USES OF EMULSIONS IN LOUISIANA

Emulsion: Design, Construction, and Performance Seminar – July 1, 2008

LTRC – Technology Transfer Education Center

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Emulsions – Found in Products Used in Everyday Life

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Asphalt Emulsions Have Been Used for More than 100 Years

Uses of Asphalt Emulsions in Louisiana Today

- Fog Seals
- Surface Treatments (Chip Seals)
- In Place Stabilization
- Slurry Seals (Micro-Surfacing)
- Prime Coats
- Tack Coats
  - Common Types
  - New Technology – Trackless Tack Coats

FOG SEALS

- Asphalt Emulsion Manufacturers Assoc. (AEMA) – A light spray application of diluted asphalt emulsion used primarily to seal an existing asphalt surface to reduce raveling and enrich dry and weathered surfaces.
- Commonly Used Emulsions – SS-1, SS-1h, CSS-1 and CSS-1h


FRESH

Surface Treatments (Chip Seals)

- Oldest and most successful road surfacing strategy.
- Consist of an application of emulsion and an aggregate as close to a single size as possible.
- Used to restore skid resistance, protecting aging of surface, and sealing of pavements.
- CRS-2P Emulsion, or PAC-15 For Hot Application.

Chip Seals

Chip Seals

Placing Emulsion

Chip Seals

Placing Aggregate

Chip Seals

Rolling

In Place Stabilization

- Hot In-Place Stabilization
  - Effective Tool, Costly
  - Rejuvenators Used to Stabilize
- Cold In-Place Stabilization
  - Good Results, Environmentally Friendly, Lower Costs
  - Rejuvenator Used to Stabilize
- Full Depth In-Place Stabilization
  - Potential Use on Low Volume Roads
  - Specially formulated Emulsions

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HIR Construction Train

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CIR Construction Train

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Full Depth Reclamation

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Slurry Seal (Micro-Surfacing)

- A designed mixture of:
  - polymer modified emulsified asphalt
  - mineral aggregate
  - mineral filler
  - water
  - other additives
- Proportioned, mixed & uniformly spread over a properly prepared surface

Micro-Surfacing

- Developed in Europe in 1970's
- Introduced in U.S. in 1980
  - Now routinely used in more than 40 states
- Used for rut filling & texturing
- Restoring surface quality & skid resistance
- Quick construction, quick traffic return
- Polymer Modified Emulsions Used

Micro-Surfacing

Prime Coats

Cutbacks – MC 30, MC-70, AEP

Tack Coats

- Light spray application of diluted emulsion
- Used to ensure bond between a surface being paved and the new surface course
- Common Types – SS-1, SS-1h, CSS-1, and CSS-1h
- New Technology – Trackless Tack Coat
  - Successfully used on US 61 near Gonzales, La.
  - NTSS-1HM Specifications developed

