



Emergency planning for tailing dams



Westfälische
Wilhelms-Universität
Münster

Geologisch-Paläontologisches Institut und Museum
Lehrstuhl für Angewandte Geologie
Prof. Dr. Wilhelm G. Coldewey
Corrensstr. 24
48149 Münster

Emergency planning for tailing dams



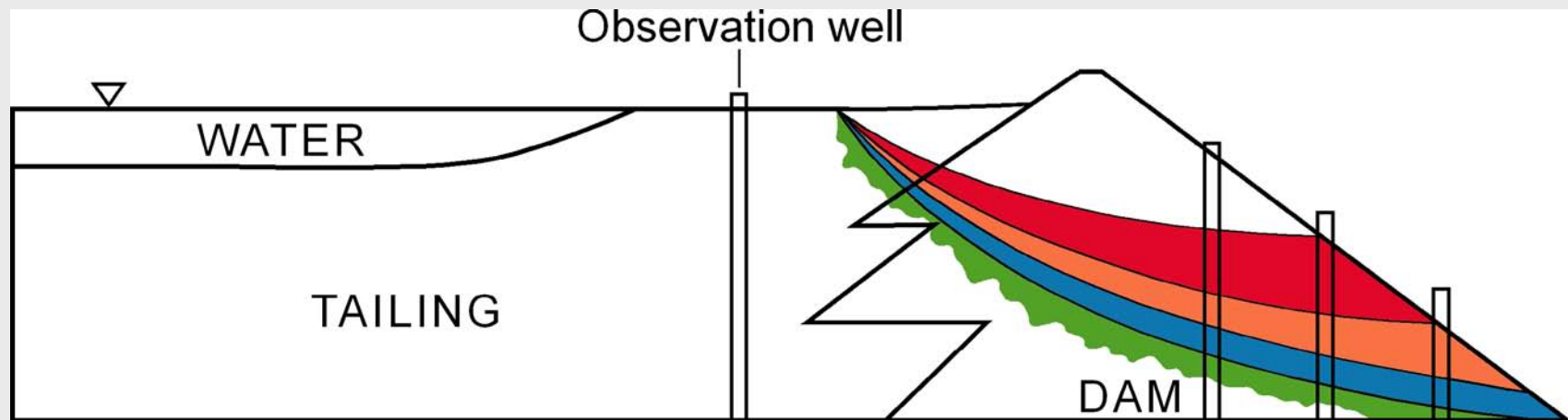
Observation of:

- water level in the dam
- water level in decant pond
- water outflow
- weather conditions
- seismic activity
- dam movement



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Observation of groundwater in the dam



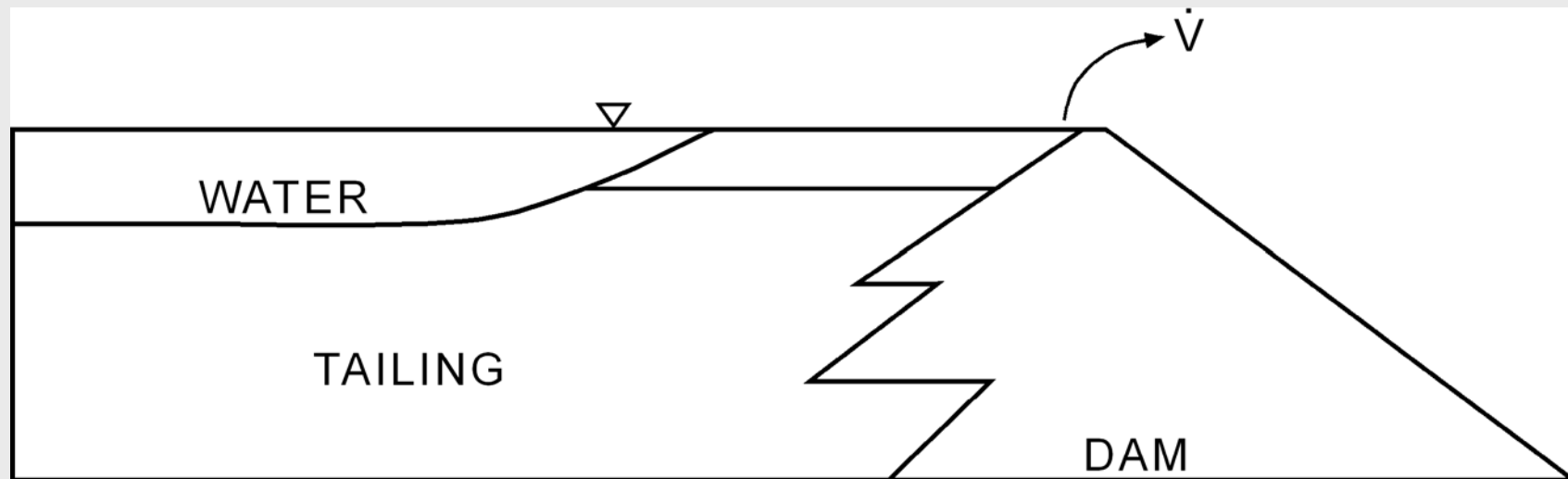
General action plan:

- green – no action
- blue – daily control
- orange – hourly control / stop of production
- red – stop of production / counter measure



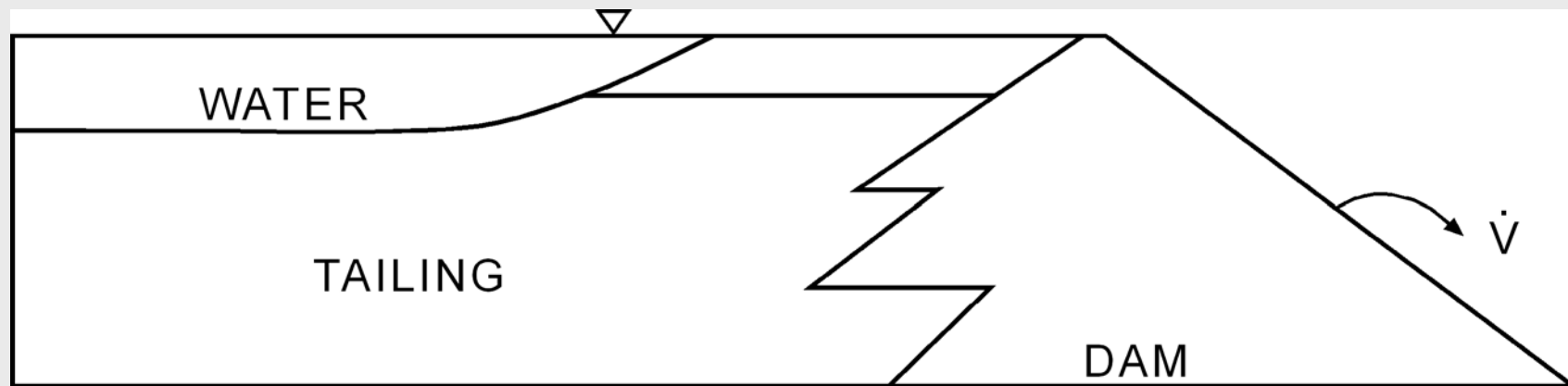
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Lowering of the water level in the decant pond



