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Waterproofing and Protection of Vehicular and Pedestrian Traffic Surfaces

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Waterproofing and Protection of Vehicular and Pedestrian Traffic Surfaces

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Waterproofing and Protection of Vehicular and Pedestrian Traffic Surfaces

Course Overview

- » This course explores the various means and methods of waterproofing vehicular and pedestrian decks through the use of liquid membranes. The course will introduce the learners to multiple technologies available in the market, and the proper procedures for installation that will result in an effective protection strategy for concrete decks.



Waterproofing and Protection of Vehicular and Pedestrian Traffic Surfaces

Course Learning Objectives

At the end of this course, you will be able to:

- » Properly specify deck coatings for pedestrian and vehicular areas
- » Evaluate different types of coatings relative to their benefits and limitations in specific applications
- » Understand the critical steps in an effective protection strategy
- » Select from different options to maximize aesthetic impact of protective coatings

Agenda

- » Traffic bearing membranes
- » Available technology
- » Installation process
- » Keys to success
- » Conclusion

Traffic Bearing Membranes

Function

- » Waterproofing protection
- » Skid resistance
- » Wear resistance
- » Aesthetics
- » Chemical resistance
- » Cleanability



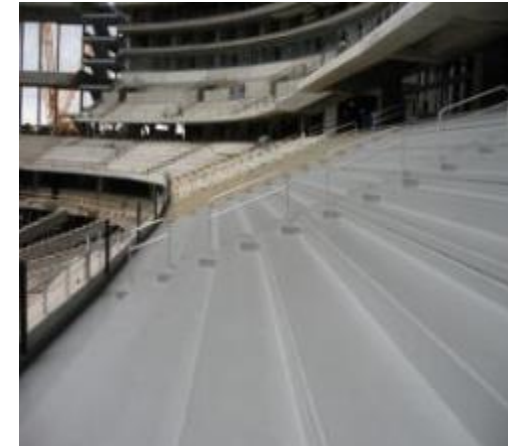
Parking “helix” ramp



Completed parking deck



Condominium balconies



Stadium seating bowl

Traffic Bearing Membranes

Function

Waterproofing Protection



Traffic Bearing Membranes

Function

Skid Resistance



Traffic Bearing Membranes

Function

Aesthetics



Traffic Bearing Membranes

Function

Chemical Resistance



Traffic Bearing Membranes Technology

- » Polyurethane
 - » One component
 - » Two component
- » Epoxy
- » Polyurea
- » Methyl-Methacrylate
- » Hybrid systems
- » Cementitious



Traffic Bearing Membranes

Technology

- » Polyurethane (One component)
- » Advantages
 - » UV stable
 - » Good wear resistance
 - » Flexible
 - » Easy to clean
 - » Affordable
 - » Proven track record



Traffic Bearing Membranes Technology

- » Polyurethane (One component)
- » Limitations
 - » Lower solids, less build
 - » Slower cure
 - » Impact of temperature
 - » Moisture Sensitive
 - » Odor



Traffic Bearing Membranes Technology

- » Polyurethane (Two component)
- » Advantages
 - » Faster cure
 - » Low odor
 - » Higher solids
 - » Excellent wear resistance
 - » Quicker return to service



Traffic Bearing Membranes Technology

- » Polyurethane (Two component)
- » Limitations
 - » Requires Mixing
 - » Pot Life
 - » Higher Material Cost



Traffic Bearing Membranes Technology

- » Epoxy
- » Advantages
 - » Fast Setting
 - » Low odor
 - » User friendly
 - » High Strength



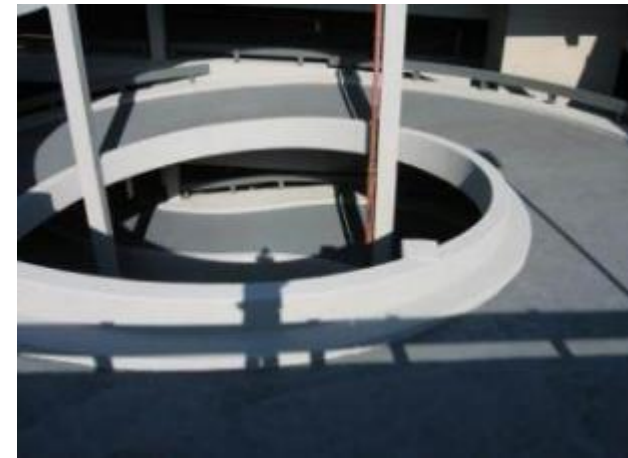
Traffic Bearing Membranes Technology

- » Epoxy
- » Limitations
 - » Rigid, potential for cracking
 - » Not U.V. Stable
 - » Plasticizer Staining



Traffic Bearing Membranes Technology

- » Methyl-methacrylate
- » Advantages
 - » Rapid Turn Around
 - » Low Temperature Cure
 - » High Strength
 - » Excellent Adhesion
 - » Easily Re-Coated



Traffic Bearing Membranes Technology

- » Methyl-methacrylate
- » Limitations
 - » High Odor
 - » Mixing
 - » Higher Cost



Traffic Bearing Membranes Technology

- » Polyurea
- » Advantages
 - » Rapid Turn Around
 - » High Elongation
 - » High Abrasion Resistance



Traffic Bearing Membranes Technology

- » Polyurea
- » Limitations
 - » Specialized Equipment and Application
 - » Critical Mixing Ratios
 - » Short Pot Life
 - » Recoat Difficulty



Traffic Bearing Membranes Technology

- » Cementitious
- » Advantages
 - » Low Odor
 - » Cost Effective
 - » Decorative
 - » Pedestrian Areas