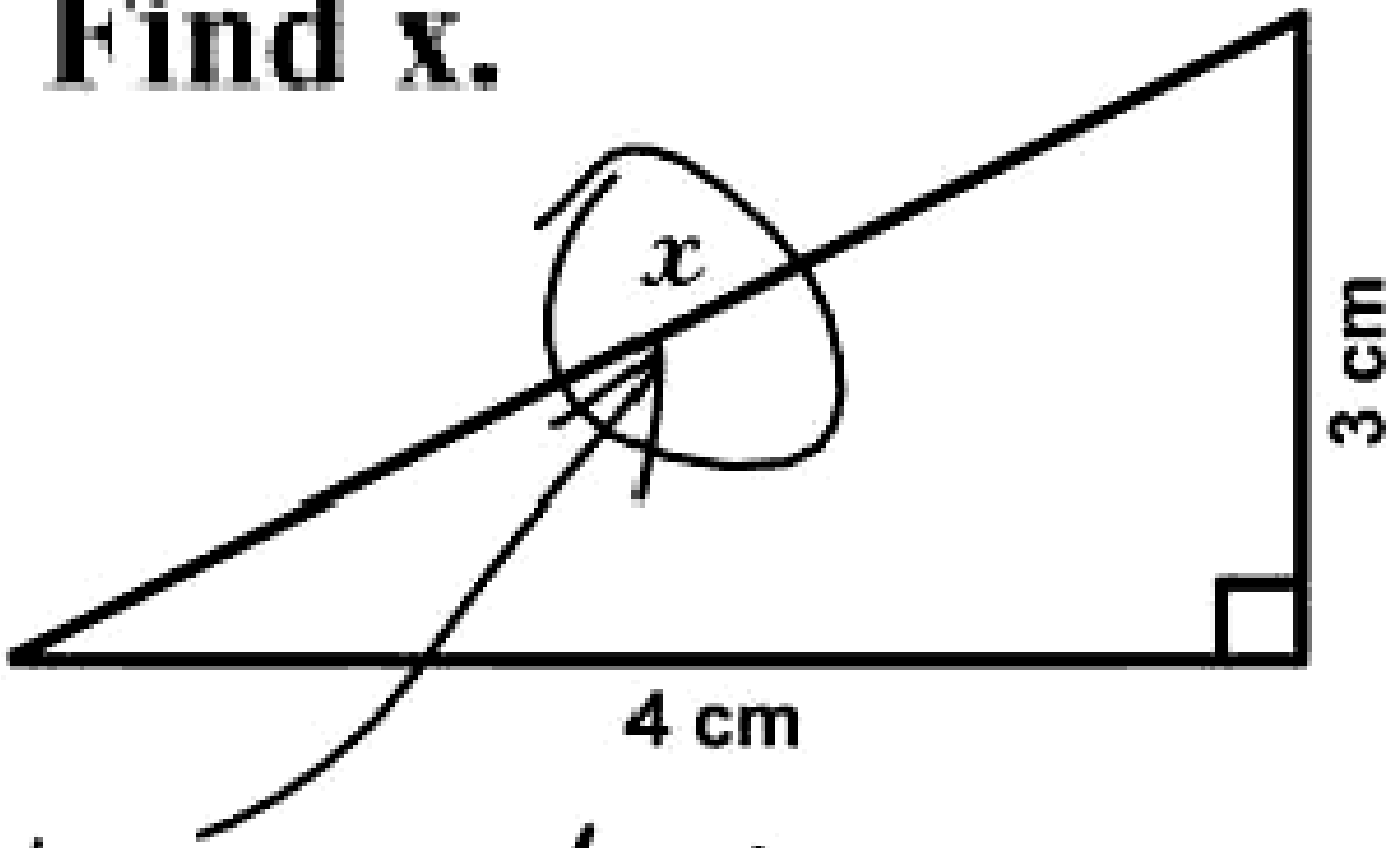
Further Discussion of Tack Coats

- Dr. Louay Mohammad

  Professor Civil Engineering

  Louisiana State University

3. Find x.



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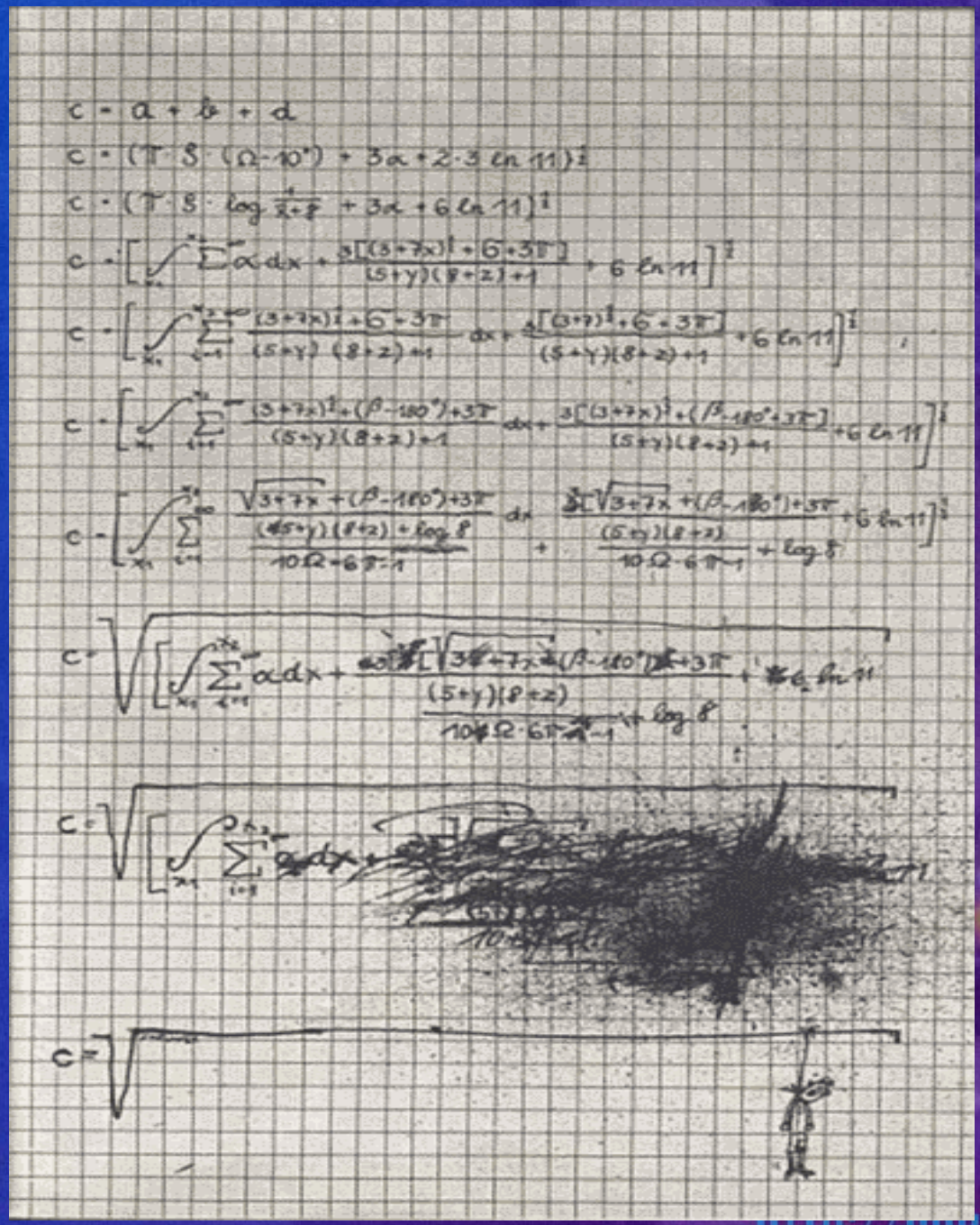