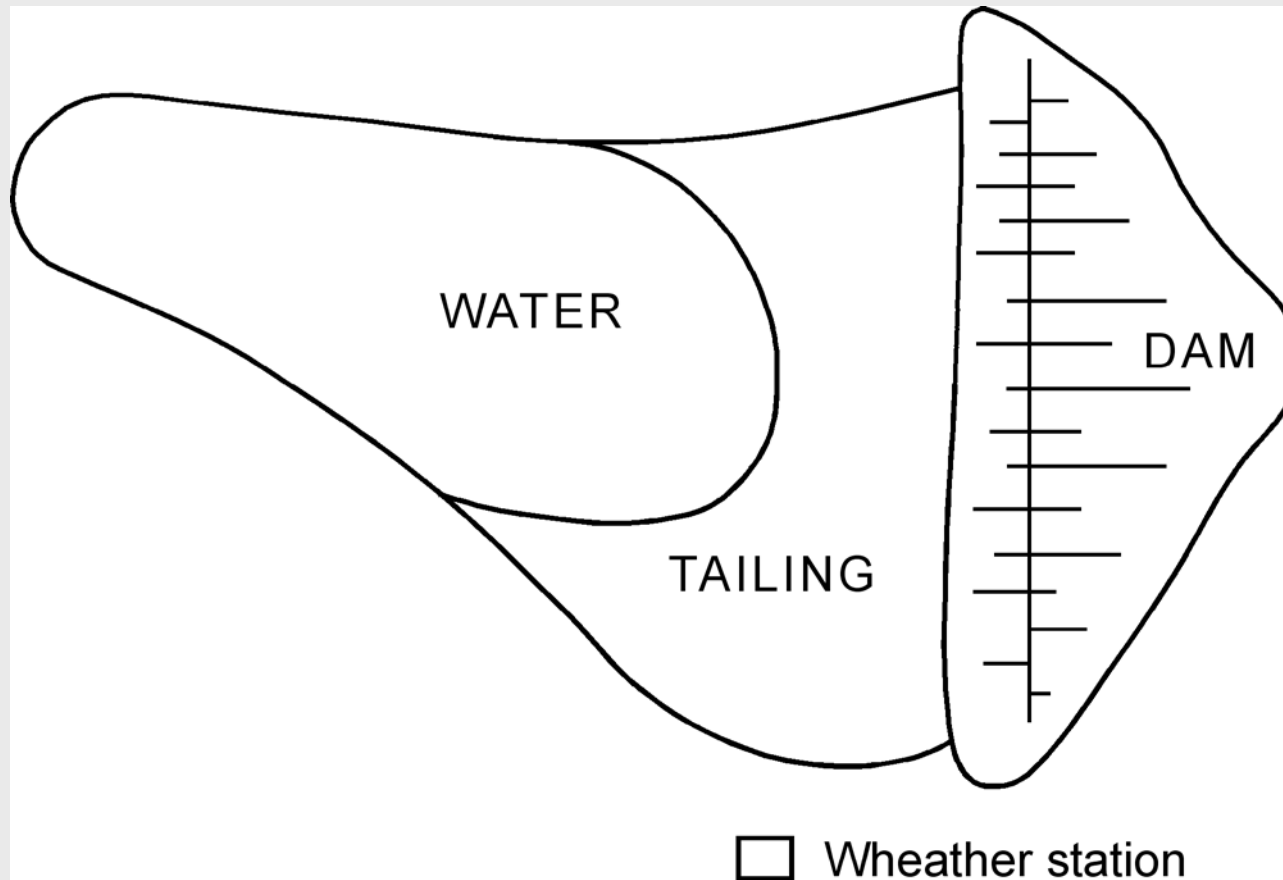
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Observation of the water outflow



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Observation weather conditions



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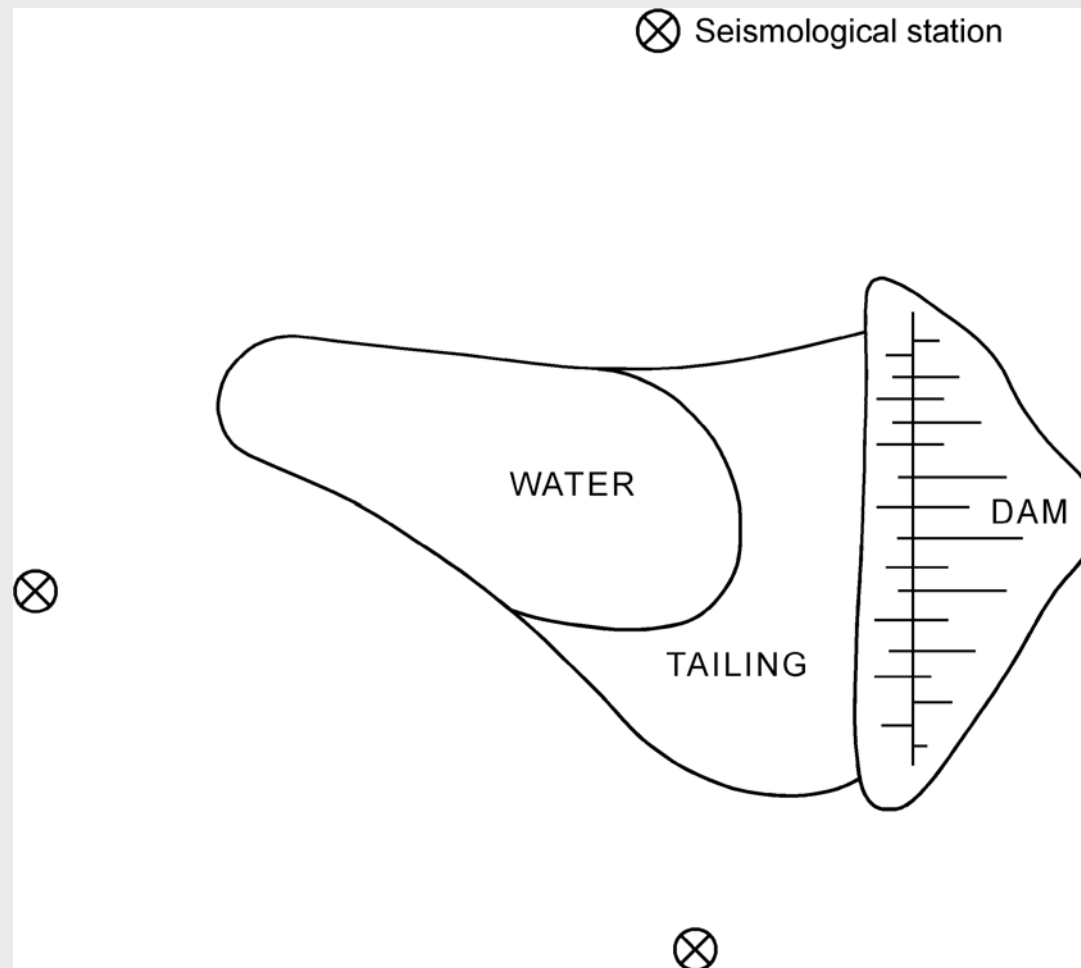
Rain rate:

- $45 \text{ l} / \text{m}^2 * \text{d} = \text{green (no actions)}$
- $45 - 60 \text{ l} / \text{m}^2 * \text{d} = \text{blue (field control)}$
- $60 - 80 \text{ l} / \text{m}^2 * \text{d} = \text{orange (safety actions)}$
- $80 - 125 \text{ l} / \text{m}^2 * \text{d} = \text{red (emergency actions)}$
- $125 \text{ l} / \text{m}^2 * \text{d} = \text{emergency actions}$



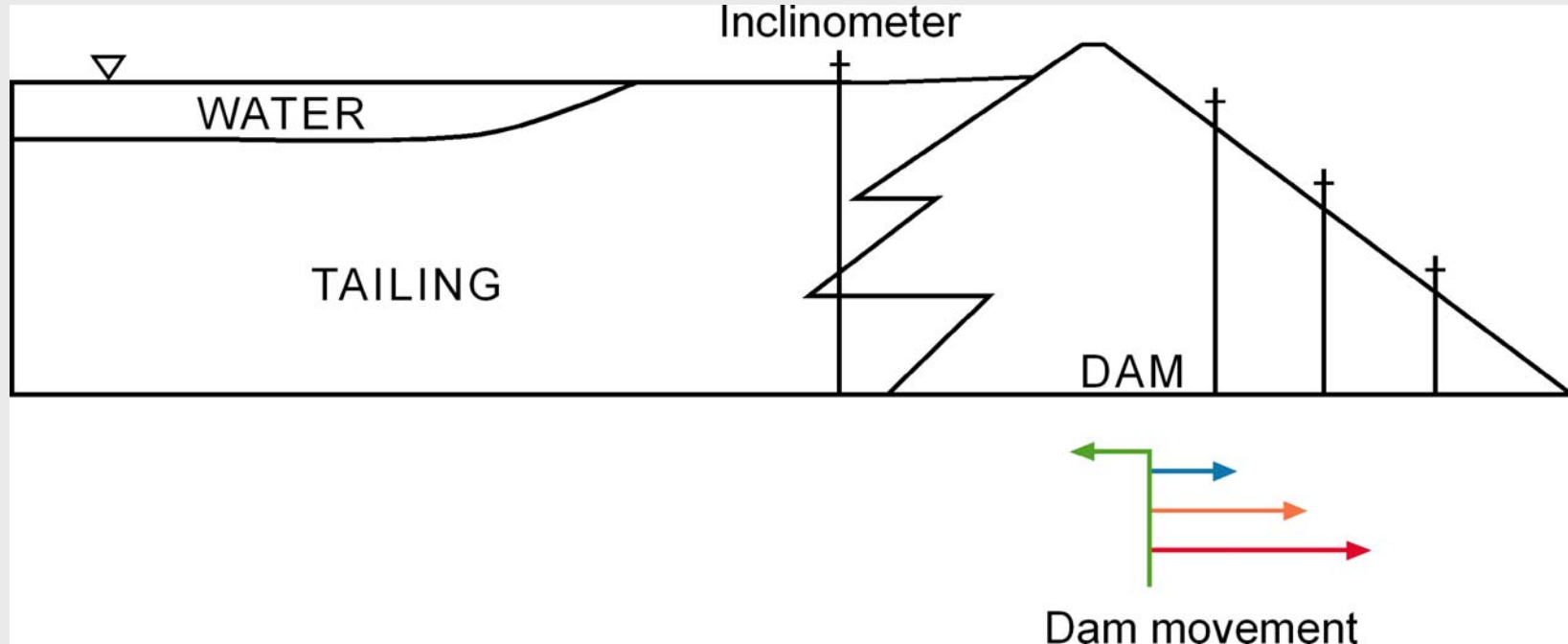
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Observation of the seismic activity



