FORENSIC ENGINEERING FOR GEOTECHNICAL ENGINEERS

CONTENTS - 3

Data Collection-2:

3.7 Available information

3.8 Desk study

3.9 Works as designed

3.10 Works as constructed

3.11 Status of completion

3.12 Postulating failure mechanisms

3.13 Agreement between parties

3.14 Storage of data

3.1 Retrospective

- Seek information on what has happened
- Rather than predict future performance
- Failure investigation cannot be standardise, each has its own requirements or tasks at hand
- Failure investigation is iterative process on data collection & failure hypothesis, the goal is to establish facts leading to failure based on field evidence

3.2 Immediate attention/attendance

- Must gain access; collapse scene can be dangerous; speed & accuracy & what to look for
- F.E. most qualified to advise to prevent further damage, loss of life; can recommend action, persuade person-in-charge[safe area, stabilisatn, demolitn]
- Evidence is perishable preserve a.m.a.p; has high value upon which investn will depend [flood subsides, debris removed, memories fade]
- Urgency of clean-up operation, rebuilding, repair, etc.
- Capture evidence before it is being removed, perished [scare=faint argumt: strong=testimony]
- F.E. if possible to be present during demolitn

3.3 Circumstances prior to failure

- Before & during
- Stage of completion
- Triggering events (explosion, leakage)
- Meteorological conditions
- Moments of measuremt: displacement, water pressure, inclination
- Early creping signs (cracking, sliding)

3.4 Sequence of events

- Eye witness: many sources
- Will point to failure mechanism
- Will point to triggering event
- Have record from 1st sign of distress, time line, speed
- All possible collapse mechanisms and origin of failure, eliminate inapp mechanism

3.5 Post failure distress

- Description of distress following failure
- Observe, photograph, field notes, sketch, video, record [first hand, factual]
- Input to back analysis at later stage
- Magnitude of deformation, trajectory
- Sheared, slickensided surfaces
- Water flow
- Deformed/deviated structure/services
- Jointly record

3.6 Interview

- Eye witness: can provide clues for collaboration with other evidence
- Status of construction
- Triggering event
- Failure sequence
- What was happening, 1st noticed, weather, any concern previously
- Can contact again?

3.7 Available information

- S.I report
- Design report and calculations
- Design, const., shop drawings
- Daily report
- Site instructions
- Minutes of meeting
- Site record photographs
- Monitoring records
- Site amendments/adjustments

3.8 Desk study

- Site location
- Site topography
- Geological map
- Aerial photographs
- Satellite imagery
- Neighbouring records

3.9 Works as designed

- Construction drawings/specifications
- Bills of quantities
- Assumed conditions

3.10 Works as constructed

- Conforming/abiding to drawing
- Site modification
- Substandard materials
- Workmanship
- Misinterpretations
- Non-compliance granted or not
- Site survey
- Site inst., minutes of mtg

3.11 Status of completion

- Status of works at time of failure
- Loading condition
- Readiness of structure
- Rate of consolidation
- Time-dependent strength

3.12 Postulating failure mechanism

- Open to all possible postulations of failure; identify failure modes & contributg factors
- Collect all data both supporting & not
- Do not fall on the pitfall of supporting a particular point of view. Fixed opinion overlooks genuine mechanism
- Carry out process of elimination
- Plausible failure mechanism investigated, leaving few logical means, perform analysis
- Collapse theory consistent with physical evidence; analysis can help identify fail.md.

3.13 Agreement between parties

- May involve different investigators; other expertise
- Employed by various parties
- Joint witness of foundation
- Joint sampling
- Get much agreement as possible during early stage of investigation, evidence will not be there during legal argument

3.14 Storage of data

- Document all data and store
- Store in easily retrieval format
- Investigation can drag few years
- Mobility of personnel
- In large case, more summarised version, cross reference, supporting doc
- Electronic storage: ease of storage, reproduction and portability

END OF TOPIC