The effect of compaction and initial water content on soil erosion

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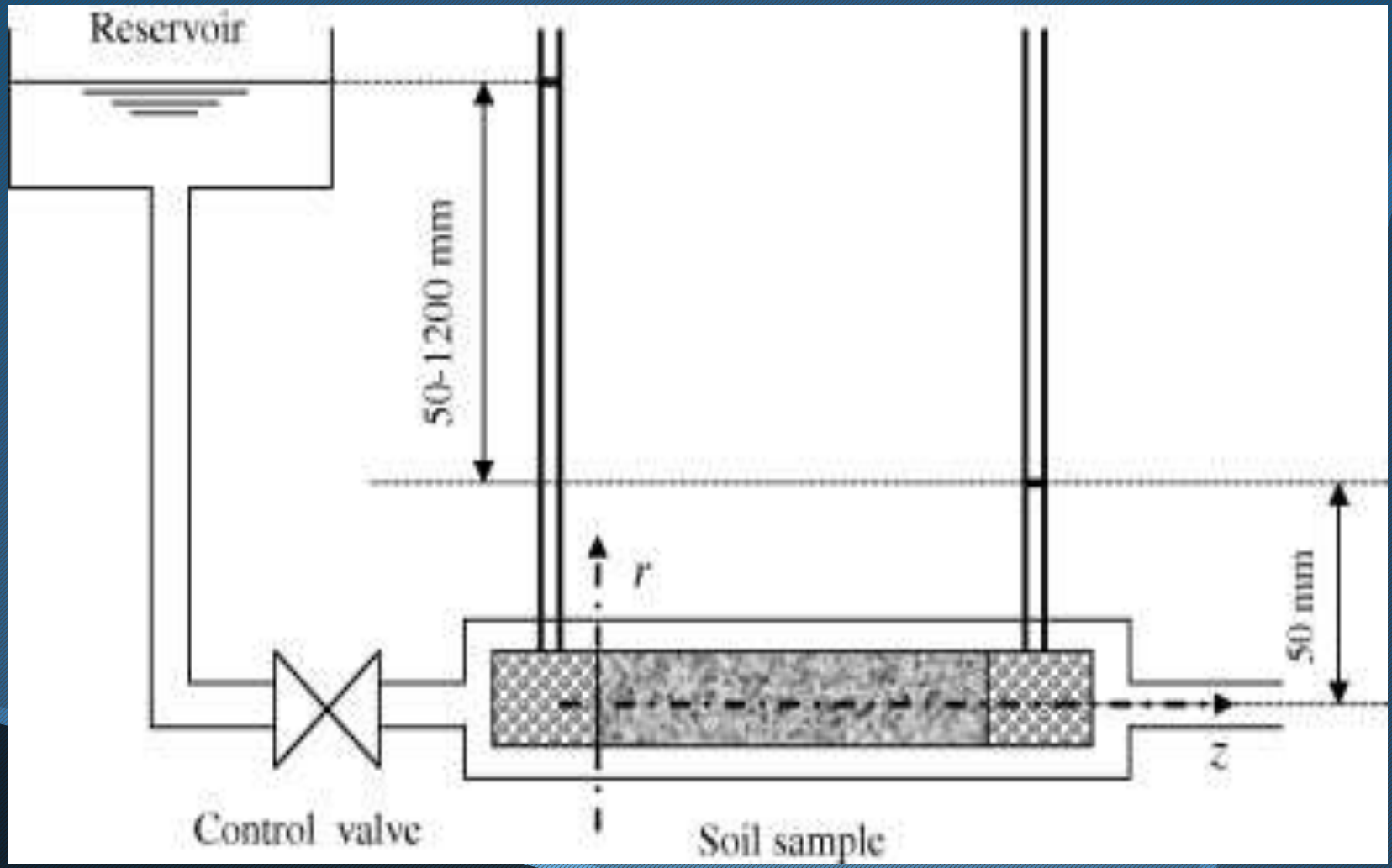
Objective

The main objective of this research is to study the effect of some properties such as effect of compaction effort and Initial water content on soil internal erosion

Methodology

- Three different types of clayey soils were selected and prepared at different initial conditions
- Hole Erosion Test was used



