LGED

Road Design Standards for LGED

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Presentation Outline

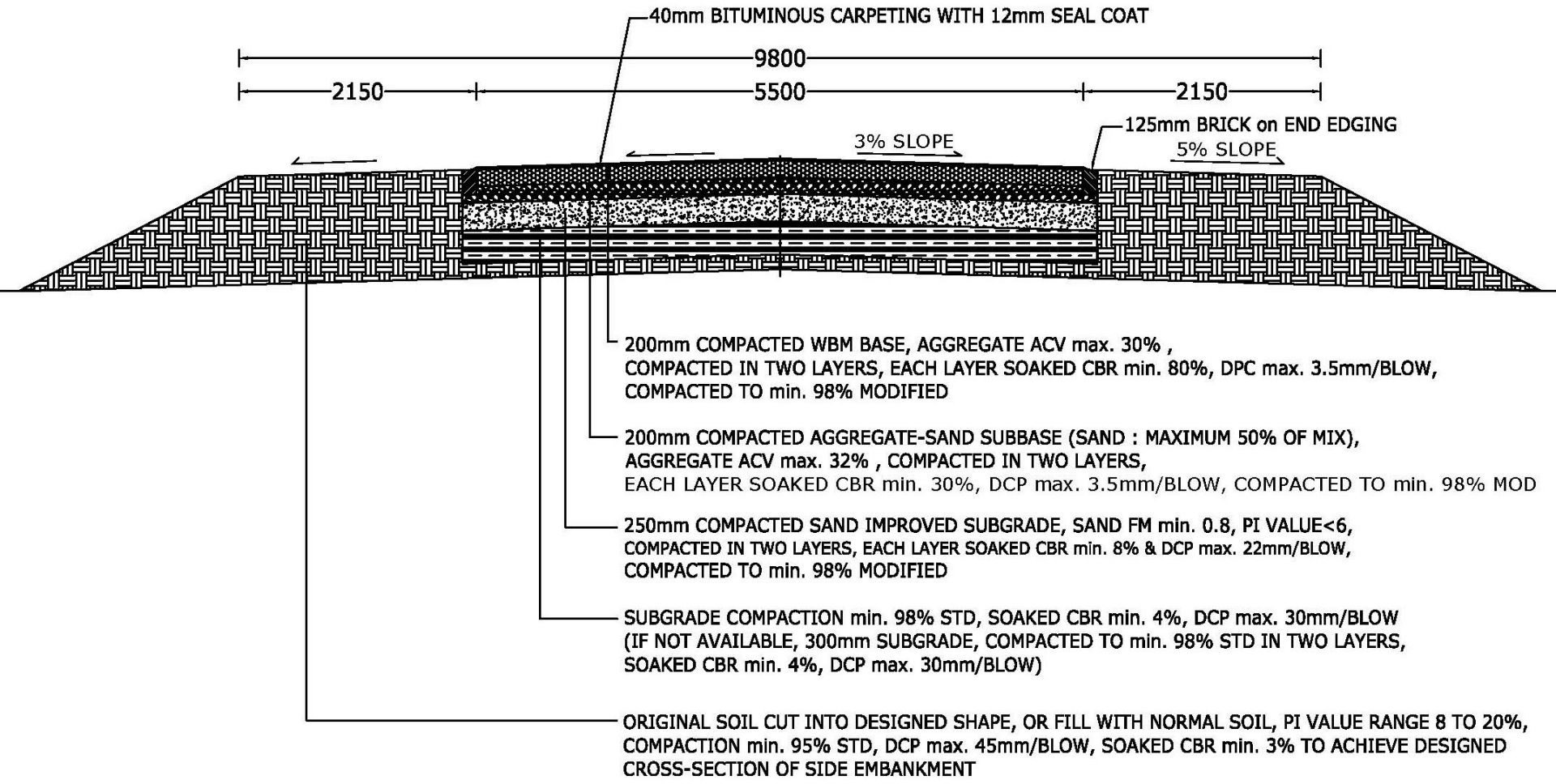
- **Road Design Standards - LGED**
- **Design Considerations**

