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SWIFT Conference - Minneapolis

RCC Paving Equipment & Construction Practices:

L. Nars, Product Manager – Vogele Pavers

RCC Paving Equipment & Construction Practices:

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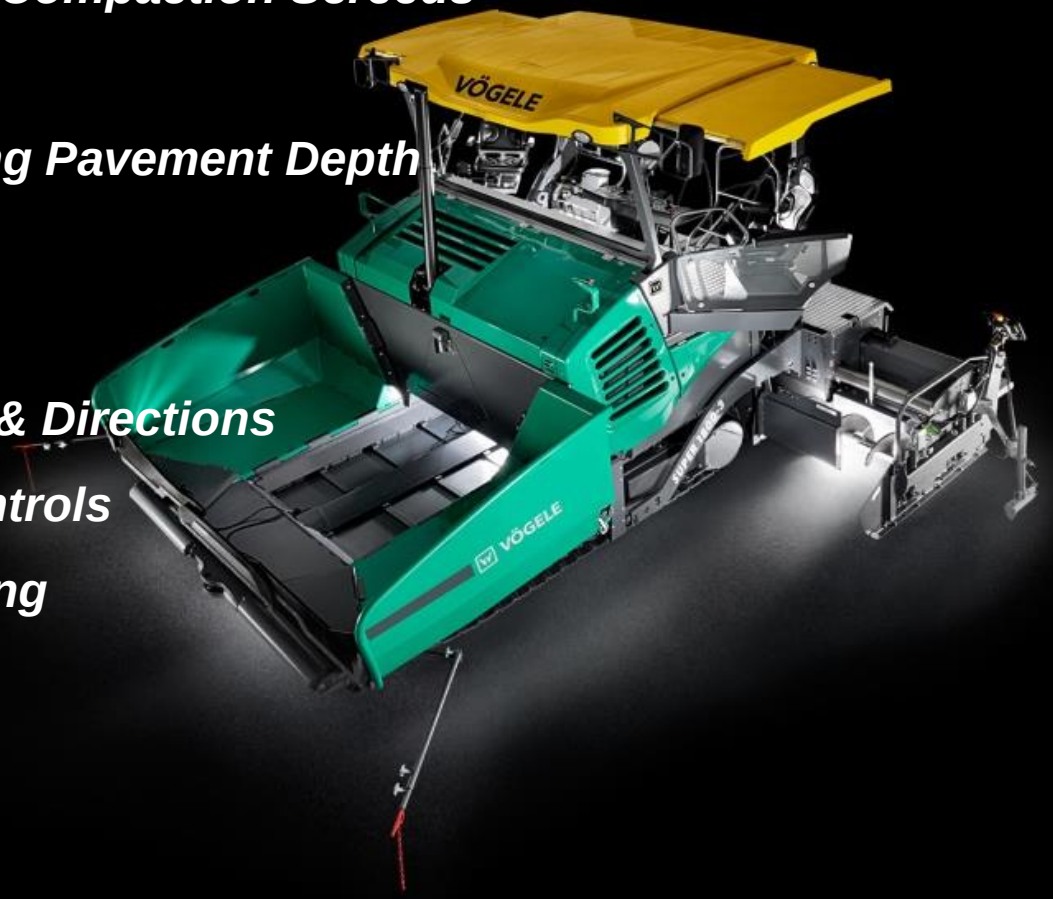
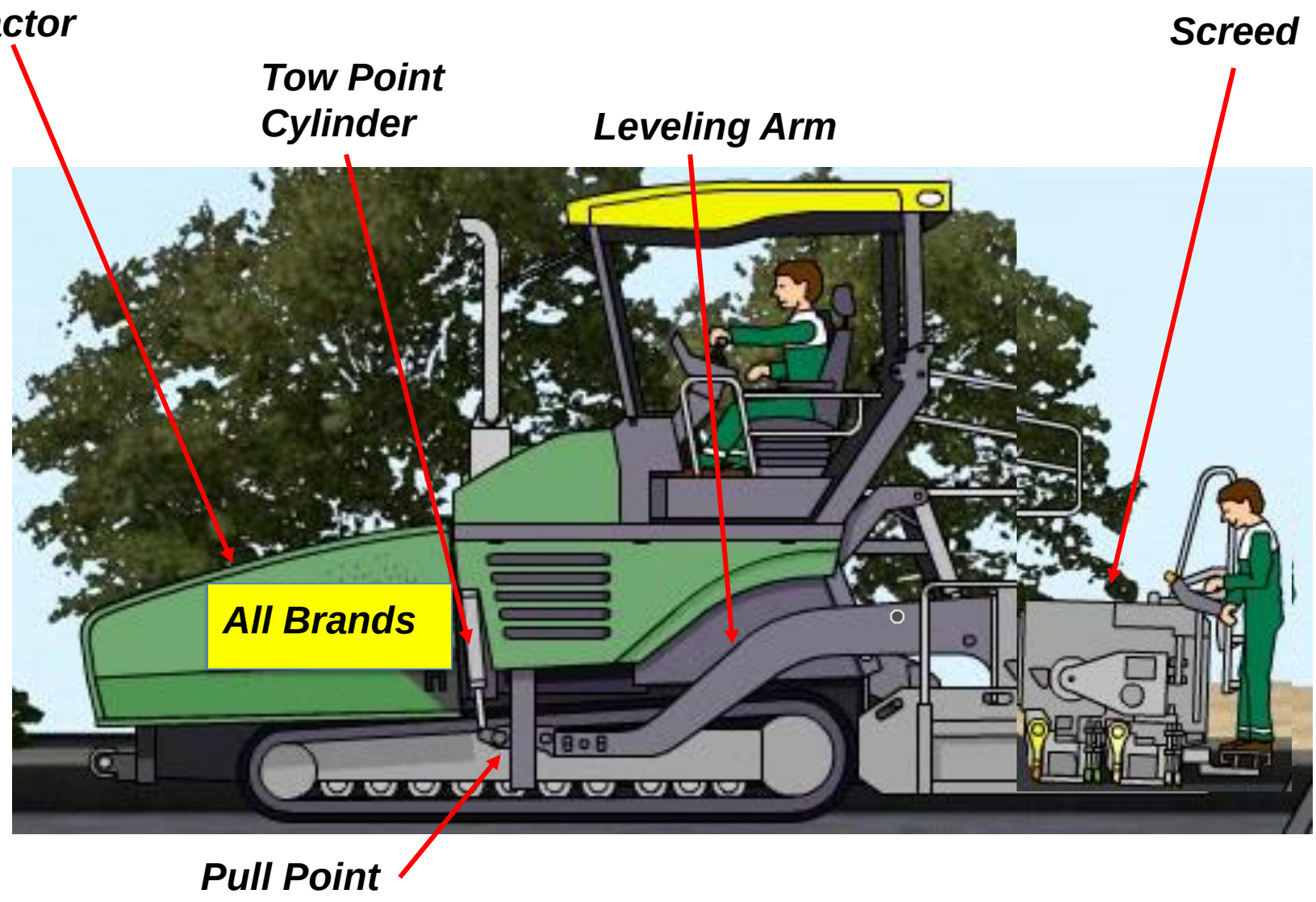
Agenda:

1. ***Pavers with Free Floating Screed***
   - ***Principles of Screed Compaction***
   - ***Vibratory, Compaction & High Compaction Screeds***
2. ***Construction Practices:***
   - ***Managing the 5 Forces Controlling Pavement Depth***
   - ***Controlling Material Consistency***
   - ***Wide Paving***
3. ***Automatic Controls, Depth, Width & Directions***
   - ***Convention Grade and Slope Controls***
   - ***3D Positioning, 1D, 2D & 3D Paving***

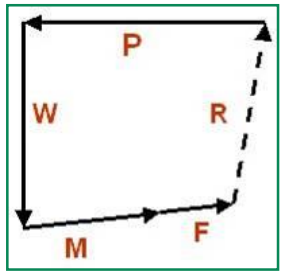


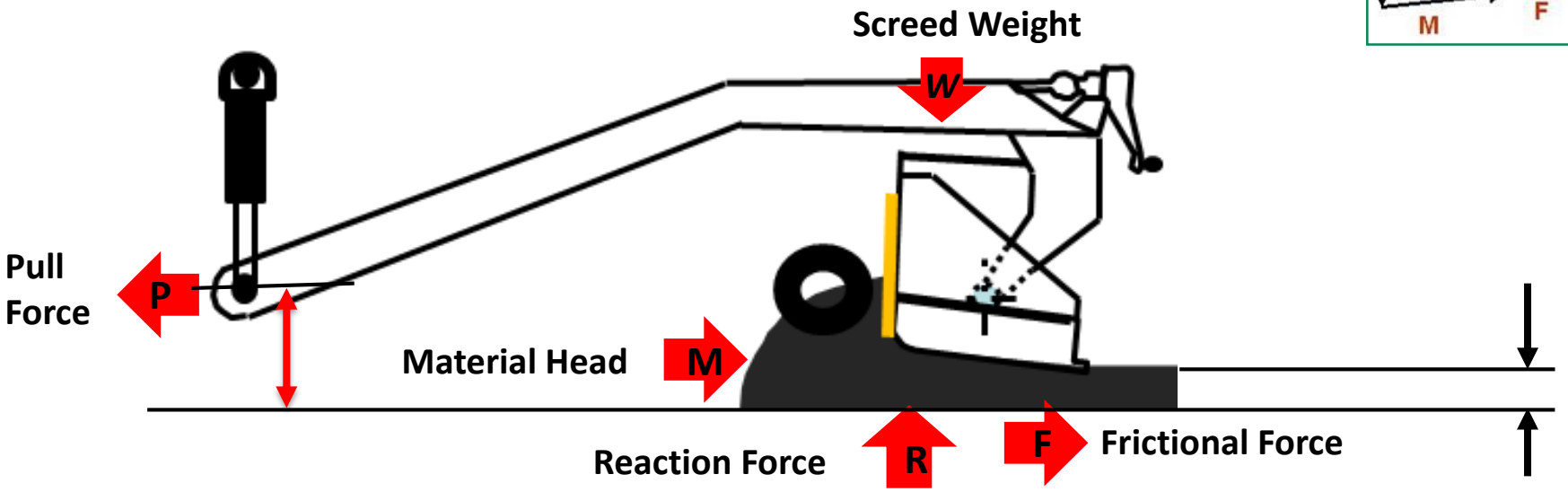
Key Components – All Brands:



Forces acting on the screed:

- *Depth Held by a pre selected screed position & 5 Forces*
- *Not by Mechanical or Hydraulic Devise*





<u>At Equilibrium</u>:
All Forces are in Balance

Constant Mat Depth is Maintained

The screed is free floating with an Equilibrium Angle (Angle of Attack)

Change in any of the 5 Force cause the screed to Rise or Fall

1. ***Vibratory Screeds – Thin Lift Commercial & Mainline Paving:***
   - ***Density due to Angle of Attack & Front Profile of screed Plate***
   - ***Screed Vibration***
2. ***Compaction Screeds – Average Lift Cold Mix Applications:***
   - ***Density Due to Tamper Bars***
   - ***Screed Vibration***
3. ***High Compaction Screeds – Thick Lift Cold Mix Applications:***
   - ***Density Due to Multiple Compacting Devices***
   - ***Tamper Bars and or Pressure Bars and or Screed Vibration***

Key Components of Pavers with Vibratory Screeds:

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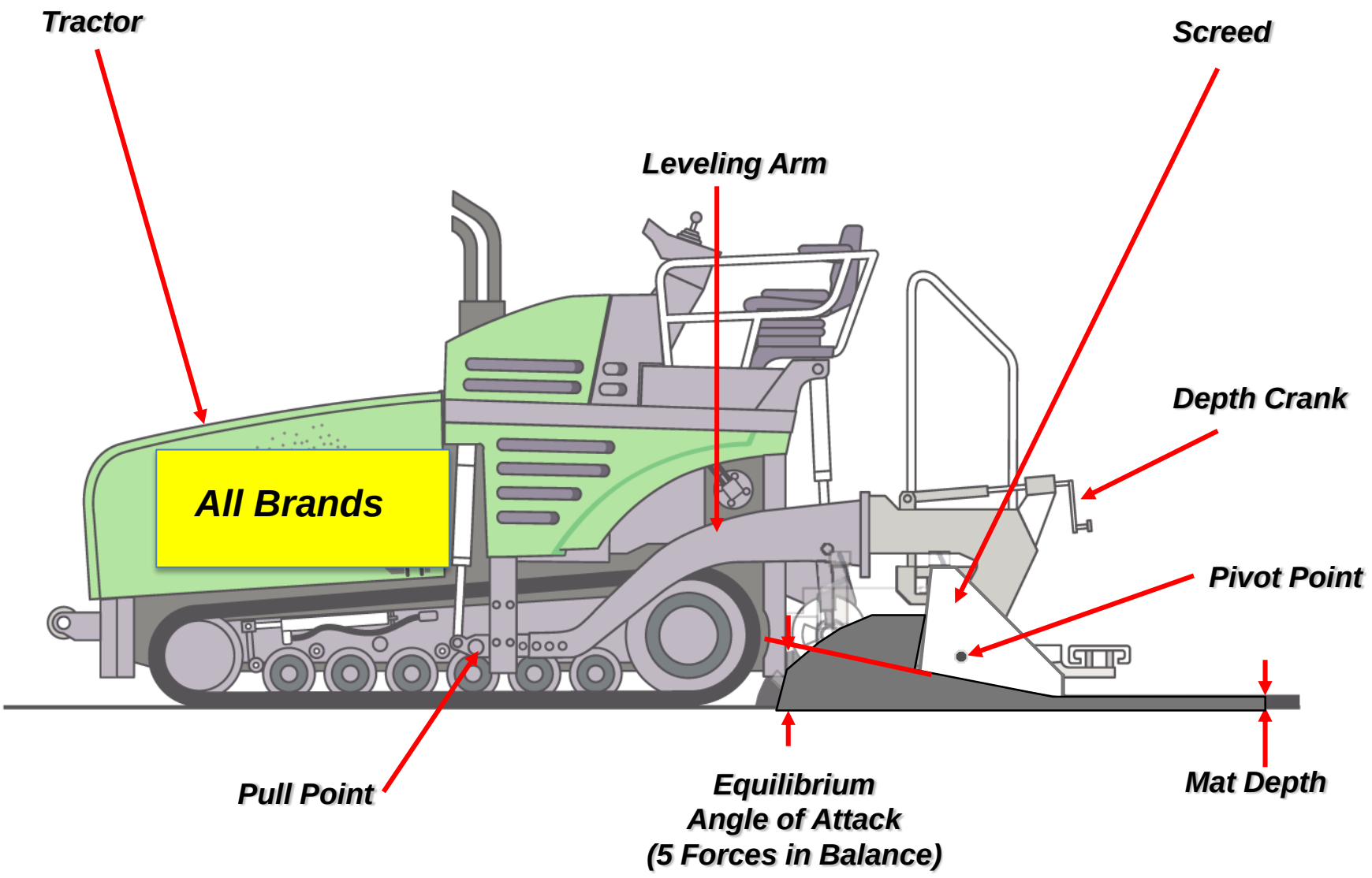


