



# Virtual Reality for Civil Engineering

## Virtual Reality for Civil Engineering Materials Testing

By Enmatech – Advanced VR Training Solutions

Step into the future of civil engineering with Enmatech's state-of-the-art Virtual Reality simulations. Designed for engineers, researchers, students, and training institutions, our immersive modules replicate real-world laboratory tests in a safe, interactive, and cost-efficient environment.

### 1. VR Concrete Testing

(1 Experience)

Step into the future of concrete testing with Enmatech's Virtual Laboratory .

In our VR environment, engineers and students can:

- **Conduct Concrete** Experiments Virtually

Simulate mixing, curing, and strength assessments of concrete without the need for physical samples.

- **Visualize the Entire Process**

Explore the concrete lifecycle—from mixing to setting to strength evaluation—in immersive 3D.

- **Evaluate Performance in Real-Time**

Interact with and assess concrete's durability and structural integrity under various simulated conditions.



#### Key Benefits:

- Safe, hazard-free training.
- Repeatable and consistent test results.
- Ideal for academic, research, and professional training environments.

## 2. VR Asphalt Testing (4 Experiences)



### 1. Gyratory Mix Design Test

#### Key Benefits:

Understanding asphalt mixture properties and evaluating its stability and performance.

Test starts with sieving oven-dried aggregates using a mechanical shaker, then weighing the correct amount for a Marshall sample. The aggregates, asphalt, and mixture are heated in an oven before adding bitumen from a storage tank. An asphalt mixer blends the materials, and the mixture is compacted with a gyratory compactor. The compacted sample is then extruded from the mold, weighed using a buoyancy balance, and conditioned in a water bath. Finally, the sample is tested with the Gyratory Stability UTM to assess its strength and performance. ( 10 machines)

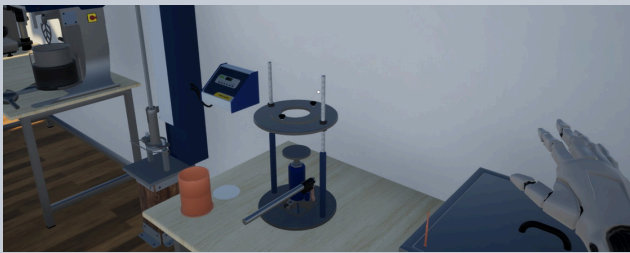


### 2. Dynamic Shear Rheometer (DSR) Test

#### Key Benefits:

Measuring asphalt binder's elasticity and resistance to deformation

The DSR test process begins by preparing specimens in a silicone mold, then placing them between 8-mm plates for testing PAV-conditioned material. The rheometer's zero gap level is set, and asphalt is poured into the silicone mold. Finally, any excess binder is trimmed from the specimen's edges using a heated trimming tool to ensure precise measurements.



### 3. Marshall Mix Design Test

#### Key Benefits:

Determining the strength, stability, and flow characteristics of asphalt samples.

The VR Asphalt Test begins by using a mechanical shaker to sieve oven-dried aggregates, followed by weighing the correct amount for a Marshall sample. The aggregates, asphalt, and mixture are heated in an oven, then bitumen is added from a storage tank. An asphalt mixer blends the materials, and the mixture is compacted using a Marshall compactor. The compacted sample is extruded from the mold, weighed using a buoyancy balance, and conditioned in a water bath. Finally, the sample undergoes testing with the Marshall Stability machine to evaluate its performance. ( 10 machines)



### 4. Polymer Modified Bitumen (PMB)

#### Key Benefits:

Assessing improved durability, flexibility, and temperature resistance of modified bitumen.

The Polymer Modified Bitumen Test uses several key devices. The **Bending Beam Rheometer** heats, molds, casts, prepares, and tests the asphalt sample. The **Pressure Ageing Vessel** preheats the mold, places the sample, and starts the ageing process. The **Rotational Viscometer** holds the sample in the RV mold with the correct mixing head. The **Rolling Thin Film Oven** weighs, heats, molds, and processes the sample, then extracts it with a special knife. The **Dynamic Shear Rheometer** transfers samples via silicone mold to 8 mm plates, sets the zero gap, pours asphalt, and trims excess binder with a heated trimmer. ( 5 machines)

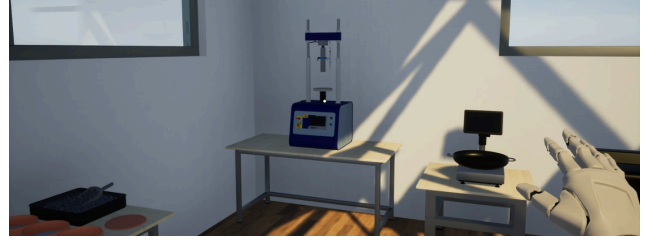
## 3. VR Soil Testing (1 Experience)

**Experience soil strength evaluation with precision and safety.**

**California Bearing Ratio (CBR) Test** – Conduct the CBR procedure virtually to measure soil strength for road and pavement design. Users can prepare samples, apply loads, and record results in a fully immersive virtual lab.

### Key Benefits:

- Realistic simulation of industry-standard equipment.
- Safe and sustainable training solution.
- Perfect for geotechnical engineers, students, and construction professionals.



## Why Choose Enmatech?

- **Safe & Sustainable** – No hazardous handling or material waste.
- **Highly Realistic** – Accurate 3D modeling and true-to-life procedures.
- **Customizable Modules** – Tailored to meet training needs and curricula.
- **Cost-Effective** – Lower operational costs, higher training efficiency.



[INFO@ENMATECHGLOBAL.COM](mailto:INFO@ENMATECHGLOBAL.COM)



[WWW.ENMATECHGLOBAL.COM](http://WWW.ENMATECHGLOBAL.COM)



### Electric Vehicle Maintenance ( 27 Experiences)

Cutting-edge Virtual Reality (VR) training simulator designed to revolutionize the way electric vehicle (EV) technicians are trained. It provides an immersive, interactive, and safe learning environment.



### HVAC Training ( 5 Experiences)

Virtual reality (VR) HVAC training is revolutionizing the way technicians acquire essential skills in heating, ventilation, and air conditioning systems. By immersing trainees in realistic 3D environments, VR allows them to practice installing, repairing, and troubleshooting HVAC equipment without the risks and costs associated with real-life scenarios.



### Agriculture ( 22 Experiences)

VR revolutionizes agricultural education with immersive simulations, letting users practice farming safely while saving time, resources, and water—making learning more effective and accessible anywhere.



### Electrical & Solar Energy Systems ( 5 Experiences)

Virtual reality (VR) is revolutionizing training in the electrical and solar energy sectors, allowing them to practice installation, maintenance, and troubleshooting procedures for electrical systems and solar panels without the risks associated with live environments.

<b>Medical</b>	27 Experiences	We design Virtual Reality simulations for medical training, covering nursing, medical equipment, emergency care, physical examinations, surgery, blood testing, and psychiatry.
<b>Engineering &amp; Vocational Training</b>	88 Experiences	We create VR vocational training experiences in fields like construction, solar energy, HVAC, plumbing, and automotive maintenance. Our immersive simulations let learners practice safely, effectively, and at lower cost
<b>Educational</b>	100 Experiences	We create VR educational experiences in science, biology, physics, chemistry, math, and lab experiments—making learning immersive and interactive
<b>Law Enforcement</b>	3 Experiences	We offer VR law enforcement training in crime scene investigation, drug control, and virtual courtroom simulations—providing safe, realistic, and practical learning experiences.