dozer
- Motor Grader
- Dumpers
- Vibratory Roller
- Water Tanker
- Auto Level
- Measuring Tape

TOOLS

- Pegs



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- Lime Powder

MANPOWER & RESPONSIBILITIES

- Construction Manager
- Engineer / Supervisor
- Land Surveyor
- Material Engineer
- Safety Supervisor
- Helpers

Construction Manager

He shall be overall responsible for the activity including planning and organizing resources in consultation with the Project Manager. He shall ensure safety requirements, conduct relevant tests, maintain records, and coordinate with the consultant for approvals.

Engineer / Supervisor

Responsible for deploying resources, executing work as per drawings, maintaining quality as per specifications, and ensuring safety compliance. Also responsible for obtaining necessary approvals.

Land Surveyor

Responsible for establishing reference points, checking levels and alignment, recording completed work, and coordinating with the consultant for approvals.

Material Engineer

Responsible for implementing quality procedures, ensuring materials meet specifications, conducting tests, and maintaining records.

Safety Supervisor

Ensure that all activities are carried out safely as per the project safety plan.

MATERIALS

Materials shall be free from logs, stumps, roots, rubbish, or any deleterious matter affecting stability. The material shall have:

- Liquid Limit (LL) less than 55%



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Samples from borrow areas shall be tested in the laboratory to verify these requirements.

PROCEDURES

- Before commencing earthwork, toe limits of embankment shall be marked.
- Original ground shall be leveled, scarified, watered, and compacted to achieve 95% of MDD.
- Material shall be excavated from borrow areas and transported by dumpers.
- Material shall be spread uniformly using grader/mechanical means.
- Clods shall be broken to maximum size of 75 mm.
- If NMC is less than OMC, water shall be added to maintain +1% to -2% of OMC.
- If NMC is more than OMC, material shall be dried by sun exposure.
- Compaction shall be done using vibratory roller (80–150 kN) to achieve 95% MDD.
- Rolling shall start from lower edge to upper edge.
- Each roller pass shall overlap 1/3rd of the previous pass.

ACCEPTANCE CRITERIA

- Field dry density $\geq$ 95% of MDD
- Layer thickness tolerance ± 25 mm
- Moisture content +1% to -2% of OMC during compaction

FREQUENCY OF TESTING

- Gradation Test (IS 2720 Part-4): 2 tests per 3000 cum
- Plasticity Test (IS 2720 Part-5): 2 tests per 3000 cum
- Density Test (IS 2720 Part-8): 2 tests per 3000 cum
- Deleterious Content (IS 2720 Part-27): As required
- Moisture Content (IS 2720 Part-2): 1 test per 250 cum
- CBR Test (IS 2720 Part-16): As required

FIELD COMPACTION TESTING

- One set of ten density measurements for every 3000 sqm or as required for statistical evaluation



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- All safety measures shall be followed as per approved EHS Plan.

FREQUENTLY ASKED QUESTIONS (FAQ)

1. What Is The Purpose Of Embankment Construction?

Embankment construction is carried out to raise the formation level of the road and provide a stable base for pavement layers.

2. What Is The Required Compaction For Embankment?

The field dry density should be at least 95% of the Maximum Dry Density (MDD) as per MoRTH specifications.

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3. What Type Of Soil Is Suitable For Embankment Construction?

Soil used should have Liquid Limit less than 55%, Plasticity Index less than 25%, and Free Swell Index less than 50%.

4. What Is The Optimum Moisture Condition During Compaction?

Moisture content should be maintained within +1% to -2% of Optimum Moisture Content (OMC) during compaction.

5. What Equipment Is Commonly Used In Earthwork?

Excavators, dumpers, graders, vibratory rollers, and water tankers are commonly used for embankment and subgrade work.

6. What Is The Maximum Layer Thickness Allowed?

Layer thickness tolerance is generally maintained within ± 25 mm as per specifications.

7. Why Is CBR Testing Important?

CBR (California Bearing Ratio) test determines the strength of subgrade soil and its suitability for pavement design.

8. How Frequently Should Field Density Tests Be Conducted?

One set of ten density measurements is carried out for every 3000 sqm of compacted area or as required.



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10. What Is The Role Of A Surveyor In Earthwork?

The surveyor establishes reference points, checks alignment and levels, and ensures the work is executed as per design.

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