Geometric design

- 5 basic geometric design types for Upazila and Union Roads all based on traffic characteristics
- Design types 5, 6, 7 & 8 : based primarily on forecasts/survey of commercial vehicles
- Design type 4 : based primarily on forecasts of peak hour passenger car units (pcu)
- Design type 8 shall be used for village Roads;
- In case of land acquisition problem and resource constraint, crest width of 7.3 metre/ 24 feet may be allowed in special cases (For Design type 4)

UPAZILA ROAD SECTION

DESIGN TYPE 4



Geometric design

- Super-elevation should be provided at all turning points on curves to prevent hazards of accidents.
- All the existing curve points on narrower roads with CW ≤ 12'-0" should be widened to 18'-0" with proper super-elevation allowing the both direction vehicles at these points to move with greater safety.
- Proper widened road intersections shall be provided at all crossing points.
- Initiative has to be taken for straightening zigzag road alignments, **otherwise those alignments will not be qualified for any further investment**.

Pavement Design Configuration

Sl. No.	DT 4	DT 5	DT 6	DT 7	DT 8
EAL (Ton)	8.2	8.2	8.2	8.2	8.2
Traffic (CV/day)	301 ~ 600 (PCU 530)	201 ~ 300	101 ~ 200	51 ~ 100	01 ~ 50
Growth Rate	5%	5%	5%	5%	5%
Design Life (Years)	10	10	10	10	10
Embank. Fill	Min. 95% STD 3% Soaked CBR	Min. 95% STD 3% Soaked CBR	Min. 95% STD 3% Soaked CBR	Min. 95% STD 3% Soaked CBR	Min. 95% STD 3% Soaked CBR
Sub-Grade	Th. = 300mm Min. 98% STD 4% Soaked CBR	Th. = 300mm Min. 98% STD 4% Soaked CBR	Th. = 300mm Min. 98% STD 4% Soaked CBR	Th. = 300mm Min. 98% STD 4% Soaked CBR	Th. = 300mm Min. 98% STD 4% Soaked CBR
Improved Sub-Grade	Th. = 250mm Min. 98% Mod 8% Soaked CBR	Th. = 250mm Min. 98% Mod 8% Soaked CBR	Th. = 250mm Min. 98% Mod 8% Soaked CBR	Th. = 250mm Min. 98% Mod 8% Soaked CBR	Th. = 250mm Min. 98% Mod 8% Soaked CBR

Pavement Design Configuration (Continue)

Sl. No.	DT 4	DT 5	DT 6	DT 7	DT 8
Sub-Base	Th. = 200 Min. 98% Mod 30% Soaked CBR	Th. = 150 Min. 98% Mod 30% Soaked CBR	Th. = 150 Min. 98% Mod 30% Soaked CBR	Th. = 150 Min. 98% Mod 30% Soaked CBR	Th. = 150 Min. 98% Mod 30% Soaked CBR
Base Course (WBM)	Th. = 200 Min. 98% Mod 80% Soaked CBR	Th. = 150 Min. 98% Mod 80% Soaked CBR	Th. = 150 Min. 98% Mod 80% Soaked CBR	Th. = 150 Min. 98% Mod 80% Soaked CBR	Th. = 150 Min. 98% Mod 80% Soaked CBR
Carpeting	40mm BC 12mm SC	40mm BC 7mm SC	25mm BC 7mm SC	25mm BC 7mm SC	25mm BC 7mm SC
Carriage way Width	5.5m DL	3.7m SL	3.7m SL	3.7m SL	3.0m SL
Hard Shoulder	0.0	0.9	0.0	0.0	0.0
Verge	2.15	0.9	1.8	0.9	1.25