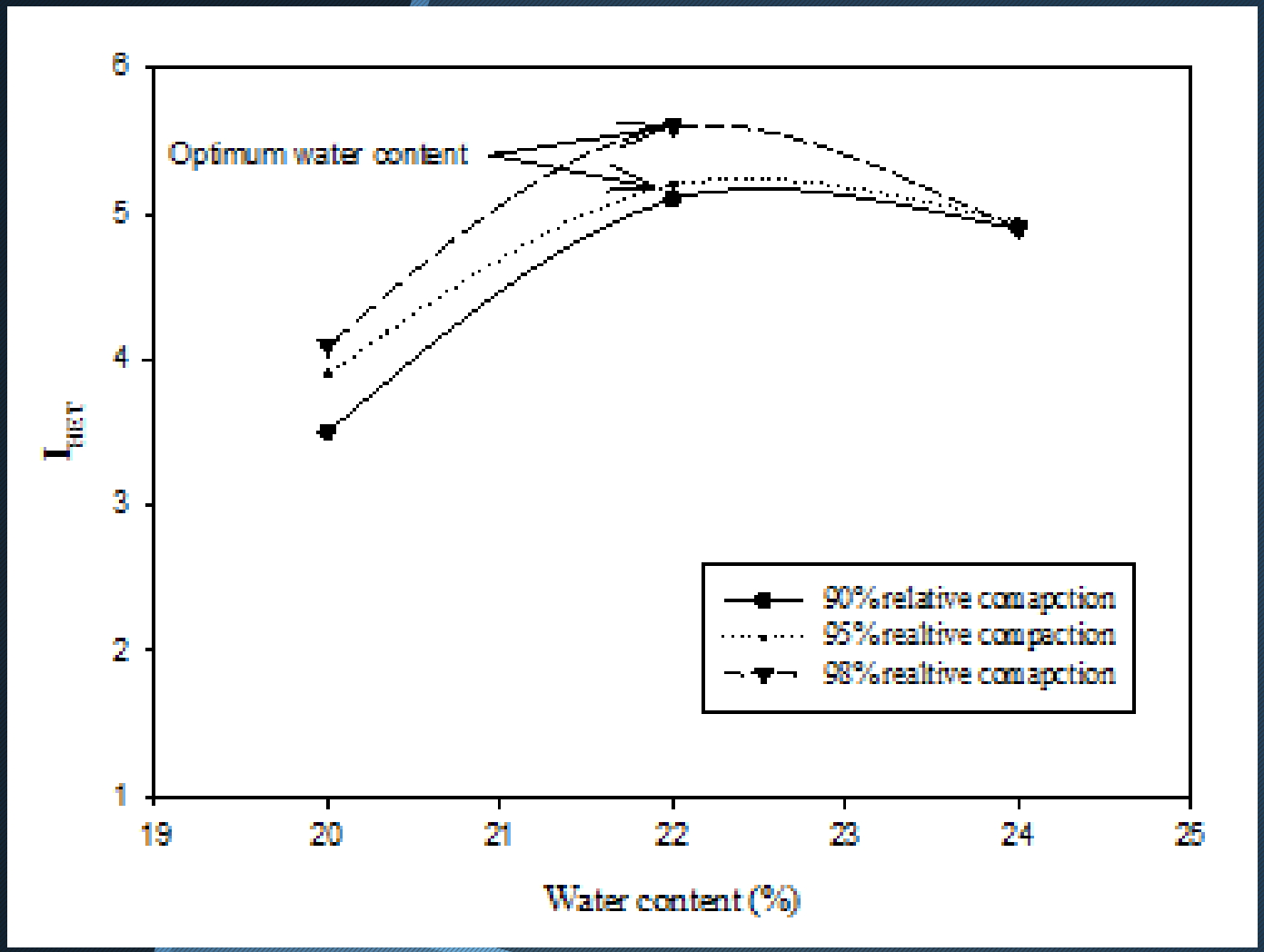
Schematic diagram of the hole erosion test