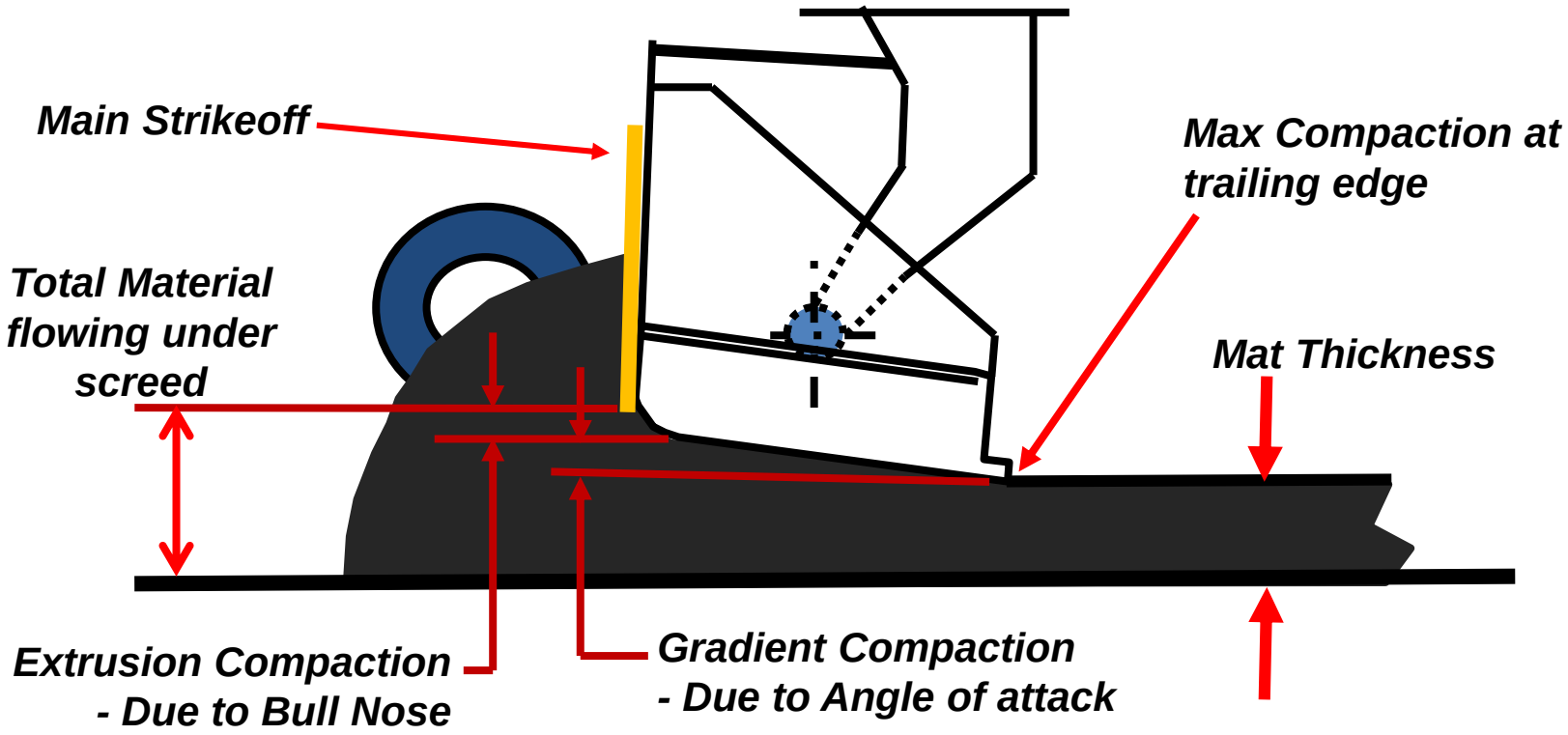
Vibratory Screed – How is Compaction Achieved??

