Recent Development in Paving Equipment & Process

1. Evolution of Screeds In the US
2. Inline Pave (Hot on Hot)
3. Spray Paver Technology
4. RCC, CTB & Applications
5. Foam Mix and Recycling
6. Narrow & Medium Width High Quality Pavement
7. Navitronic Plus - mm GPS System
8. Latest Innovations in Paving Systems
   Ease of Operation
   Ease of Maintenance
   Economy Efficiency
   Application Performance for Smoothness & Density
1. Evolution of Screeds in the USA

A. Fixed Screeds with Hydraulic Strike-off, Becoming Obsolete
B. Rear Mount Screeds with & without strikeoff
C. Front Mount Screeds – Equal & Unequal width
D. Compaction Screeds, Latest Screed Innovation in the US
1. Evolution of Screeds in the USA

**Fixed Screeds with Strikeoff - The Original Free Floating Screed**

- Wedge lock Extensions for Width Changes on Mainline
- Hydraulic Strikeoff used for width changes on commercial applications
- Short Endgates Reduce Hand work

![Diagram of pavement setup showing main screed, compaction mat, and loose mat.]

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Evolution of Screeds in the USA

**Rear Mounted Extensions without Pre-Strikeoff**
- No Extension Pre-Strikeoff
- Cannot retract easily
- Long Endgates maximizes Hand work

**Rear Mount Extensions with Pre-Strikeoff**
- Extension Pre-Strikeoff
- Better Material Management
- Long Endgates maximize Hand work

**Front Mount Extensions with Pre-Strikeoff**
- Pre-strikeoff in the middle, difficult to control
- No Strike off for Versatility on Multi Variable Application
- Short Endgates minimize Hand work

**Front Mount Extensions without Pre-Strikeoff**
- Extend and Retract with out Trapping material
- Exceptional Versatility on Multi Variable Application
- Short Endgates minimize Hand work
1. Evolution of Screeds in the USA

High Compaction Screeds - Tamper Bar & Pressure Bars

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1. Evolution of Screeds in the USA

High Compaction Screeds: Density & Temperature Range

- **Conventional screeds:** 75 - 85%
- **High Density screeds:** 90% +

<table>
<thead>
<tr>
<th>Temp Range</th>
<th>Density</th>
<th>Compactor</th>
</tr>
</thead>
<tbody>
<tr>
<td>300° – 250°</td>
<td>85 – 92%</td>
<td>H D screeds / Double Drum</td>
</tr>
<tr>
<td>250° – 200°</td>
<td>92 – 94%</td>
<td>H D Screeds / Combo Roller</td>
</tr>
<tr>
<td>200° – 150°</td>
<td>94 – 96%</td>
<td>Double Drum / “ozzi”</td>
</tr>
</tbody>
</table>

**Target** 96%
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1. Evolution of Screeds in the USA
   High Compaction Screeds: Screed / Roller Density Comparisons

   - Up to 6” Lift
     - Opportunity for Waves
     - Roller 80 to 96%
     - Conventional Screeds 75 to 80% Density

   - Up to 12” Lift
     - Roller – 94 to 96%
     - Compaction Screeds 92 to 94%
2. Inline Pave

Volvo Futurastic Paver
Machine Technology

SUPER 1600-2 / SUPER 1800-2
Pavers for wearing course

AB 600-2 IP
High compaction screed

SUPER 2100-2 IP
Paver for binder course

MT 1000-1
Mobile feeder

AB 600-2 IP
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3. Spray Pavers

- Surface Treatment Applications
3. Spray Pavers

5 Spray Bars
In-between chassis, Behind tracks & beyond chassis

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4. CTB & RCC Applications

New Road Construction Bid 2 ways

- CTB Base
  - 8” CTB
  - 2” Intermediate Asphalt
  - 1 ½ Surfacing Asphalt

- Asphalt Base:
  - Fine Grading
  - 6” Black Base
  - 2” Intermediate
  - 1 ½ Surfacing

CTB - Project Reduced from 284 days to 92
## 4. CTB & RCC Applications

### Asphalt, RCC / CTB and Concrete Comparisons

<table>
<thead>
<tr>
<th>Asphalt</th>
<th>RCC/CTB</th>
<th>Concrete</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Flexible Pavement</strong></td>
<td>Not Flexible</td>
<td>Not Flexible</td>
</tr>
<tr>
<td><strong>Instant setup, No Re-bars</strong></td>
<td>Instant setup, No Re-bars</td>
<td>Intense setup, Re-bars, etc</td>
</tr>
<tr>
<td><strong>No Slump</strong></td>
<td>No Slump</td>
<td>Slump</td>
</tr>
<tr>
<td><strong>1 ½ - 5” Average Lift</strong></td>
<td>5-10” Average Lift</td>
<td>4-10”</td>
</tr>
<tr>
<td><strong>Roller Compacted</strong></td>
<td>&lt; 5” Roller Compacted</td>
<td>Not Compacted</td>
</tr>
<tr>
<td><strong>High Speed Traffic</strong></td>
<td>Limited to Lay down Technique</td>
<td>High Speed Traffic</td>
</tr>
<tr>
<td><strong>Asphalt paver</strong></td>
<td>Asphalt Paver</td>
<td>Slip Form Paver</td>
</tr>
<tr>
<td><strong>Asphalt Contractors</strong></td>
<td>Asphalt Contractors</td>
<td>Concrete Contractor</td>
</tr>
</tbody>
</table>

Layer thickness of RCC / CTB usually limited to 5” based on Conventional screeds capabilities.