Physical Engineering Properties of the Used Soil

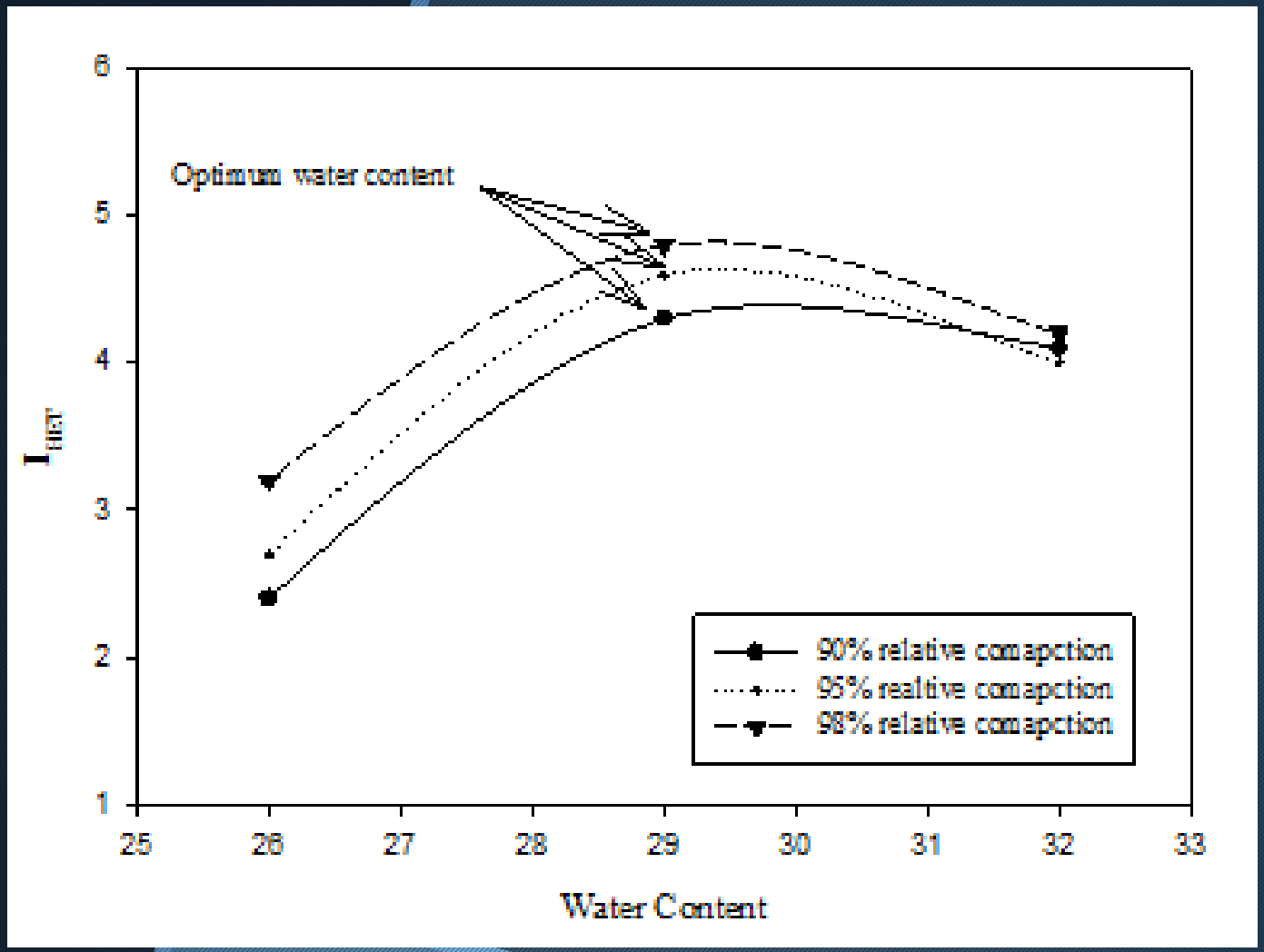
Soil e	Atterberg's limits (%)			Grain fractions (%)			Compaction (OPN)		Specific Gravity	Classification (USCS)
	LL	PL	PI	Sand	Silt	Clay	$\gamma_{d\ (max.)}$	O.W.C		
Soil 1	34	25	9	27	42	31	14.8	22.1	2.65	ML
Soil 2	42	20	22	18	38	44	14.1	29	2.66	CL
Soil 3	59	23	36	11	38	53	13.2	38	2.66	CH