1. *Gradient Compaction - Due to screed angle of attack*

   Influenced by Weight and or Vibration

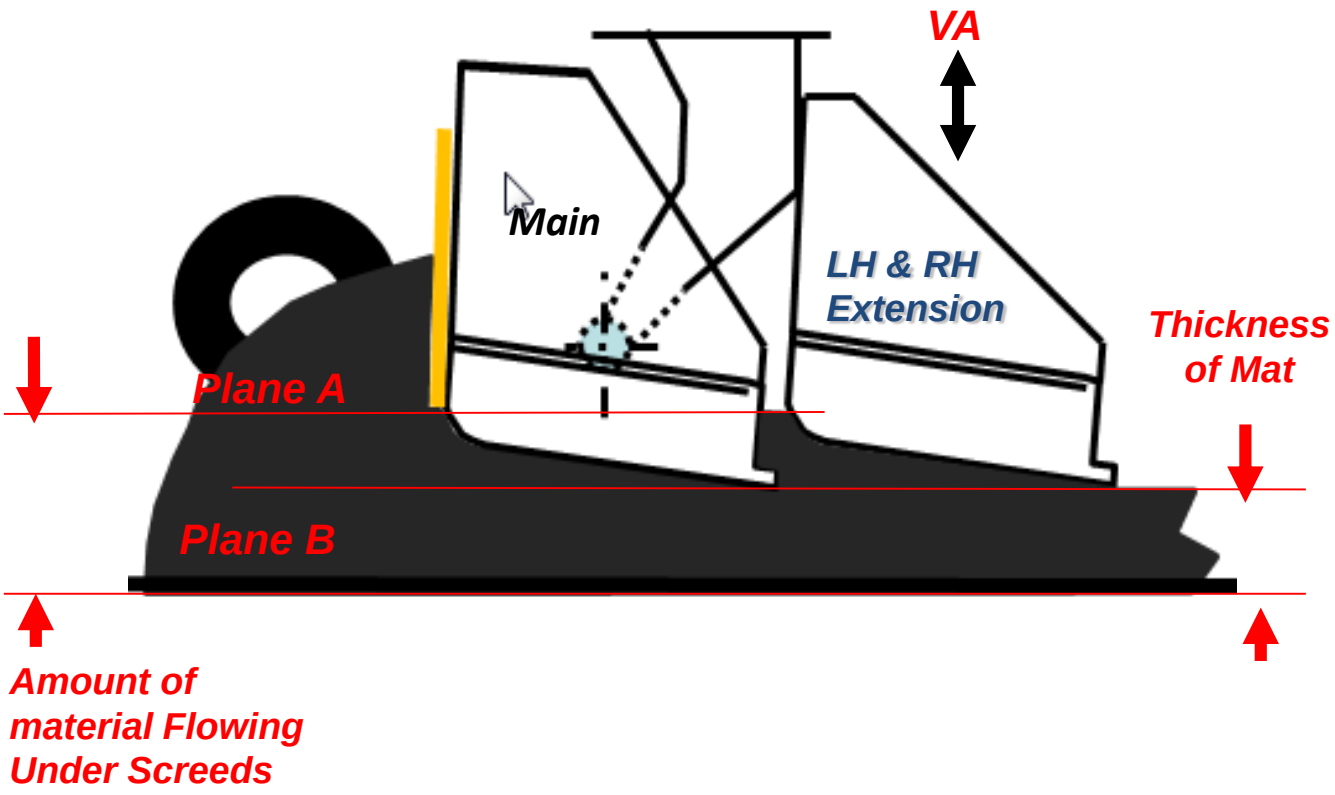
2. *Extrusion Compaction*

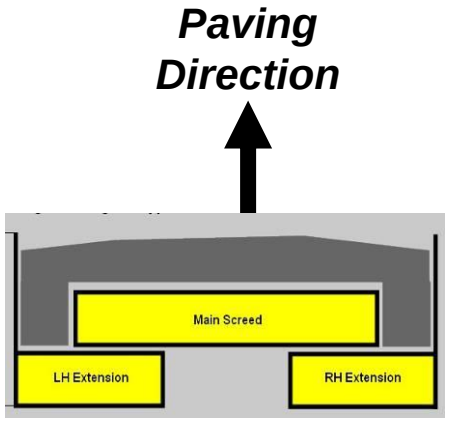
   Influenced by the strikeoff and Bull nose on screed plate