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5. Foam Mix / Recycling

KMA Plant:
- Using RAP to Produce Foam Asphalt
- Could also produce RCC
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5. Foam Mix / Recycling

High Compaction Screed Laying the Following:
Foam Asphalt, & RCC / CTB & Asphalt

RCC
Foam Asphalt
Hot Mix
5. Foam Mix / Recycling
Cold-in-place Recycling:
– Recycle Train: S2100 TP2 Screed & Hopper Insert

Before

After
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5. Foam Mix / Recycling
Cold-in-place Recycling:
– CR3800, Windrow Elevator & Conventional Screed
Recent Development in Paving Equipment & Process

5. Foam Mix / Recycling
Cold-in-place Recycling:
– CR3800 With TV Screed
6 a. Narrow Width High Quality Pavement:
Smoothness & Density Equivalent to 10’ Pavers

Paving Widths:
• With Cutoff Shoes: 20”
• Hydraulic Extendable: 3’ 7“ – 6’ 7”
• With Bolt on Extensions: 10’ 7“

Typical Applications:
• Utility
• Narrow Width Patching
• Shoulders / Lane Shift Extension
• Sidewalk
• Jogging Trails & Bike Paths
• Golf Cart Paths
Recent Development in Paving Equipment & Process

6 a. Narrow Width High Quality Pavement: 20” - 10’ 6”
20” Patching With Cutoff Shoe
6 a. Narrow Width High Quality Pavement: 20” - 10’ 6”
Narrow Width Mill & Fill / Patching
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6 a. Narrow Width High Quality Pavement: 20” - 10’ 6”

Eliminating Rumble Strip for Lane Extension
Recent Development in Paving Equipment & Process

6 a. Narrow Width High Quality Pavement: 20” - 10’ 6”

GM Test Track:
2 x 5.5’ wide
554 Grade Changes in 1000’
Recent Development in Paving Equipment & Process

6 a. Narrow Width High Quality Pavement: 20” - 10’ 6”

Asymmetrical Hopper for off-set Paving
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6 b. Medium Width High Quality Pavement: 4’ - 15’
Mat Smoothness and density Equivalent to 10’ Pavers
Recent Development in Paving Equipment & Process

6 b. Medium Width High Quality Pavement: 4’ - 15’

Paving Widths:
• With Cut-off shoe: 4’
• Hydraulic Extendable: 6’ – 11’
• With Screed Extensions: 8’ – 15’

Typical Applications:
• Utility
• Medium Width Patching
• 6 to 8’ Shoulders / Lane Shift Extension
• Sidewalk
• Jogging Trails & Bike Paths
• Golf Cart Paths
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6 b. Medium Width High Quality Pavement – 4’ to 15’

- Large Driveways
- Parking Lots

S1303

S1300

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7. **Navitronic Plus - mm GPS**
   - **Positioning Systems from Topcon or Leica**
   - **Communicating with Vögele Integrated Machine Control**
     - **Controls Mat depth, Steering and Paving Width**
7. Navitronic Plus - Mm GPS

Could Also Control Steering with String Line and Sensor
8. Latest Innovations in Paving Systems

Today’s Design Focus:

Reliability
Ease of Operation
Ease of Maintenance
Economic Efficiency

Application Performance for Smoothness & Density
8. **Latest Innovations in Paving Systems:**

**Ease of Operation:**

- Raised Operator’s Platform for Full Visibility
- Swing out Platform for Better visibility at narrow width
- Console Swivel & Tilt for comfort
8. Latest Innovations in Paving Systems:

Ease of Operation:
- Digital Display
- Onboard Diagnostics
- Interactive Training
Recent Development in Paving Equipment & Process

8. Latest Innovations in Paving Systems:

Ease of Operation:

Pave Mode – Engage all paving functions

Maneuver Mode – Disengage all Paving functions
8. Latest Innovations in Paving Systems:

Ease of Operation:

- AUTO Fill Switch
- Reverse Conveyors & Augers
- Feeder Cleanout Switch
- Digital display of material head
8. Latest Innovations in Paving Systems:

Ease of Operation:
- Hydraulically Raised Apron
Recent Development in Paving Equipment & Process

8. Latest Innovations in Paving Systems:
   Ease of Operation:
   • Digital Display Screed Control
   • Integrated Grade & Slope control
   • Multiple Function Remote Control

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8. Latest Innovations in Paving Systems:

Ease of Operation:

- Could power 2 Balloon lights while heating the screed
8. Latest Innovations in Paving Systems:

Ease of Maintenance:

- **Daily Maintenance Free Engine – Sensors monitoring engine vitals**
- **Hydraulic Conveyor Chain Tensioning**
- **Centralized Grease Zerk for All Feeder Bearings**
  - **Economical Optional Auto Lube**
8. Latest Innovations in Paving Systems:

Economic Efficiency:

- Eco Engine RPM
- Engine Driven Generator & Cooling Fan
  - Reduced Fuel Consumption
8. Latest Innovations in Paving Systems:

Application Performance for Smoothness & Density:

- 4 Sensors Material Management system
- Feedback steering to optimize Controllability
- Screed Hold & Freeze to Optimize Smoothness
8. Latest Innovations in Paving Systems:
   Application Performance for Smoothness & Density:
   Non-Contact Averaging Ski:
   • 8’ - 50’ Length
   • 3 x 5 Eye Sensors
   • Swivel the Rear sensor to read off the New Mat
8. Latest Innovations in Paving Systems:

Application Performance for Smoothness & Density:

Wide Paving Widths:

• 10’ – 30’ with Fixed Screed

• 10’ - 30’ with Hydraulic Extendable Screeds