Note: $\gamma_{d\ (max.)}$ **is in kN/m^3**

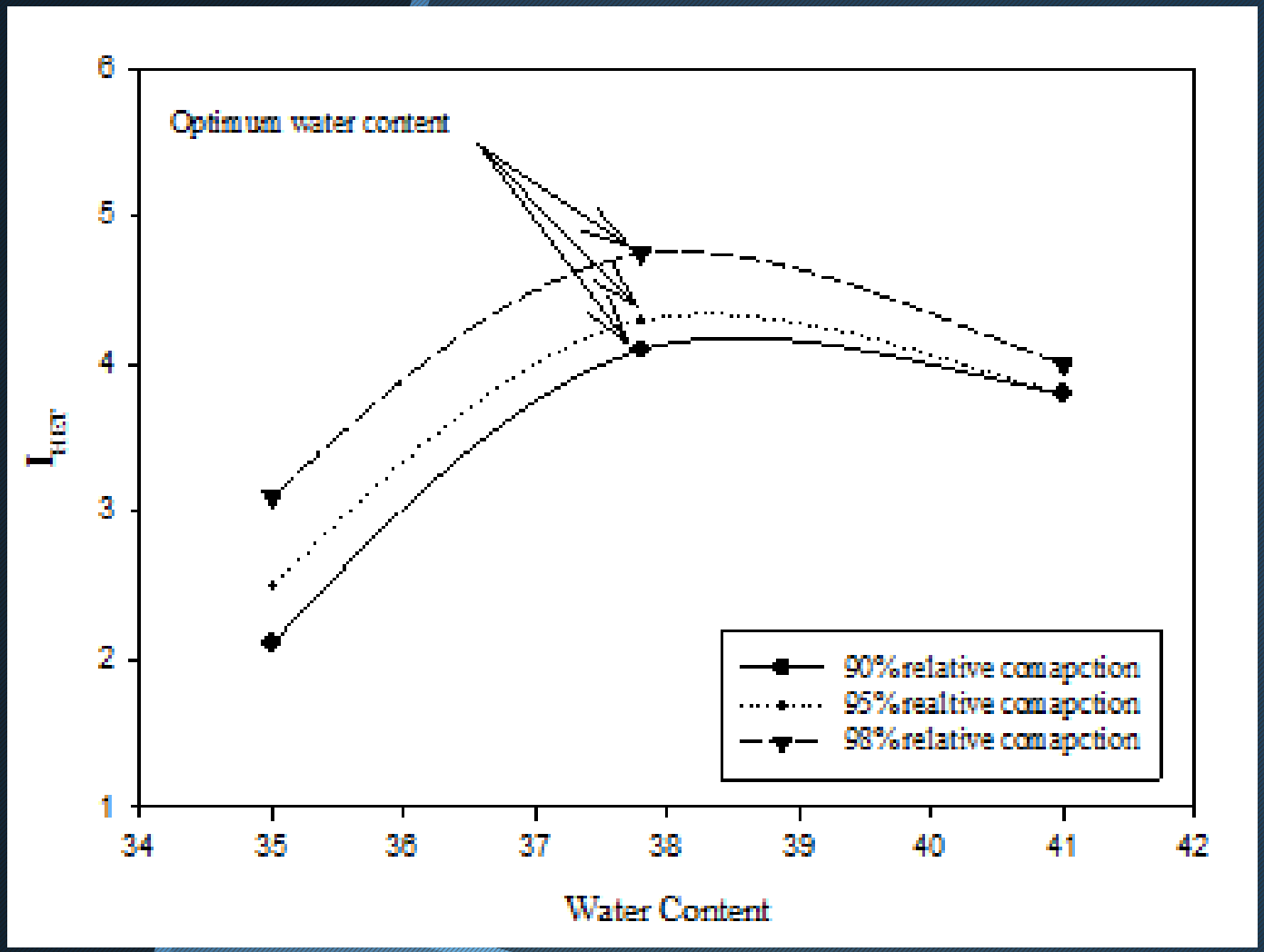
The effect of initial water content on erosion rate index (I_{HET}) for ML soil