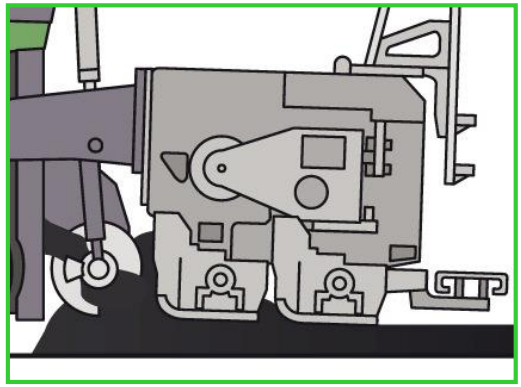


Rear Mount Vibratory Screed…..Angle of Attack & vertical Adjust

- *Material Flowing Under all Screed Sections must Be Equal*

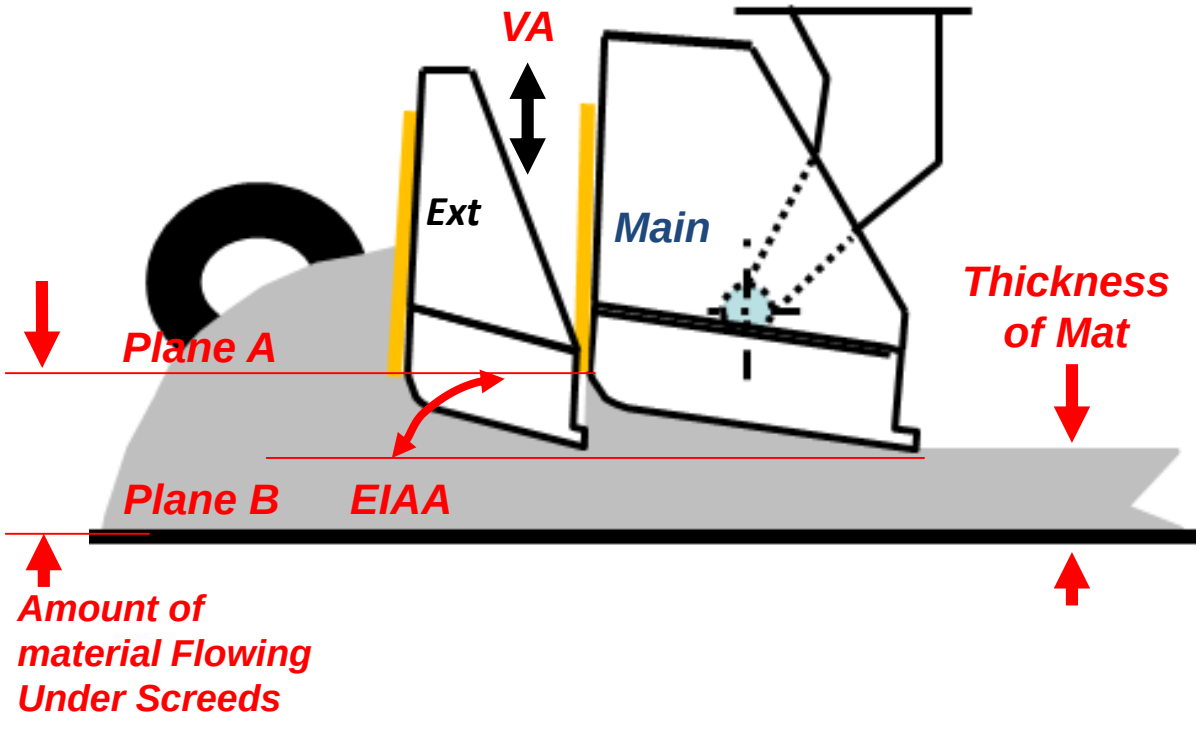


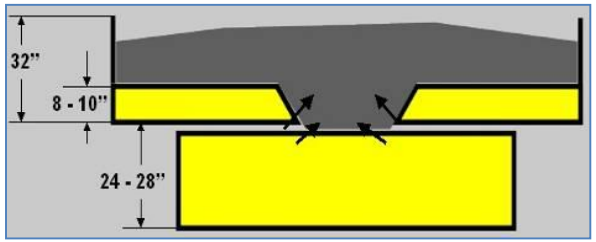


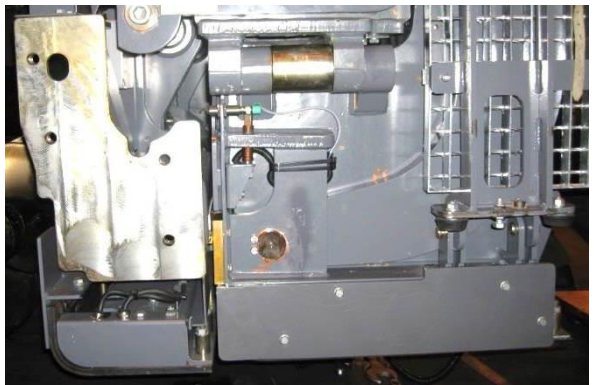


Front Mount Vibratory Screed…..Angle of Attack & vertical Adjust

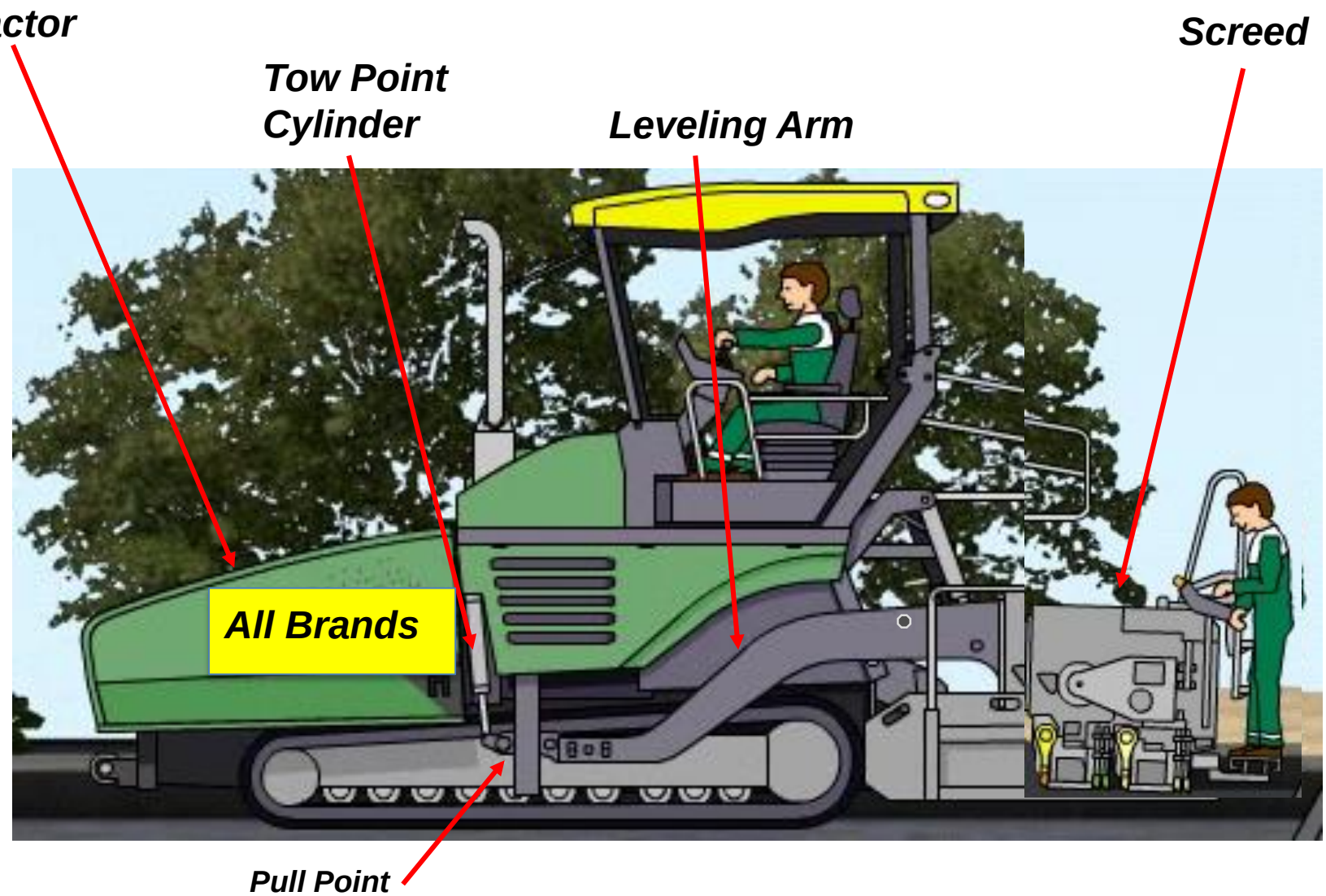
- *Material Flowing Under all Screed Sections must Be Equal*







Key Components of Pavers with Compaction & High Compaction Screed:



