

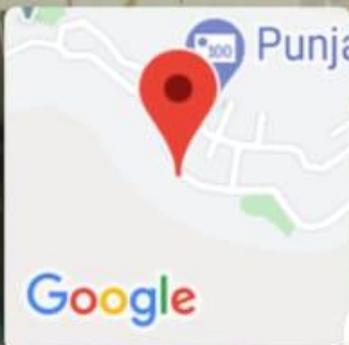
Highway Engineering Laboratory

Purpose: To provide practical understanding of various types and properties of highway materials. To study the physical consensus and source properties of aggregate materials. To measure and study the physical properties of bitumen.

| S. No. | Experiment Name | Equipment Used |
|--------|--|--|
| 1 | To determine the hardness (Abrasion) of aggregates by the Los Angles Abrasion test method. | <ul style="list-style-type: none"> • Los Angles Abrasion testing machine • Steel spherical balls of 4.5 cm diameter and weight 390 g to 445 g • Sieves of sizes 80–4.75 mm and 1.7 mm • Balance of capacity 10 kg • Tray |
| 2 | To determine the toughness (impact value) of aggregates | <ul style="list-style-type: none"> • Impact testing machine • Cylindrical measure • Tamping rod • Sieve 12.5, 10, and 2.36 mm • Balance • Oven (thermostatically) |
| 3 | To determine the crushing value of road aggregates | <ul style="list-style-type: none"> • Aggregate crushing value apparatus • Cylindrical measure of internal diameter 11.5 cm, and height 18 cm. • Steel tamping rod 45 to 60 cm long and 1.6 cm diameter having a pointed end. • Compression testing machine capable of applying load of 40 tonnes at a uniform rate of loading of 4 tons per minute. • Balance of cap: 3 kg with accuracy up to 1 g Sieves of 12.5 mm, 10 mm, and 2.36 mm. |
| 4 | To determine the specific gravity and water absorption of aggregates by perforated | <ul style="list-style-type: none"> • Density Basket • Thermostatically controlled oven to maintain temperature of 1000 to 1100 C • Balance of capacity about 5 kg: To weight accurate to 0.5 g, and of such a type and shape as to permit weighing of the sample container when suspended in water, • Shallow tray • Two dry absorbent clothes, each not less than 750 mm X 450 mm. |
| 5 | To determine the flakiness and elongation indices of the given aggregates sample | <ul style="list-style-type: none"> • Standard Thickness Gauge • Length Gauge • IS sieves of sizes 63, 50, 40, 31.5, 25, 20, 16, 12.5, 10 and 6.3 and 3 mm. • A balance to weigh the samples. |
| 6 | To determine the softening point of bitumen. | <ul style="list-style-type: none"> • Softening Point Apparatus • Thermometer • Water bath • Stirrer |
| 7 | To determine the Ductility of bituminous material. | <ul style="list-style-type: none"> • Ductility testing machine • Water bath arrangement |

| | | |
|----|---|---|
| 8 | To determine the flash and fire point of given bitumen sample | <ul style="list-style-type: none"> • Flash & Fire point Apparatus with thermometer • Water bath arrangement |
| 9 | To determine the viscosity of road tar | <ul style="list-style-type: none"> • Tar Viscometer with thermometer • Water bath • Sleeves • Stirrer |
| 10 | To determine the Penetration value of the Bitumen. | <ul style="list-style-type: none"> • Universal Penetrometer • Container • Needle • Water Bath • Transfer Tray |
| 11 | To determine the specific gravity of semi-solid bitumen road tars, creosote and anthracene oil | <ul style="list-style-type: none"> • Specific gravity bottles of 50mL capacity • Water bath • Bath Thermometer–Range 0 to 44⁰C, Graduation 0.2⁰C |
| 12 | To determine the strength (Marshall Stability Value) and flexibility (flow value) for the given bitumen mixture | <ul style="list-style-type: none"> • Marshall Test Apparatus • Specimen Mould Assembly • Specimen Extractor • Compaction Rammers • Compaction Pedestal • Oven or Hot Plates • Bitumen Mixer Apparatus • Water Bath • Thermometer of range up to 2000⁰C with sensitively of 2.5⁰ Celsius • Miscellaneous Equipment: Container, Mixing and Handling Tools |
| 13 | To determine quantity of bitumen in hot mix paving mixtures and pavement samples | <ul style="list-style-type: none"> • Centrifuge Extractor • Bowl • Filter paper • Balance • Commercial Benzene |

CONTROLLED WATER BATH



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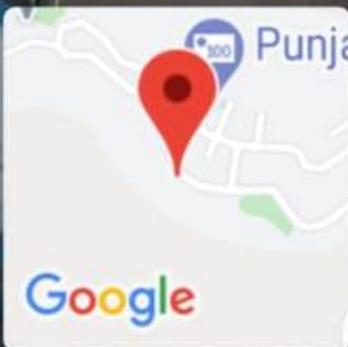
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Lat N 31° 0' 57.1752"

Long E 77° 4' 9.786"

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SOFTENING POINT APPARATUS, VELOCITY METER, FLASH & FIRE POINT TEST APPARATUS ETC



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PENETROMETER



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MERLIN APPARATUS



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MARSHALL MOULD COMPACTOR



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LOS ANGELES ABRASION APPARATUS



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OVEN



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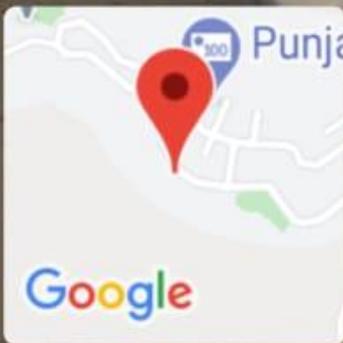
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DUCTILITY TEST APPARATUS



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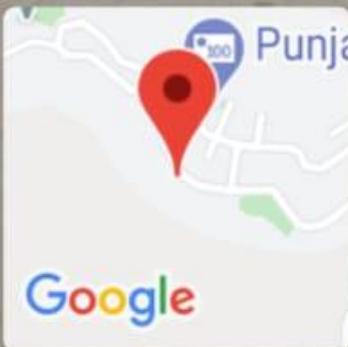
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CENTRIFUGAL EXTRACTOR



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CBR TEST APPARATUS



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CBR TEST APPARATUS



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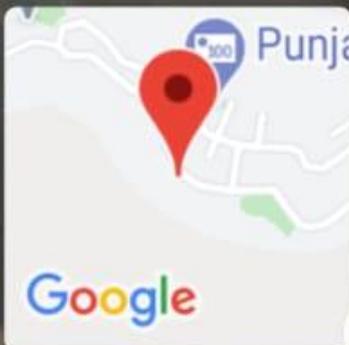
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BITUMEN MIXER & IMPACT TEST APPARATUS



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BENKELMAN BEAM APPARATUS



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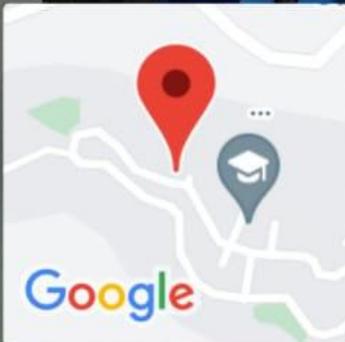
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CORE CUTTER DIESEL ENGINE OPERATED



GPS Map Camera



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