Improved SubGrade for Various Sub-Grade CBR Values

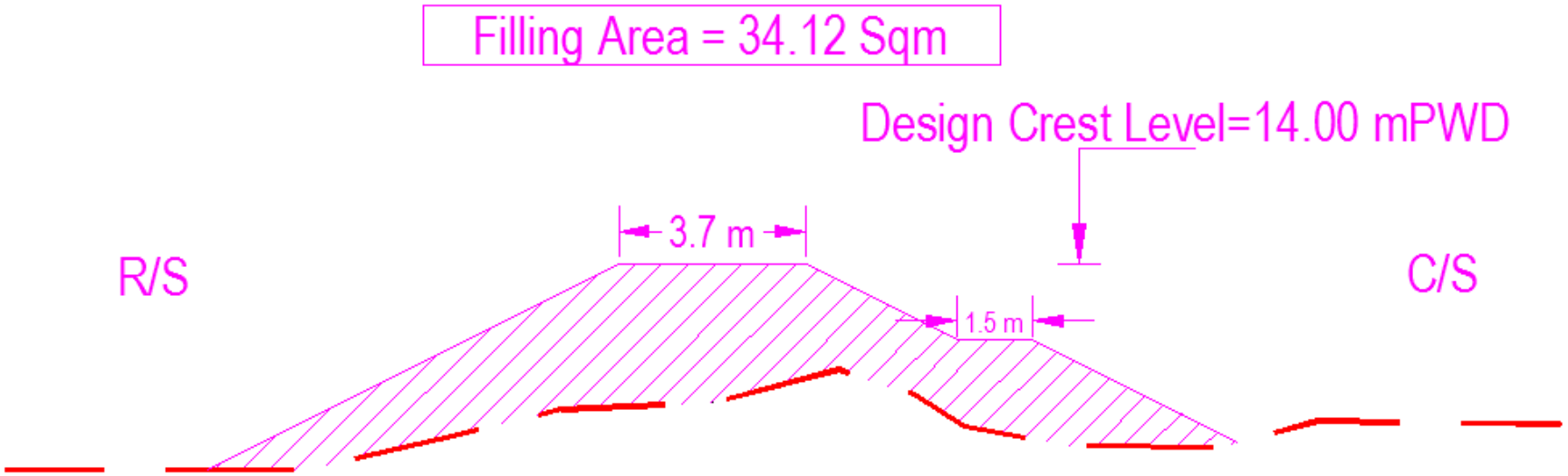
Thickness of improved sub-grade for various sub-grade CBR values.

Min. CBR Value of Sub-grade material (at specified compaction) %	Thickness of Improved Sub-grade to give CBR of 8%
2%	450 mm
3%	300 mm
4%	250 mm
5%	200 mm

Various options applied if Subgrade CBR < 2%

- Sand Drain
- Sand Compaction Pile
- Prefabricated Vertical Jute Drain
- Prefabricated Vertical Synthetic Drain
- Application of Jute Geo-Textile in ISG Layer etc.

Typical Section of Embankment



Types of Embankment

Submersible Flood Embankments

- It is designed mainly to protect boro rice from the pre-monsoon floods
- During monsoon season these embankments remain submerged and cannot be used for communication

High Flood Embankments

- It is designed mainly to protect the subproject area from inundation by excluding both pre-monsoon and monsoon high floods.

Design Considerations

Height of Embankment

Height of embankment or crest level of embankment is fixed up to maintain integrity of the embankment for protection against the design flood.

Crest level of embankment= Design Flood Level + Free Board

Design Considerations

Crest Width of Embankment

Crest width should be designed taking into account soil stability (seepage and slope sliding) and future use of the embankment.

Generally crest width is fixed considering standard crest width of road.