Compaction Screed: Single Tamper Bar & Vibration

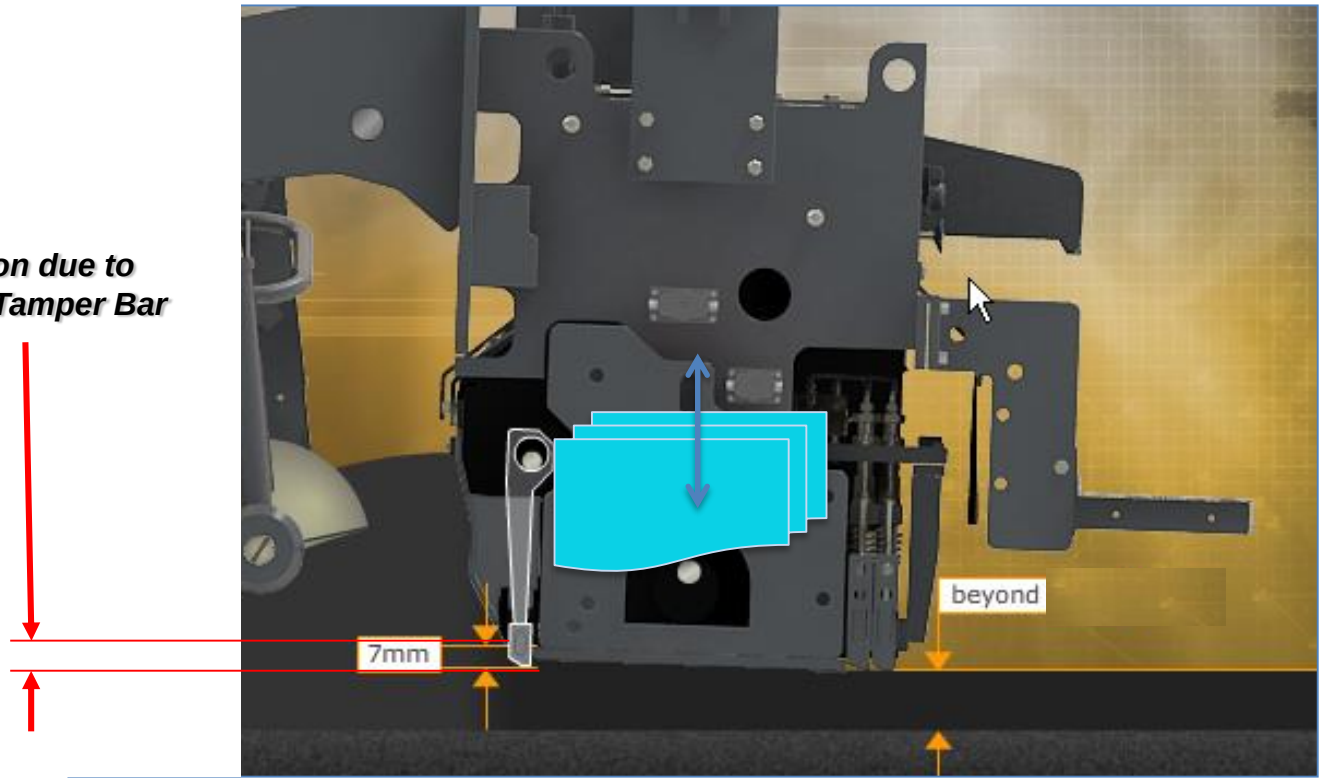
Compaction Screed

High Compaction Screed

Compaction Screed: Single Tamper Bar & Vibration – Used on Average Lift

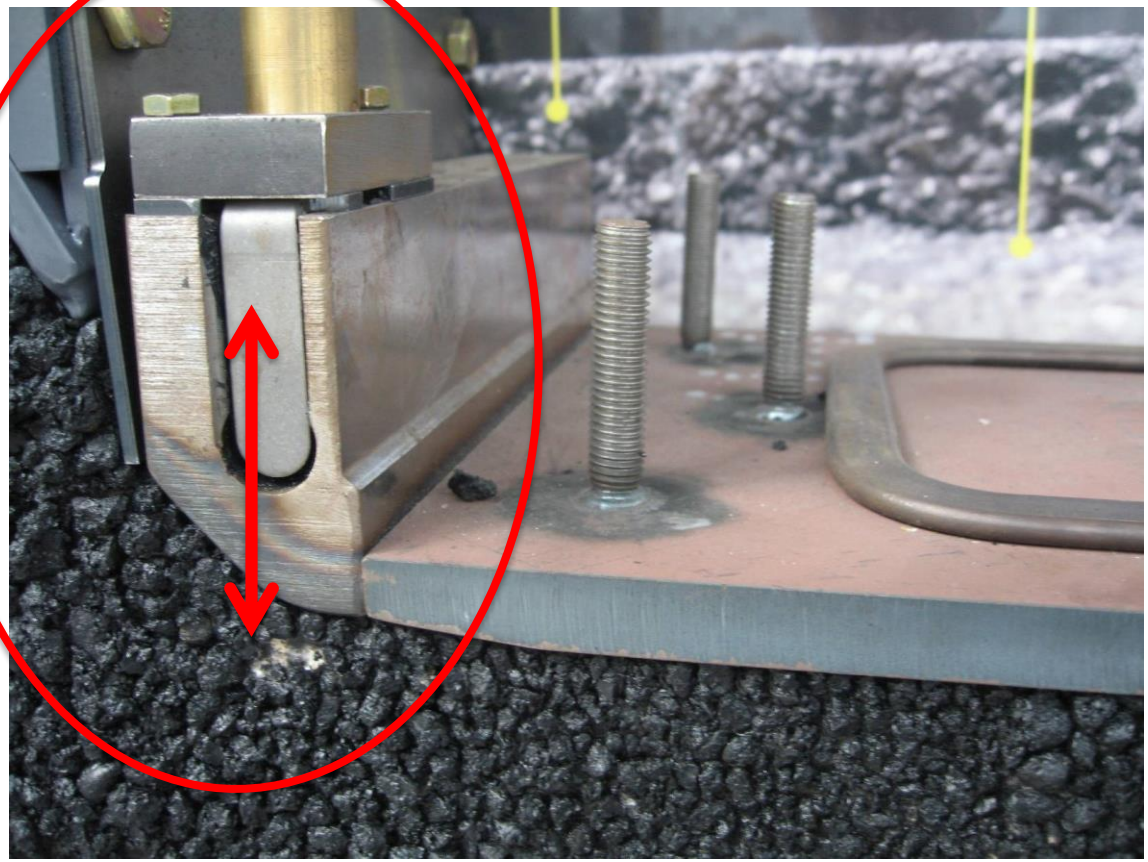
- *Tamper Bars at the Leading Edge*
- *Vibration attached to the screed Plates*

Compaction due to Vibration & Tamper Bar



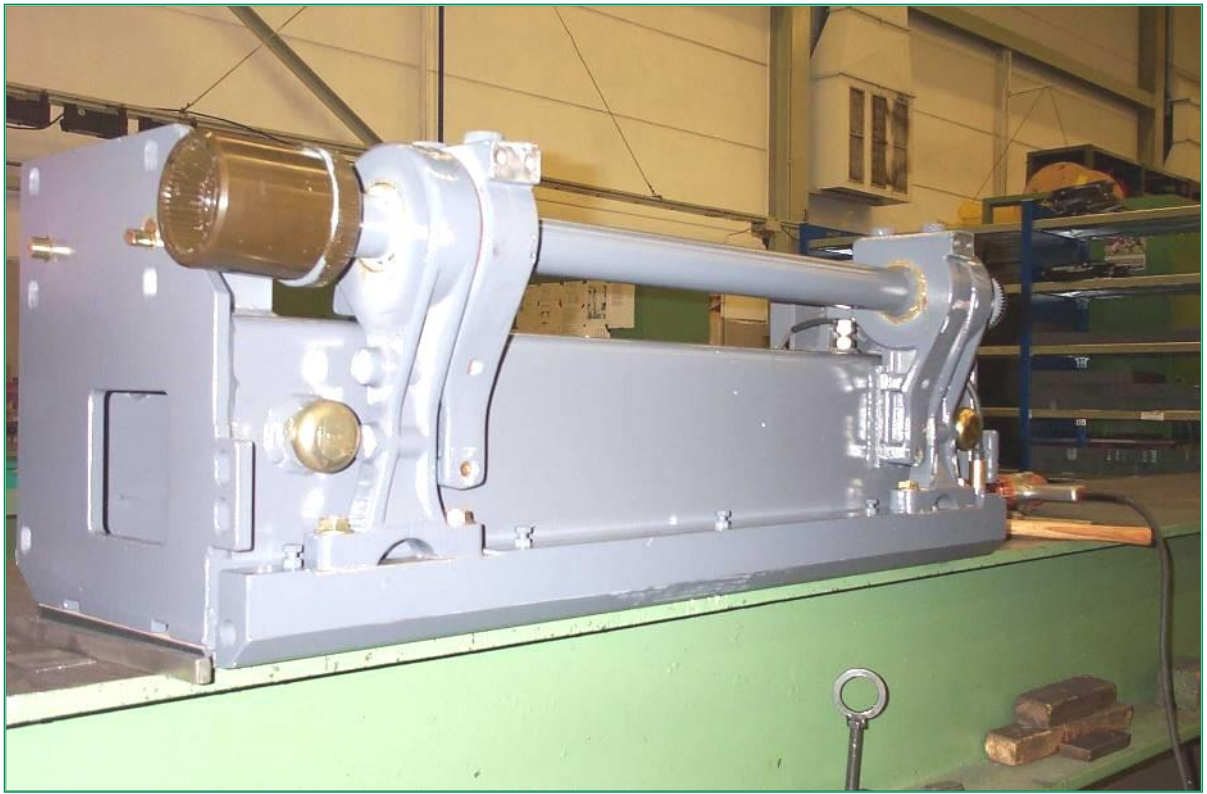
Compaction Screeds – Cut away View:

Tamper Bar Moves up & Down – To tuck the material under the screed Plate



Compaction Screeds: Tamper Bar Specifications

- *3 Strokes for different lift thickness - 2, 4 & 7 mm*
  - *RPM - Adjustable from 0 to 1,800*
  - *Driven by Hydraulic Motor*
- *Available from Most Paver Manufacturers*