Traffic Bearing Membranes Technology

- » Cementitious
- » Limitations
 - » Mixing
 - » Not Suitable for Vehicular Traffic



Traffic Bearing Membranes Technology

- » Hybrid Systems (Epoxy-Urethane, Urethane 1K/2K)
- » Advantages
 - » Versatility for Unique Applications
 - » Cost Effective
 - » Combine Benefits of Two Technologies



Traffic Bearing Membranes

Technology

- » Hybrid Systems (Epoxy-Urethane, Urethane 1K/2K)
 - » Limitations
 - » Epoxy-Urethane
 - » Potential for cracking in epoxy topcoat
 - » Urethane 1K/2K
 - » Slower cure time for 1K base coat

Traffic Bearing Membranes Technology

- » Evaluation
 - » Condition survey
 - » Define owner's needs/budget
 - » Create Scope
 - » Considerations
 - » Turn Around Time
 - » UV Exposure
 - » Odor
 - » Wear Resistance
 - » Cost



Traffic Bearing Membranes

Installation

- » Concrete Repair
 - » Cementitious
 - » Square up holes by saw cut
 - » Clean and re-dampen to SSD (saturated surface dry)
 - » For maximum performance, wet cure for 12 – 24 hours



Traffic Bearing Membranes

Installation

- » Concrete Repair
 - » Epoxy Urethane
 - » Prime with Part A and B with no aggregate
 - » Maximum depth of 1½"
 - » Traffic or re-coat ready in 2-4 hours
 - » Good for small repairs



Traffic Bearing Membranes

Installation

- » Concrete must be fully cured (28 day cure)
- » Check for moisture conditions
- » ASTM D4263, Plastic Sheet Method
- » ASTM F1869, Calcium Chloride

Traffic Bearing Membranes

Installation

- » SRS CSP Standards From CSP-3 to CSP-5
- » Refer to the ICRI Guideline form No. 310.2R, International Concrete Repair Institute
- » Selecting and specifying concrete surface preparation for sealers, coatings and polymer overlays
- » Website: www.icri.org



CSP Profile chips

Traffic Bearing Membranes

Installation



A good profile will physically “mechanically” lock the material into the pore structure of the concrete and ensures a positive bond



Traffic Bearing Membranes

Installation

Cracks and Joints



- » Non-moving joints and cracks $> 1/16''$ require routing to a minimum $1/4''$ by $1/4''$

Traffic Bearing Membranes

Installation

Cracks and Joints



- » Routed and filled cracks are then stripe coated with base coat

Traffic Bearing Membranes

Installation



- » Tool joints flush with surface
- » Cracks under 1/16" should be pre-stripped
- » Cracks over 1/16" routed to minimum 1/4" and filled with appropriate sealant
- » Sealant cove beads should extend 2" vertically and 2" onto deck
- » Do not use silicone sealants

Traffic Bearing Membranes

Installation



- » A minimum of 10' x 10' mock up is suggested
- » Mock up to include surface profile, sealant joints, flashing, and termination details
- » Evaluation of appearance and slip resistance

Traffic Bearing Membranes Installation

The Grid System



Traffic Bearing Membranes

Installation

- » Equipment
 - » Properly notched squeegee important to achieve desired mil thickness
 - » Notched squeegees will wear, take into account on large projects
 - » Flat squeegees can be used to apply topcoats



Traffic Bearing Membranes

Installation

- » Equipment
 - » Spiked shoes are required to walk on wet coating while back-rolling and broadcasting aggregate
 - » Ensure the metal spikes are clean to avoid leaving marks in the wet coating



Traffic Bearing Membranes Installation

- » Equipment
 - » Small rollers



Traffic Bearing Membranes

Installation

Primer



Traffic Bearing Membranes

Installation



- » Base Coat
- » Squeegee/back roll
- » Do not stretch

Traffic Bearing Membranes

Installation



- » Mid coat / Intermediate
 - » Squeegee/back roll
 - » 60-100 sq. feet/ gal
 - » 25-15 mils
 - » Aggregate refusal or broadcast / back roll
 - » 2-4 hour cure

Traffic Bearing Membranes

Installation



- » Aggregate
 - » Size of aggregate can determine slip resistance
 - » May differ from pedestrian to vehicular traffic
 - » Specialty aggregates such as walnut shells, rubber, etc., require prior approval
 - » Another reason for proper mock up

Traffic Bearing Membranes

Installation

- » Mid coat / Intermediate
 - » Medium duty
 - » Heavy duty
 - » Extra heavy duty
- » Aggregate Broadcast
 - » Several methods
 - » Broadcast and back roll
 - » Broadcast to refusal
 - » Hand and mechanical means



Traffic Bearing Membranes

Installation

- » Top Coat
 - » Lock coat
 - » 15 – 20 mils (typical)
 - » Apply by squeegee and back roll
 - » For additional slip resistance aggregate can be broadcast into the top coat



Traffic Bearing Membranes

Keys to Success

- » Adhesion testing
- » Mock ups
- » Pre-application meetings
- » Proper surface prep
- » Proper material choice
- » Proper mil thickness
- » Attention to details



Mock-Up / Adhesion Test

Traffic Bearing Membranes

Conclusion

- » What does the client need/want? What does the condition survey tell you? What will it take to meet the client's goal?
- » Select the right system for the application. Balance resistance to wear, weather, slipping, chemical exposure against aesthetics, cost and downtime.
- » Use mockups and pre-job meetings as quality assurance tools.
- » Pay attention to details – repair work, surface preparation, crack and joint work, mixing and proper application.

**This concludes the
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