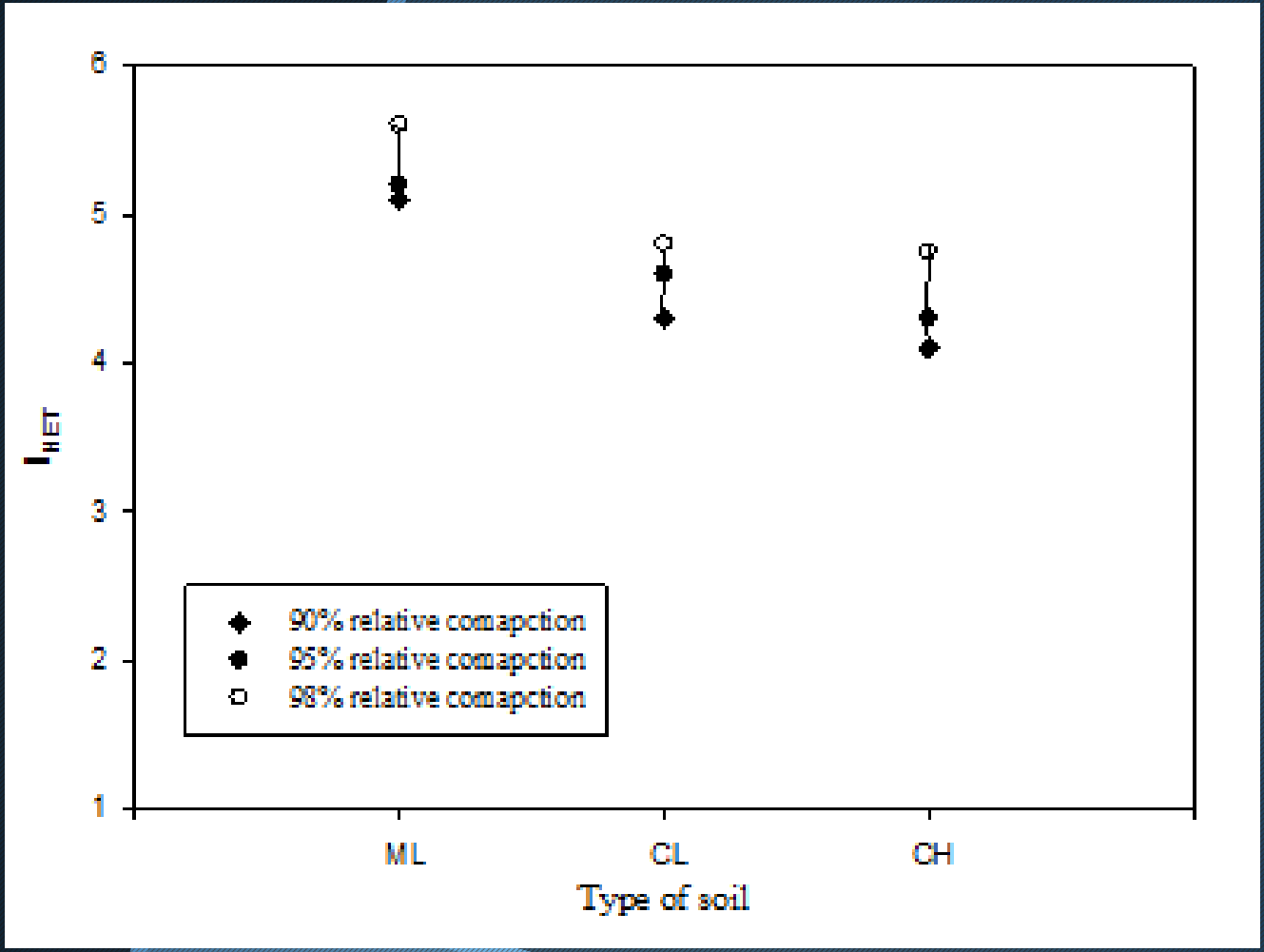
The effect of initial water content on erosion rate index (I_{HET}) for CL soil