$$c = a + b + d$$

$$c = (\pi \cdot 8 \cdot (\Omega - 10°) + 3\alpha + 2 \cdot 3 \ln 11)^{\frac{1}{2}}$$

$$c = (\pi \cdot 8 \cdot \log \tfrac{4}{2+\beta} + 3\alpha + 6 \ln 11)^{\frac{1}{2}}$$

$$c = \left[\int_{x_1}^{x_2} \sum_{i=1}^{n} \alpha \, dx + \frac{3[(3+7x)^{\frac{1}{2}} + 6 + 3\pi]}{(5+\gamma)(8+z)+1} + 6 \ln 11 \right]^{\frac{1}{2}}$$

$$c = \left[\int_{x_1}^{x_2} \sum_{i=1}^{n} \frac{(3+7x)^{\frac{1}{2}} + 6 + 3\pi}{(5+\gamma)(8+z)+1} \, dx + \frac{3[(3+7)^{\frac{1}{2}} + 6 + 3\pi]}{(5+\gamma)(8+z)+1} + 6 \ln 11 \right]^{\frac{1}{2}}$$

$$c = \left[\int_{x_1}^{x_2} \sum_{i=1}^{n} \frac{(3+7x)^{\frac{1}{2}} + (\beta - 180°) + 3\pi}{(5+\gamma)(8+z)+1} \, dx + \frac{3[(3+7x)^{\frac{1}{2}} + (\beta - 180° + 3\pi]}{(5+\gamma)(8+z)+1} + 6 \ln 11 \right]^{\frac{1}{2}}$$

$$c = \left[\int_{x_1}^{x_2} \sum_{i=1}^{\infty} \frac{\sqrt{3+7x} + (\beta - 180°) + 3\pi}{(5+\gamma)(8+z) + \log 8} \, dx + \frac{3[\sqrt{3+7x} + (\beta - 180°) + 3\pi}{(5+\gamma)(8+z)} + 6 \ln 11 \right]^{\frac{1}{2}}$$
$$10\Omega + 6\pi - 1 \qquad\qquad 10\Omega - 6\pi - 1 \qquad + \log 8$$

$$c = \sqrt{\left[\int_{x_1}^{x_2} \sum_{i=1}^{n} \alpha \, dx + \frac{\alpha \cdot 3[\sqrt{3+7x} + (\beta - 180°) + 3\pi}{(5+\gamma)(8+z)} + 6 \ln 11 \right.}$$
$$\left. 10\Omega \cdot 6\pi - 1 \qquad + \log 8 \right]$$

$$c = \sqrt{\left[\int_{x_1}^{x_2} \sum_{i=1}^{n} \alpha \, dx + \right.}$$

$$c = \sqrt{}$$

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