



UC CE Students utilize UC's Materials Testing Laboratory (UC-MTL) to study whether impounded mine tailings may be used as a base course construction material

Tapping & awakening the creativity of students in Civil Engineering; --- by Tasking these Students to apply their Textbook Knowledge on creative, real life situations. --- Consider this particular UC CE Student Project: "To transform useless & hazardous material into practical use."

Considering the massive amounts of "mine tailings" produced in the processing of mined ores for mineral extraction, UC Civil Engineering students embarked on an enterprising study on how useless & even toxic materials can be positively re-purposed.

Using mine tailing samples sourced from mining companies, UC Civil Engineering Students were able to evaluate, analyze & consider the properties of these materials; --- relative to the standard specifications for road pavement construction duly imposed by various Engineering entities; --- namely the Department of Public Works and Highways (DPWH), the American Association of State Highway and Transportation Officials (AASHTO), and the American Society for Testing and Materials (ASTM). The study assessed the materials' capacity as a component in aggregates used for the construction of road pavements; specifically as a granular base.

To conduct the study, UC Civil Engineering students turned to the UC-CEA Materials Testing Laboratory (UC-MTL). Using various devices & apparatus in the UC-MTL, such as the California Bearing Ratio molds and apparatus, sieves, Hot Plates, Moisture Cans, Soil Pan and Digital Balance; --- the CE students were able to analyze the mine tailings' geotechnical properties in terms of: 1) Fineness Modulus, 2) Particle Size Distribution, 3) Coefficient of Uniformity and Curvature, 4) Soil Classification, 5) Optimum Water Content, 6) Maximum Dry Density and CBR Value, and 7) Specific Gravity. With the UC-MTL readily-available next to their classroom; UC CE students did not need to commission testing laboratories outside the school.



UC Civil Engineering students utilize the sieves (left) and the California Bearing Ratio molds and apparatus (right). These equipment are acquisitions of the UC College of Engineering and Architecture Materials Testing Laboratory which allows students to apply practical Civil Engineering practices in the conduct of their experiments and researches.

After rigorous testing and computation, the results positively indicated that the subject mine tailings indeed met the DPWH, AASHTO, and ASTM specifications and range values for typical base materials. The exception being that the mine tailings scored below DPWH's minimum grading specifications. The material was found to be too fine which may pose difficulty in the construction's compaction process.

The students also studied the risks of using mine tailings in consideration to its chemical properties. It was found that despite the material's hazardous chemical properties, using it as a granular base for road pavements can still adequately elimi-

nate the risk of undue human exposure. In terms of its environmental impact on the other hand, mine tailings must not come in contact with water during construction to avoid soil pollution through "seepage." To further avert these risks, the appropriate treatment process can reduce the levels of its hazardous chemical properties.

The UC CE students also analyzed how its chemical properties may react with other construction materials. They noted that the mine tailings' sulfur content may affect the longevity of the road pavements if it comes in contact with the asphalt concrete surface. Hence, the students proposed that a thin layer of aggregates be laid in between the material and the asphalt to obstruct any possible contact.

These scientific findings are proof that such access to actual machines & devices duly boosts the learning acquired inside the classroom & takes that learning to a whole new level. Such Engineering practice facilities enable students to conduct realistic applications of classroom knowledge. Thus, students are able to apply textbook theories and concepts readily to complete their preparation for their chosen profession prior to graduation.

In addition to the mentioned devices used in the study, students have total access to the DPWH-accredited Universal Testing Machine; another acquisition of the UC-MTL. This access enables UC Civil Engineering students to freely engage hands-on in realistic Civil Engineering situations & practices. Moreover, it allows students to exercise their creativity in discovering innovative solutions to real-life issues through careful scientific approaches.

The Roster of New UC Civil Engineers

					<p>• 65.31% UC Passing Rate •</p> <p>of First-Time Examinees</p> <hr/> <p>• 45.11% National Passing Rate •</p>						

• Date of Exam: November 10 & 11, 2018 • Results Released: November 15, 2018 •

The Roster of New UC Electronics Engineers

	<p>• 50.00% UC Passing Rate •</p> <p>of First-Time Examinees</p> <hr/> <p>• 49.49% National Passing Rate •</p>		

• Date of Exam: October 20 & 21, 2018 • Results Released: October 26, 2018 •

The Roster of New UC Sanitary Engineers

<p>• 75.00% UC Passing Rate •</p> <p>of First-Time Examinees</p> <hr/> <p>• 48.91% National Passing Rate •</p>		

• Date of Exam: January 15, 16 & 17, 2019 • Results Released: January 21, 2019 •

The Roster of New UC Architects

	<p>• 71.43% UC Passing Rate •</p> <p>of First-Time Examinees</p> <hr/> <p>• 56.28% National Passing Rate •</p>		

• Date of Exam: January 25 & 27, 2019 • Results Released: January 30, 2019 •