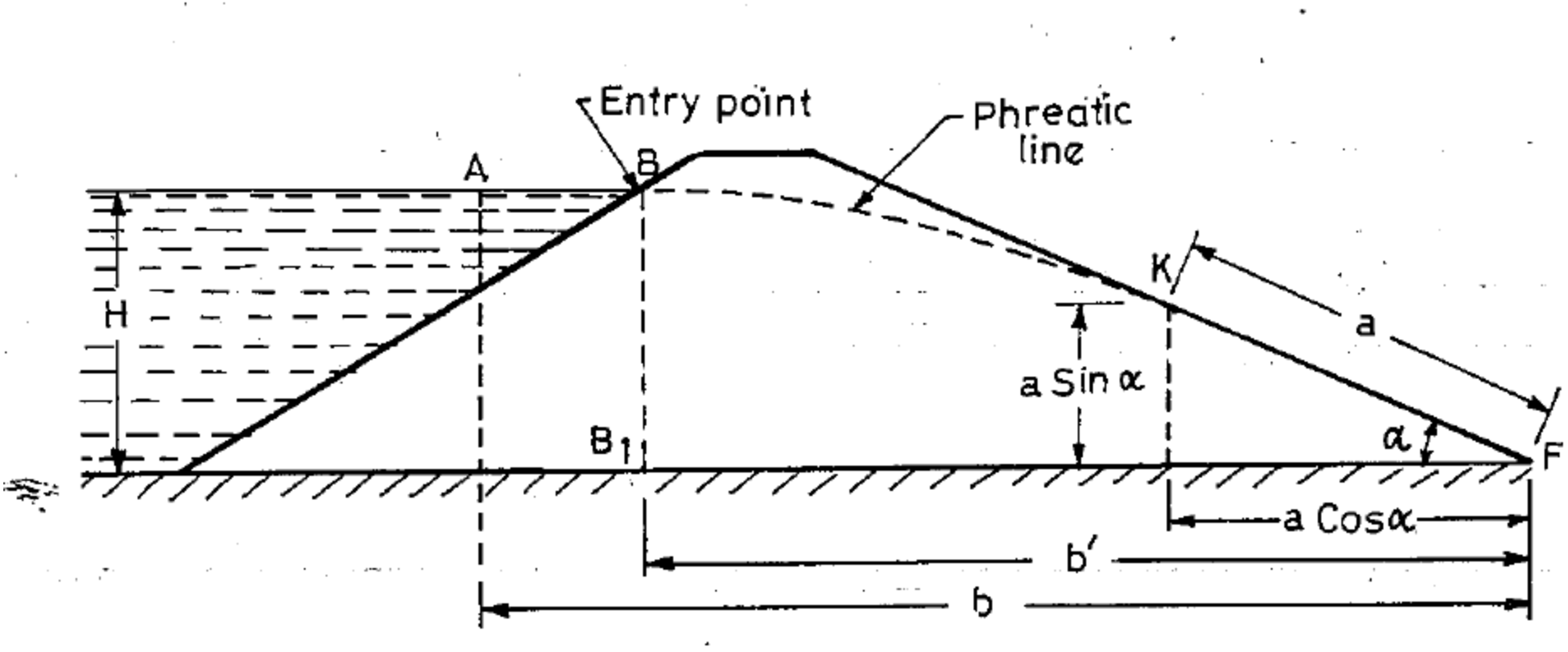
Design Considerations

Side Slope of Embankment

Side slope should also be designed taking into account soil stability (seepage and slope sliding) and future use of the embankment.

Phreatic line analysis and slope stability check should be considered to select the design slope and overall embankment width.