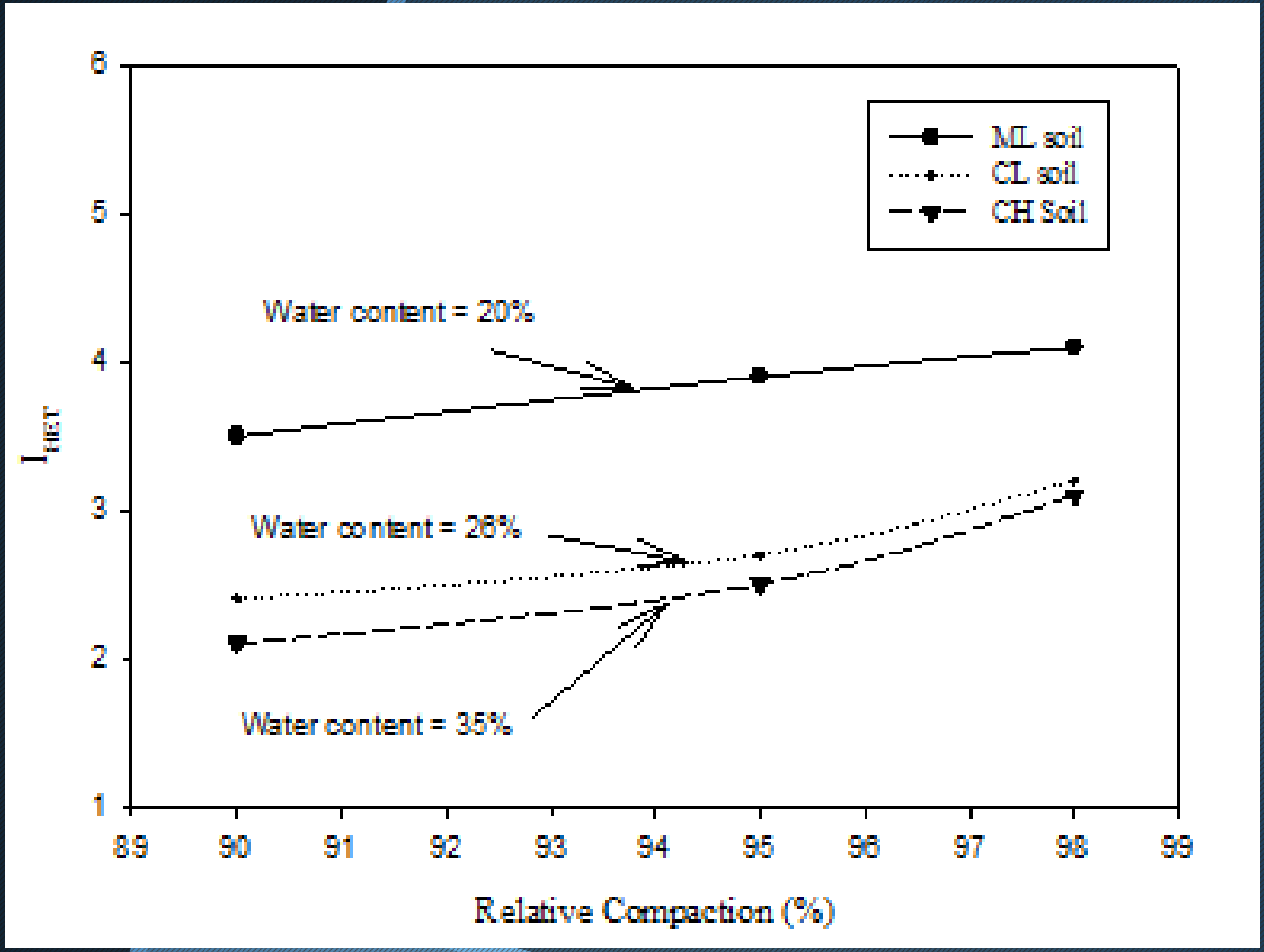
The effect of initial water content on erosion rate index (I_{HET}) for CH soil