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Observation of the dam movement



Movement of the dam:

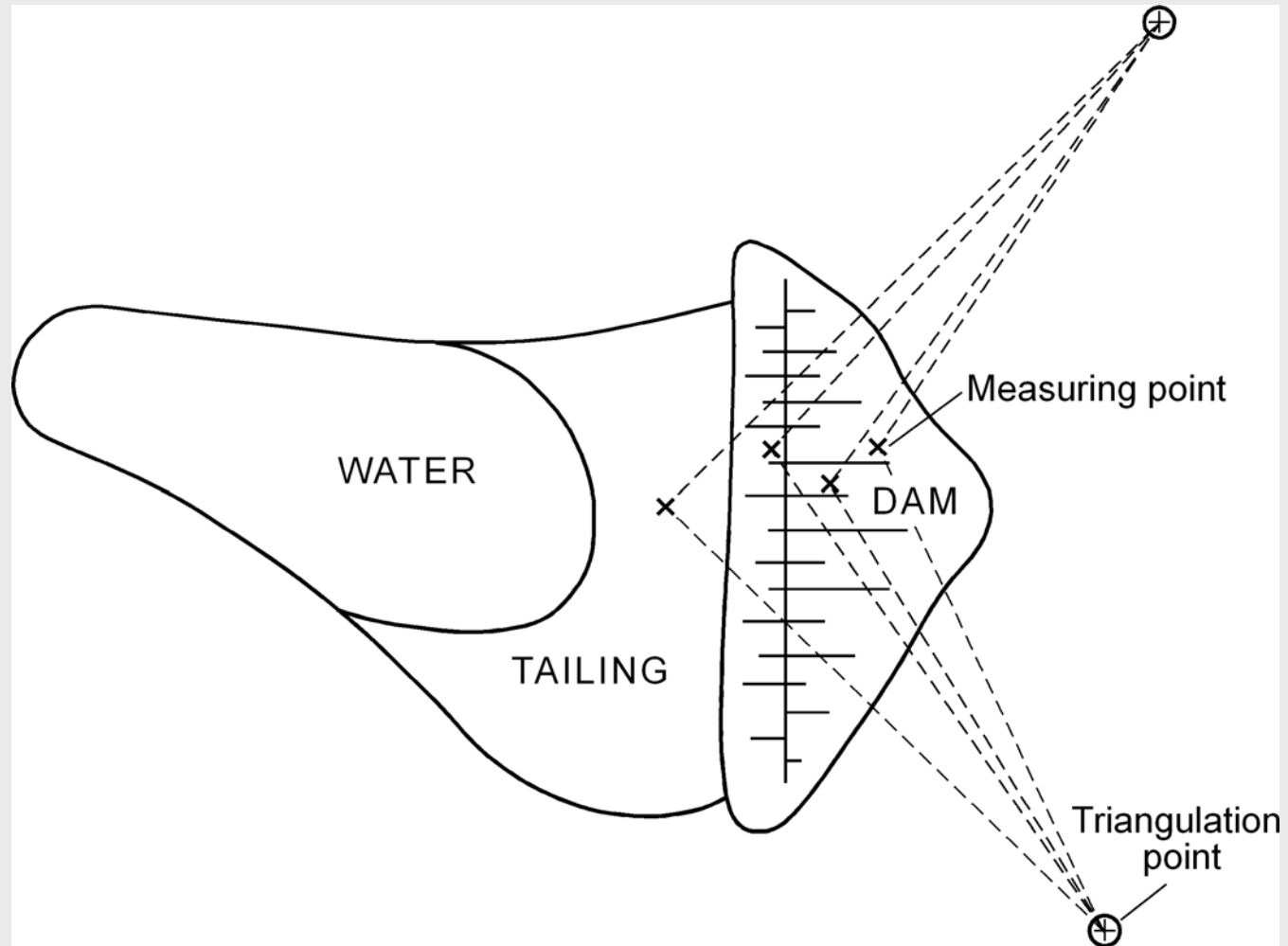
- linear movement
- acceleration of the movement
 - 1mm per quarter of a year (blue)
 - 5mm per quarter of a year (orange)
 - 1cm per quarter of a year (red)



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Observation of the dam movement



Conclusion

- Different parameters concerning safety must be measured
- These parameters must be adapted to the local situation as:
 - Type of dam
 - Tailing material
 - Meteorology
 - Seismology

