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| **COURSE NO:** CE 363 | **DATE OF TESTING:** 14.10.2011 |
| **NO. AND TITLE OF TEST:** SML 8(a) - Standard Proctor Compaction Test | |
| **YEAR AND SECTION:** 3 - 5 | **LAB GROUP:** 3 |
| **SURNAME, OTHER NAMES OF STUDENT:** | |

**1. OBJECT OF THE EXPERIMENT**

To determine the maximum dry density of soil and determination of optimum moisture content.

**2. APPARATUS**

1. Proctor compaction mould, with removable base-plate and collar
2. A 2.5 - kg rammer, with a suitable arrangement for controlling the drop to 300 mm
3. A balance readable and accurate to 1.0 g
4. A palette knife
5. A metal straightegde
6. A 20 mm test sieve and a receiver
7. A large metal tray
8. Apparatus for moisture content determination
9. Apparatus for extracting specimens from the mould



(http://www.impact-test.co.uk/images/SL122a.jpg)

**3. THEORY**

To increase the air voids in the water and to determine the optimum water content to make soil strength maximum, soil must be compacted with an optimum water content. To define that content for a soil, this test is used.

**4. METHOD OF TEST**

Soil sample passing 20 mm sieve is used for this test. The sample is taken as dry and added some water to it. (4 - 6 % for gravelly and sandy soils; 8 - 10 % for cohesive soils). This wet sample is placed into the mould and it is compacted with rammer from a suitable distance (300 mm) for 25 drops. Then another layer is added and dropped 25 times again until it reaches 3 layers. Then it is taken out from the mould and a sample is taken after leveling off. It is also weighed. Its moisture content is determined. This procedure is repeated for at least five times and the results are noted. But in the test day, nobody saw the test procedure completely because of the time limitations. A value paper was distributed and the lab session finished.

**5. RESULTS**

The results are on the data sheet.

**6. CALCULATIONS**

Bulk density, moisture content and dry density values are calculated by the values obtained in the test. For bulk density, ρ=(M2-M1)/V is used. Then moisture content is calculated. And dry density is found by ρd=100ρ/(100+m) formula. After that theoretic values of air void curves are obtained for all moisture content values. The graph that obtained can be found below:

In the end optimum value of moisture content and maximum dry density values are found for the test.

**7. DISCUSSION OF RESULTS**

In the compaction test, the optimum value of water content and maximum dry density values are obtained. These values have a lot of importance. For example while building a dam, the core must be clay in order to minimize the water permeability. But in order to stand and to hold that dam which water content is needed? With this test this can be determined.

Until a point when water content is increased, dry density is also increase. But after that point, dry density start to decrease. This situation is also depends on air voids but, that turning point's values are maximum dry density and optimum water content. These are determined in this test.

The obtained values are logical in the test. But the test was not actually done by ourselves. The data were taken from the instructor. This may lead an error in the experiment. Also the line crosses 10% air void line at maximum dry density position. This means the air voids in the sample is lower than 10% or just equal to 10%. But line of the sample do not cross the 0% line as expected. So there is no error related with this. Also Excel program is unable to find the real curve and the real values on it. The maximum value on the excel graph was 1.447 g/ml and 25.16 %. Therefore that values are taken as maximum values. This may be an error for the reality.

**8. CONCLUSION**

In conclusion, the experiment was not done by ourselves and I believe it did not understood properly. As it is read from the manual, the experiment calculations are done but in the end a big question mark is still on my mind about this test.

On the other hand, the topics covered in the course such as dry density-moisture content curve are repeated and used in the calculations part.

**9. REFERENCES**

Mirata, T. (2009). *Laboratory instructions for soil mechanics students.* Ankara: METU Press.