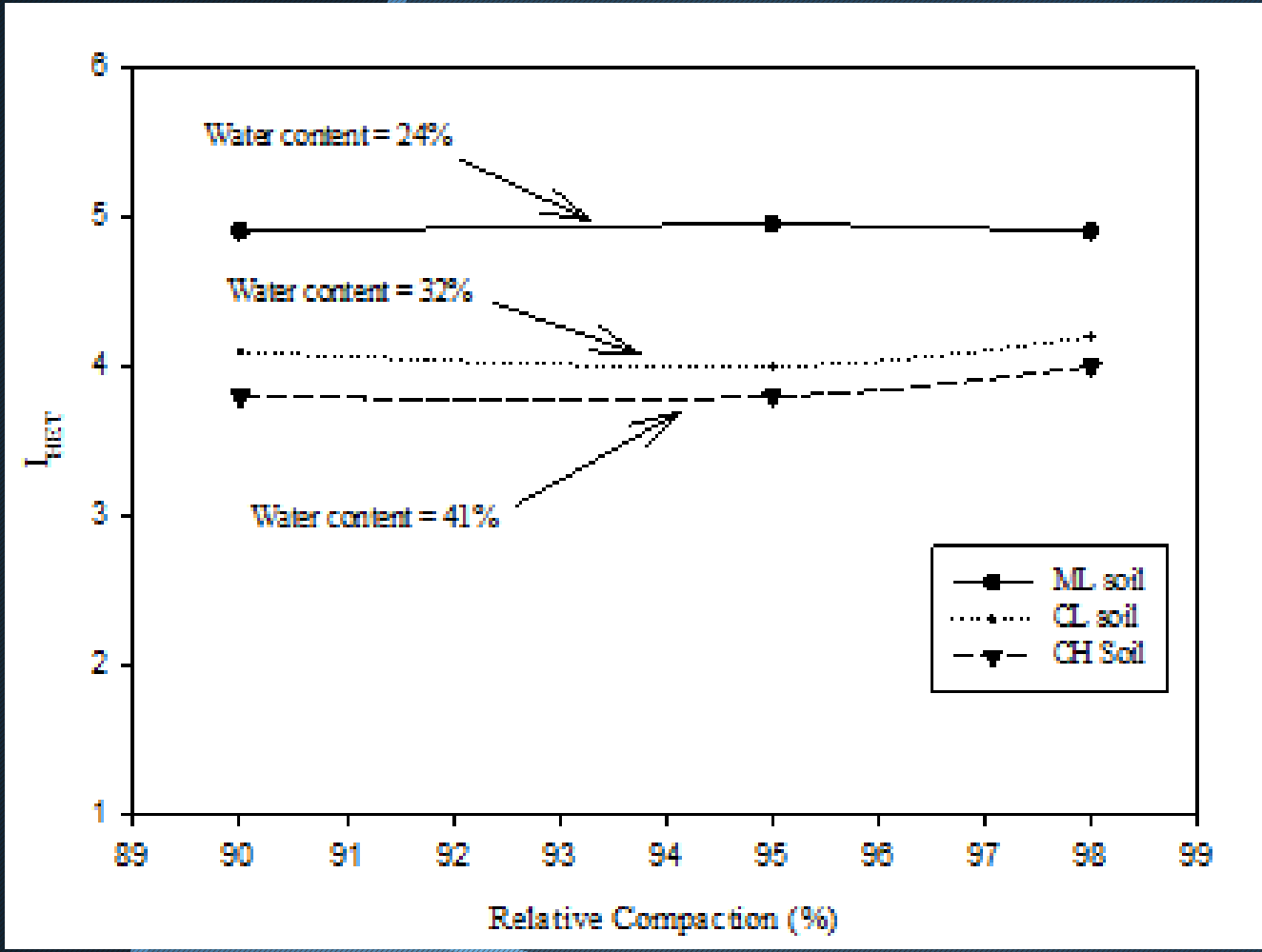
The erosion rate index (I_{HET}) for three types of soils at different compaction effort at the optimum water content



