Advantages of Concrete Parking Lots

Presented by:
National Ready Mixed Concrete Association (NRMCA)
American Society of Concrete Contractors (ASCC)
disclaimer

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n a statement denying responsibility for or knowledge of something.

Today’s Outline

- Market Trends
- Benefits of Concrete Parking Lots
  - Economics
  - Concrete/Asphalt Comparisons
  - Sustainability
- Our Goal: To give you correct information from the people who make concrete and the contractors who build with it, enabling you to make an informed decision regarding your parking lot project.
Historical Trend - The Market Has Changed

Break Even Analysis - Current Costs

- Total Ownership Costs (in Thousands)
- Years

- ACI-330
- Specified Asphalt
Benefits of a Concrete Parking Lot

- Economical
- First Cost
  - Affordable and competitively priced
  - Minimum subbase preparation
  - One pass completion
Benefits of a Concrete Parking Lot

- Economical
- Long Term Cost
  - Lower annual maintenance
  - No scheduled re-paving
  - Lower life-cycle cost
  - No business interruption
Benefits of a Concrete Parking Lot

• Performance
  • Proven long life
  • Strength increases with age
  • No potholes, bumps, or wrinkles
  • Evenly carries heavy loads
  • Resistance to freeze/thaw
Why Do Pavements Failure?

- Not due to # of years/age
- Due to stress of carrying loads
- Vehicle traffic-Improper Design
- Heat / Cold-Weather Conditions
Tire Point Load Transfer - Asphalt

- 7000 lbs load
- 15 - 20 psi pressure

Layers:
- Asphalt Wearing Course
- Asphalt Base Course
- Aggregate Base Course
- Subgrade
Tire Point Load Transfer-Concrete

7000 lbs load

Concrete

pressure ~3 - 7 psi

subgrade

stress
Design Thickness

- Design for purpose (adjust thickness)
  - Passenger vehicle parking
  - Truck lanes
  - Loading areas
  - Truck parking (sand shoes/dollies)
    - Increase thickness
    - Thickened beam
Established National Design

- ACI 330R-08
  - Guide for the Design and Construction of Concrete Parking Lots
- ACI 330.1-03
  - Specification for Unreinforced Concrete Parking Lots

- NOT AASHTO
Heat Island Mitigation

- Concrete’s lighter color means less heat absorption
- Lowers ambient air temperature by 7 to 10 degrees
- 1 degree equals 1.5% change in energy consumption
## Solar Reflectance (Albedo) and Solar Reflective Index (SRI)

<table>
<thead>
<tr>
<th>Material surface</th>
<th>Solar Reflectance*</th>
<th>Emittance</th>
<th>SRI*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Black acrylic paint</td>
<td>0.05</td>
<td>0.9</td>
<td>0</td>
</tr>
<tr>
<td>New asphalt</td>
<td>0.05</td>
<td>0.9</td>
<td>0</td>
</tr>
<tr>
<td>Aged asphalt</td>
<td>0.1</td>
<td>0.9</td>
<td>6</td>
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<tr>
<td>“White” asphalt shingle</td>
<td>0.21</td>
<td>0.91</td>
<td>21</td>
</tr>
<tr>
<td>Aged concrete</td>
<td>0.2 to 0.3</td>
<td>0.9</td>
<td>19 to 32</td>
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<tr>
<td>New concrete (ordinary)</td>
<td>0.35 to 0.45</td>
<td>0.9</td>
<td>38 to 52</td>
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<tr>
<td>New white portland cement concrete</td>
<td>0.7 to 0.8</td>
<td>0.9</td>
<td>86 to 100</td>
</tr>
<tr>
<td>White acrylic paint</td>
<td>0.8</td>
<td>0.9</td>
<td>100</td>
</tr>
</tbody>
</table>
EPA Heat Island Reduction Initiative

- Trees and Vegetation
- Green Roofs
- Cool Roofs
- Cool Pavements
Concrete Pavements can Reduce Global Warming Potential by 50%

Photos courtesy of the American Concrete Pavement Association
Concrete’s reflectivity optimizes performance of LED lighting
Reduce wattage from 400W to 125W
“The higher reflectance values from concrete play as much of a role in the visibility and apparent brightness of the site as the lighting.”
A Concrete Alternative for Existing Asphalt Parking Lot

Concrete Overlay
What can be done with an existing asphalt parking lot?
Concrete Overlays: New life for existing parking lots without reconstruction
What is an “overlay”? 

- Formally known as: 
  - Whitetopping 
  - Thin Whitetopping 
  - Thin Overlay
What is an “overlay”?

- 3” - 5” concrete on existing asphalt surface
- Provides rigid pavement able to withstand heavy traffic
- Existing asphalt serves as compacted base for concrete pavement
Why Concrete Overlays?

- Can be placed on both concrete and asphalt pavements.
- Offer an economically sound solution that will outlast any asphalt.
- All the benefits of concrete pavement
  - Long-term skid resistance
  - Greater visibility.
  - Reduced Heat Island effect
  - Reduced lighting requirements
  - Increased safety
- Concrete overlays have a proven track record with millions of Yds$^2$ across the U.S.
Like ACI 330, there is an industry standard guide:

- Pavement Evaluation
- Required Thickness
  - Car parking area
  - Access roads
  - Heavy duty truck Lanes
- Surface preparation
- Placement procedures
- Joint layout guidelines
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Questions?