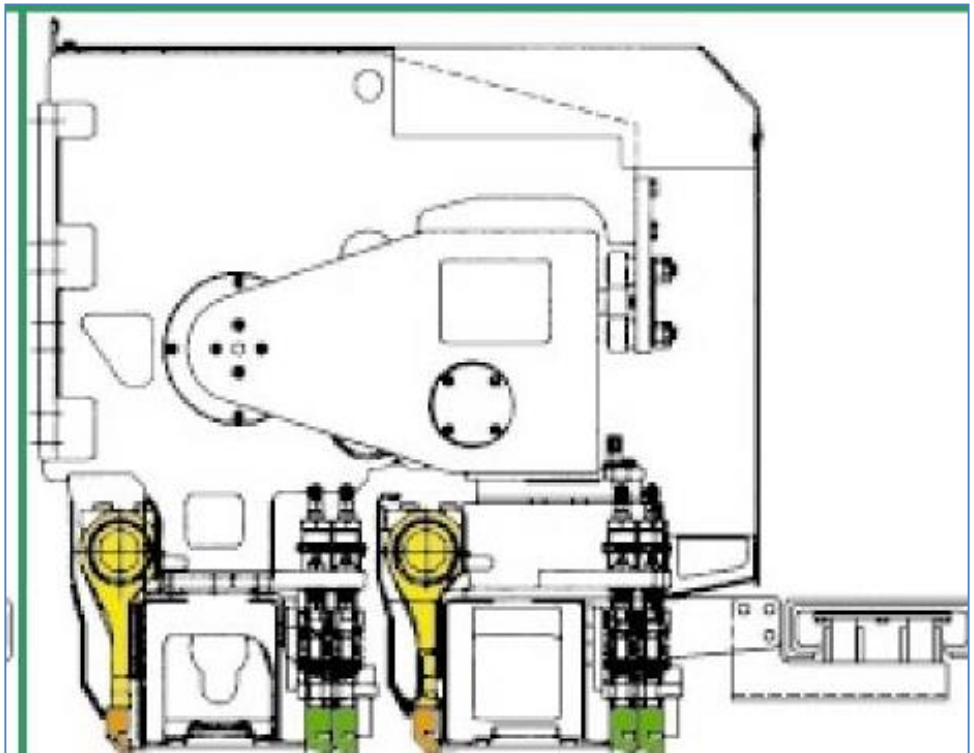


High Compaction Screeds: - Most suited for thicker lifts

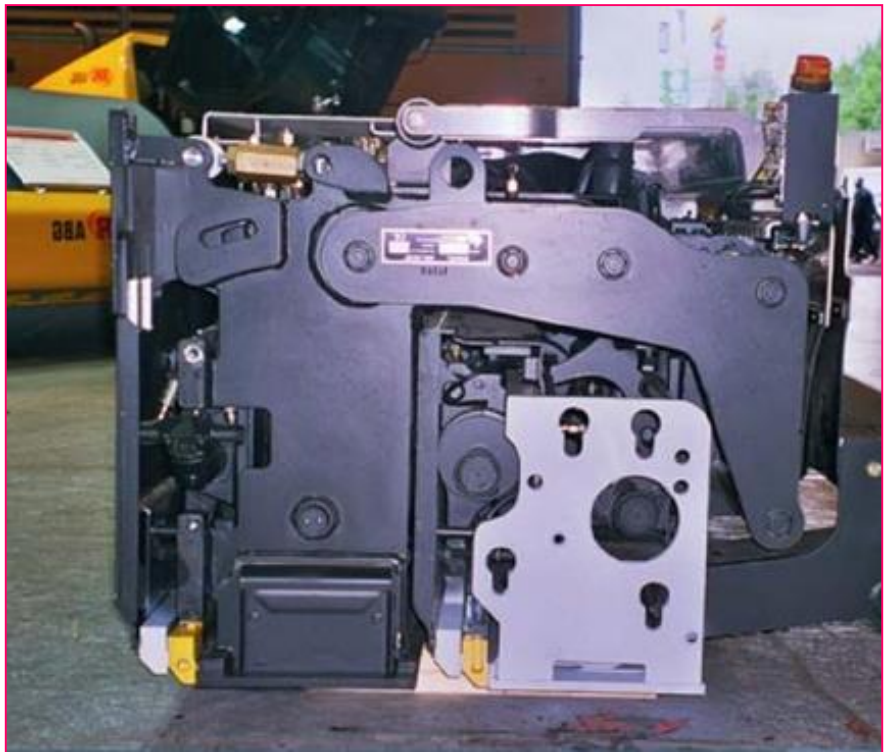
Vogele AB Screeds: 1 Tamp & 2 Pressure Bars

Some Manufactures have 2 Tamper Bars

1 Tamp & 2 Pressure Bars



2 Tamper Bars

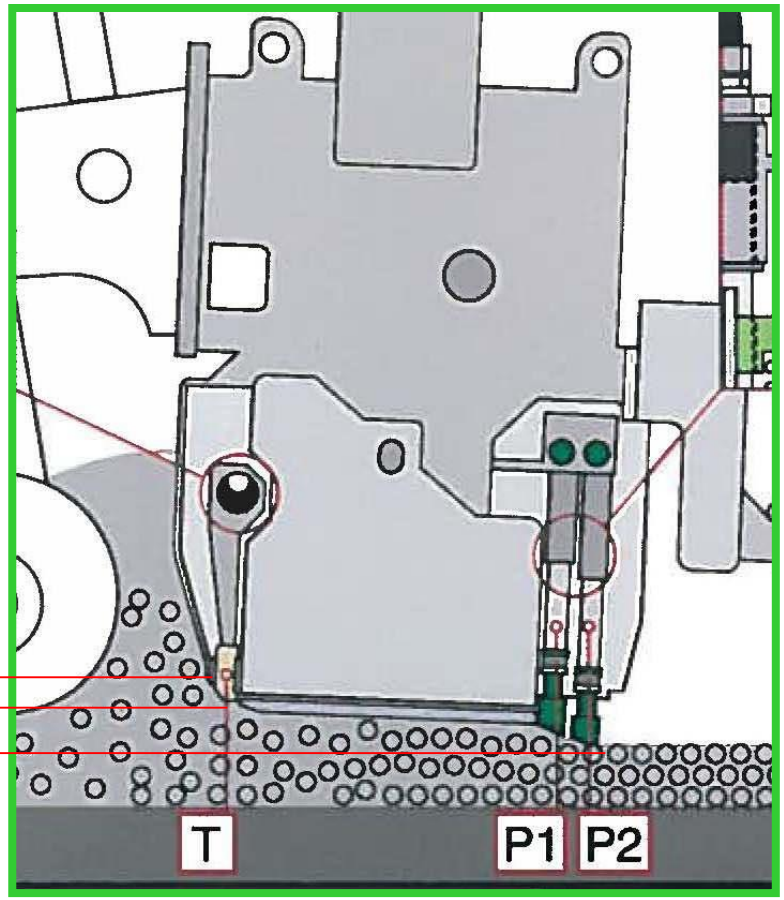


High Compaction Screed – How is Compaction Achieved??