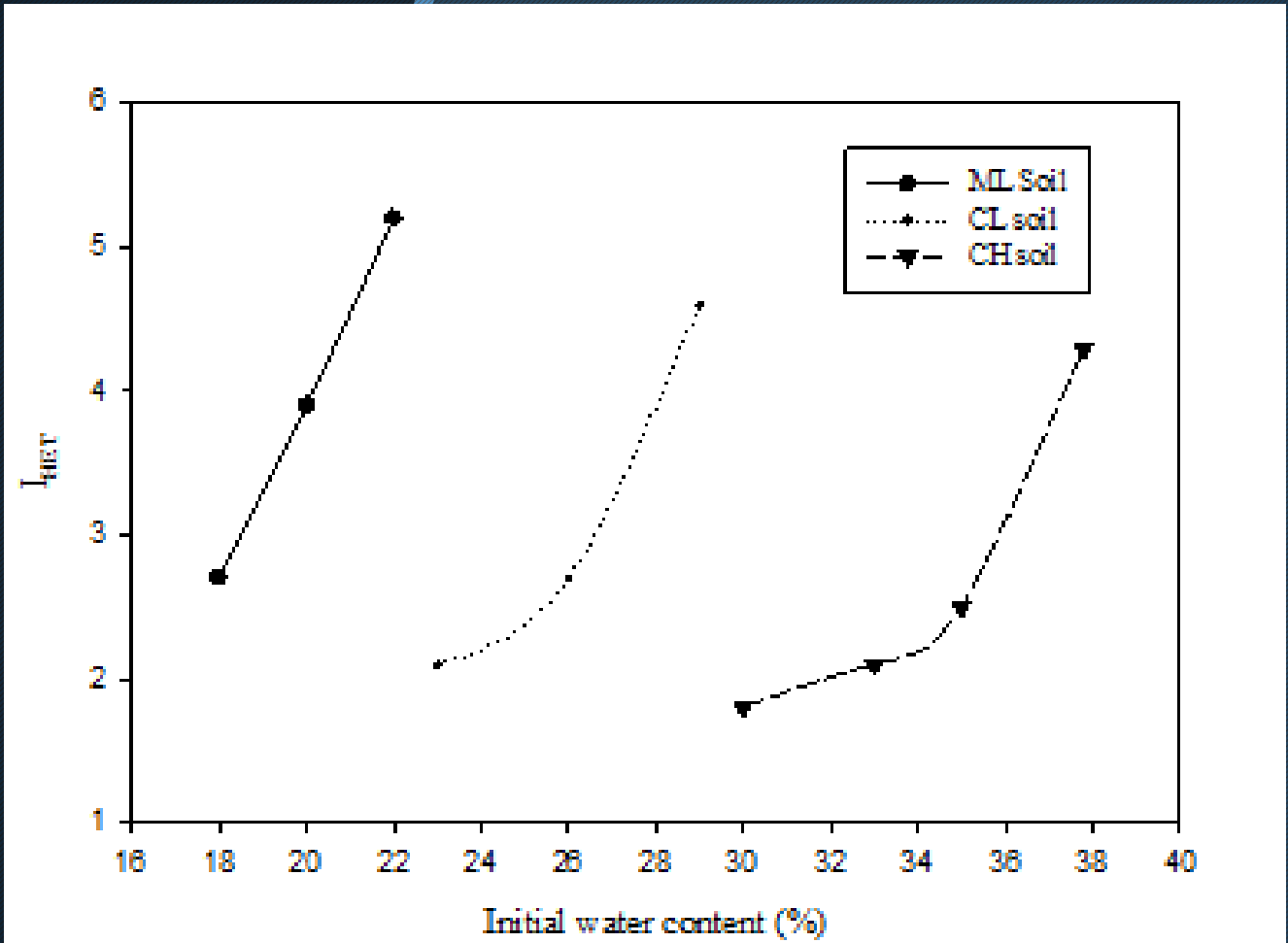
The effect of relative compaction on I_{HET} on the three types of soil at the dry side of the optimum



The effect of relative compaction on I_{HET} on the three types of soil at the wet side of the optimum



The effect of initial water content on the I_{HET} at the dry site of the optimum



CONCLUSION

- For the same initial dry density, the soil is more erodible at the dry side of the optimum more than the wet side of the optimum
- At the dry side of the optimum, increasing the relative compaction (compaction effort) will increase the erosion rate index (I_{HET})
- Increasing the water content in the dry side of the optimum will decrease soil erosion


Any Questions
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