Construction of Concrete Pavements for Streets and Local Roads

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Why it all began…
Balanced Paving Program
With better ideas came better design

Cross Sections of Good and Bad Ditches

**GREAT!**
With gentle sloping sides this ditch is stable.

**BAD!**
Water tends to spread itself out, not run in a tube. The bottom of this ditch will erode until it looks more like the first one.

**BAD!**
With a high volume of water the banks of the ditch will slump and erode.
What Is SUDAS?

SUDAS (pronounced "soo'dahs") is short for Statewide Urban Design and Specifications. The Institute for Transportation at Iowa State University maintains Iowa's SUDAS manuals for public improvements. Developing and maintaining Iowa's unique SUDAS manuals is the result of a lengthy and painstaking effort by more than 300 stakeholders across the state.

A brief history

In the late 1980s, 16 central Iowa urban jurisdictions, including the City of Des Moines, surrounding cities, and two counties, began meeting to discuss developing common urban standards for public improvements. Such improvements include sanitary sewers and water mains, streets and sidewalks, utility locations, signalization, drainage and erosion control, etc.

Developing common standards among several jurisdictions was breaking new ground in Iowa, and the group made slow but deliberate progress.

Their efforts came into focus when, in 1995, Governor Terry Branstad assembled a Blue Ribbon Task Force on Transportation to investigate ways to use Iowa’s Road Use Tax Fund more efficiently. One of the task force’s recommendations was that agencies “adopt common standards for construction specifications . . . .” By 1998, the central Iowa group (known as the Central Iowa Committee) had expanded to 34 Iowa jurisdictions, including several communities outside the Des Moines area and had published their design standards and specifications.

In 2000, the effort was underway to further expand the number of cities using the Central Iowa Committee’s manuals and to convert them to statewide manuals, eventually known as the SUDAS program.
NRMCA Design Assistance Program

- Amanda Hult
  - CPA-ACI 330

- Brian Killingsworth
  - StreetPave
No Mystery

- Prepare and compact subgrade to a uniform value
- Determine the thickness for the load-SLR typically 6” thick
- Pave with exterior mix-4000-4500 psi
- Use curing material on fresh slab
- Cut joints to a min depth T/4-sealant optional
- Joint Spacing=25-30 times panel thickness
- Cut panels as square as possible
- No panel size exceeds 15’
- No steel in pavement <8” thick
Placement Methods

- Full width slipform paver with integral curb and gutter is ideal
- Truss screed between independent curb and gutter-can be full width with center line crown
- Roller screed between independent curb and gutter-usually ½ width with centerline form
- Other straight edge screed between independent curb and gutter
Curb Types

- Integral
- Independent
Maintenance and Repair
Sawing Procedure for Repair

6-8 inch

Repair Area

Full Depth Cut

T/4 Cut
Utility Trench Repair-Fix It and Forget It

After utility work is done, fill and compact excavation (flowable fill*) to subgrade level, bust away remaining concrete to T/4 cuts and replace concrete

*Flowable fill of different colors helps identify buried utility type
Panel Replacement - Similar Process to Utility Trench

After removing damaged panel, replace and re-compact the sub-grade level, bust away remaining concrete to T/4 cuts to create aggregate interlock and replace concrete.
Removal back to T/4 saw cut
Place and Screen Across Shortest Distance
Texturing
Curing
Why No Tie Bars?

- Both ACI 330 and ACPA do not endorse the use of drilled in tie bars in pavements less than 8” thick.
  - Drilling of bars in pavements thicker than 8” requires special rigs that drill the holes perfectly
  - Drilling in bars in pavements thinner than 8” can cause multiple problems
    - Recreating aggregate interlock is a far better practice
Rehabilitating Existing Asphalt Pavements
LE MARS, IA
ASPHALT PAVEMENT/CONCRETE OVERLAY

2009 & 2011
3rd Avenue SE and 1st Avenue SW
LeMars Overlay Details

Mill Curb/Slipform New Integral Curb & Gutter with Overlay

Saw Cut

Concrete Overlay
## COST COMPARISON

**FULL DEPTH REPLACEMENT VS OVERLAY**

<table>
<thead>
<tr>
<th>PER BLOCK</th>
<th>2005</th>
<th>2009</th>
<th>2011</th>
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<tbody>
<tr>
<td>(440 FEET)</td>
<td>F.D. REPLACEMENT</td>
<td>Overlay as Detailed</td>
<td>Overlay as Detailed</td>
</tr>
<tr>
<td><strong>TOTAL PROJECT</strong></td>
<td>$115,000</td>
<td>$51,000</td>
<td>$60,000</td>
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<tr>
<td>%</td>
<td>100%</td>
<td>44%</td>
<td>52%</td>
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<tr>
<td><strong>INFLATION (3%)</strong></td>
<td>$137,000</td>
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<tr>
<td>ADJUSTED %</td>
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<td>44%</td>
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<tr>
<td><strong>PAVEMENT ONLY</strong></td>
<td>$90,000</td>
<td>$35,000</td>
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<tr>
<td>%</td>
<td>100%</td>
<td>39%</td>
<td>39%</td>
</tr>
</tbody>
</table>
And Once You Believe What Concrete Can Do.....
Recreational Trails
Golf Cart Paths
Airport Runway
Secondary Roads
Covering Asphalt
Concrete is a ridged pavement…but it is not hard..

- Iowa design model is 140° temperature swing
- We salt, sand, and pre-treat with harsh chemicals to comply with “clear pavement policy” in winter
- We build on expansive clay, black dirt, and unforgiving loess soil
- We have good aggregate…and not so good
- Cost of paving material in place has never been this close..balance today is easier
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Thank You Virginia Concrete Conference

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