Phreatic Line Analysis



Slope Stability Check

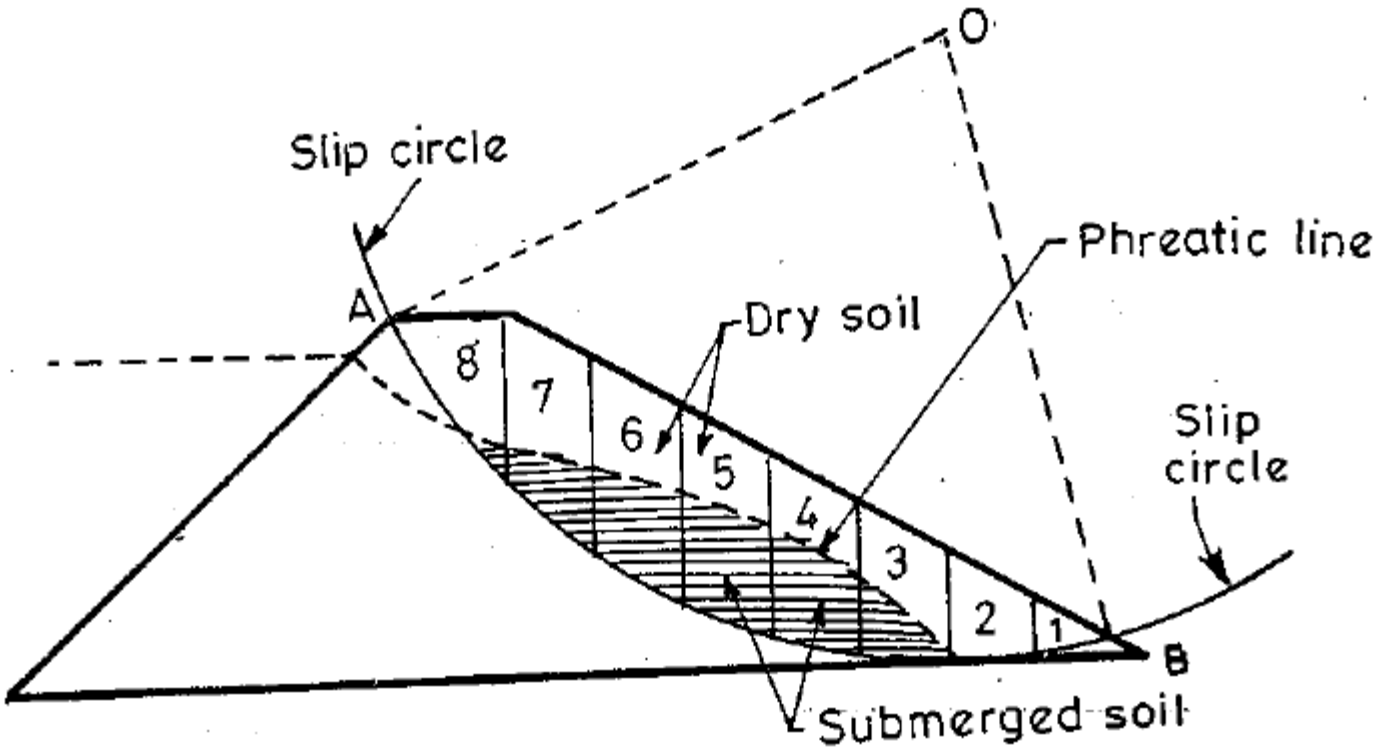


Fig: Swedish Slip Circle Method

Design Considerations

Set Back Distance

The minimum design set back distance, including re-sectioning of existing embankments, shall be 3.0 m. Approximate embankment set back distance (SB) can be determined from the following relation.

$$SB = Ze \times Dch$$

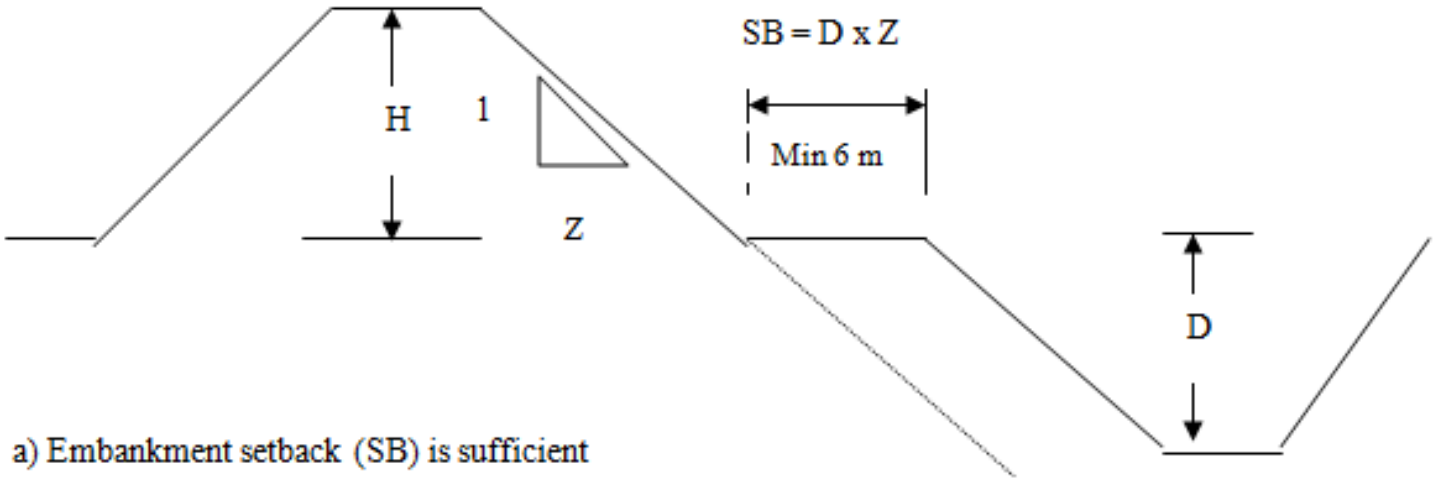
Where:

SB = embankment set back distance (m)

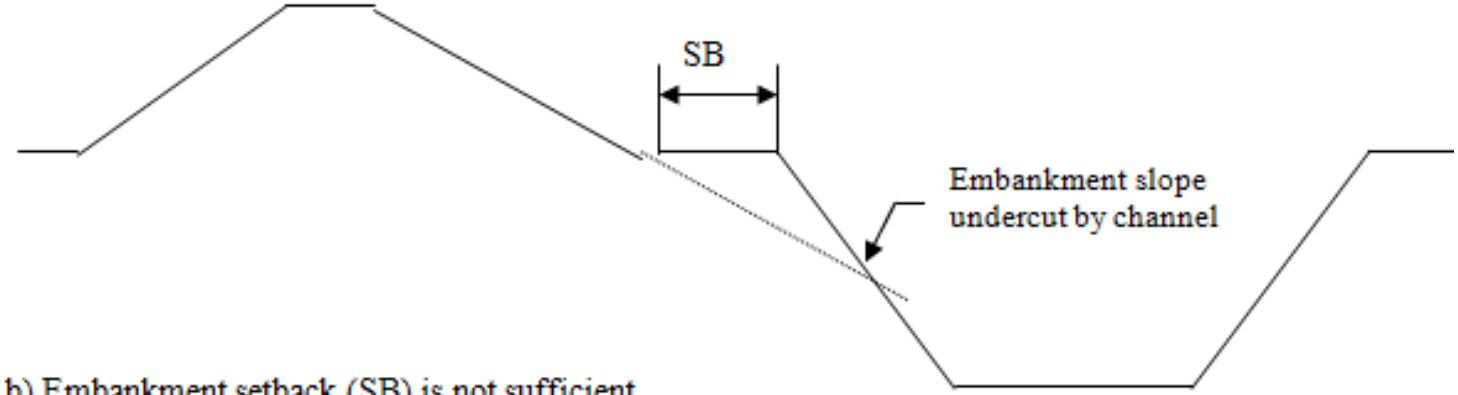
Ze = side slope of embankment

Dch = depth of channel (m)

Set Distance Calculation



a) Embankment setback (SB) is sufficient



b) Embankment setback (SB) is not sufficient.
Berm above doted line will slide down.

Design Considerations

Submersible Flood Embankments

- Design Water Level - 1:10-year Pre-monsoon HFL
- Freeboard - 0.30 m
- Crest Width - 2.50 m
- Side Slopes - 1:2

High Flood Embankments

- Design Water Level - 1:20-year Annual HFL
- Freeboard - 0.60 m
- Crest Width - Minimum 2.50 m
- Side Slopes - Maximum 1V: 1.5H

Design Considerations

Embankment Height (m)	Side Slope (V:H)
0 – 1.99	1:1.5
2.00 – 3.99	1 : 2
4.00 – 4.99	1 : 2.5
5 and above	Determine from detail slope stability analysis

Thanks