- *Single Tamper Bar and Dual Pressure Bars*
- *Or Dual Tamper Bars*
  - *90% to 96% Density*

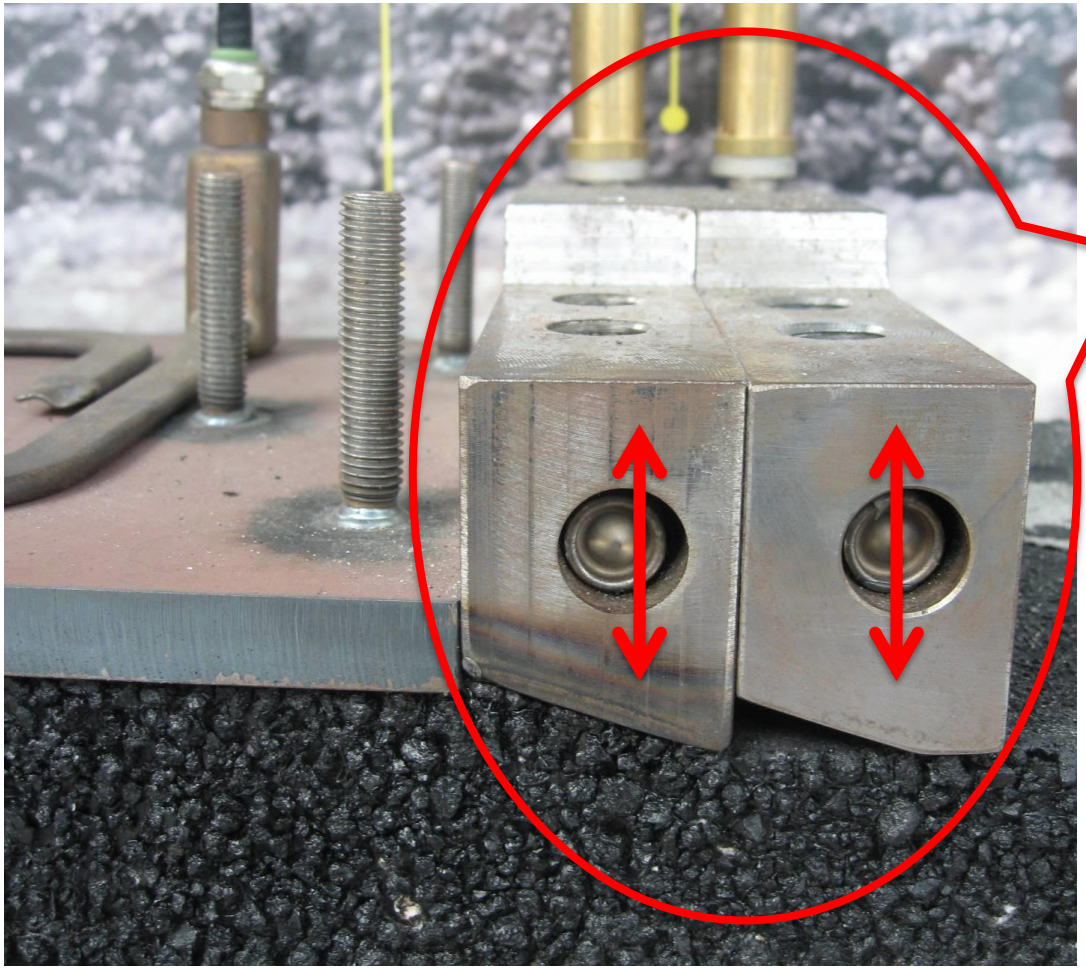
Initial compaction with Tamper bar, 2, 4 or 7 mm stroke

Compaction due to P1 & P2 Strokes below screed plate



AB 600 Flash

High Compaction Screeds, Dual Pressure Bars – Cut away View



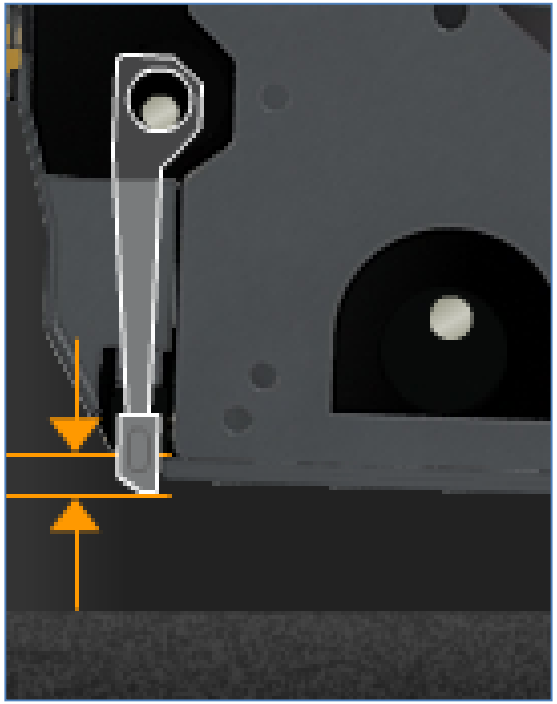
Dual Pressure Bars at the Trailing Edge of the Screed Plate

- ***Provides Final Compaction***
- ***Less Tearing on cold mix***

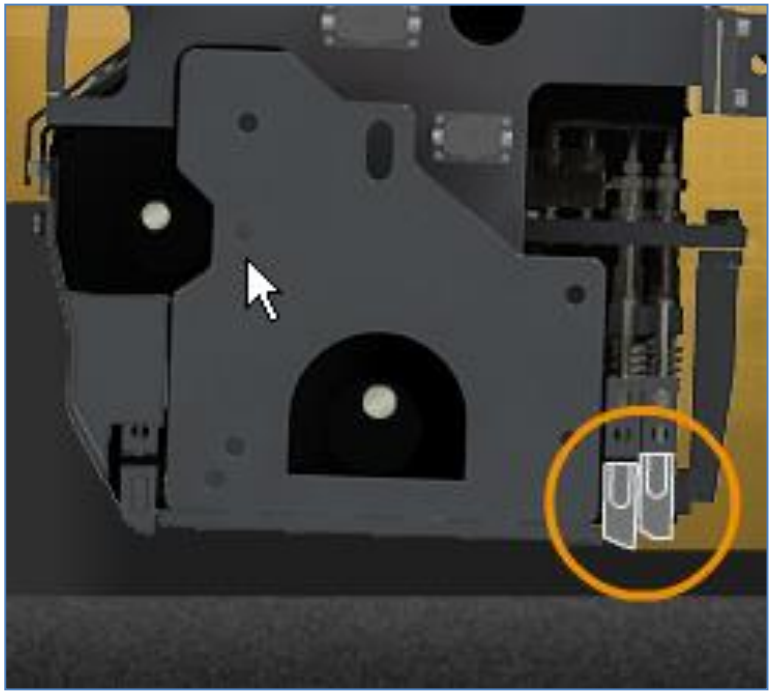
Factors Influencing Compaction & High Compaction Screeds:

- ***Impact per Inch & Stroke…..based on Depth & Speed***
- ***Must Maintain Constant Paving Speed***
- ***Operator Knowledge – A MUST***

Initial Compaction from Tamper Bar



Final Compaction from Pressure Bars



Compaction & High Compaction Screeds (C & HC Screeds):

- ***Higher In Place Density…….Less Roll down***
- ***Less Probability for Roller Imperfections***

Screeds VS Roller Compaction Comparisons:

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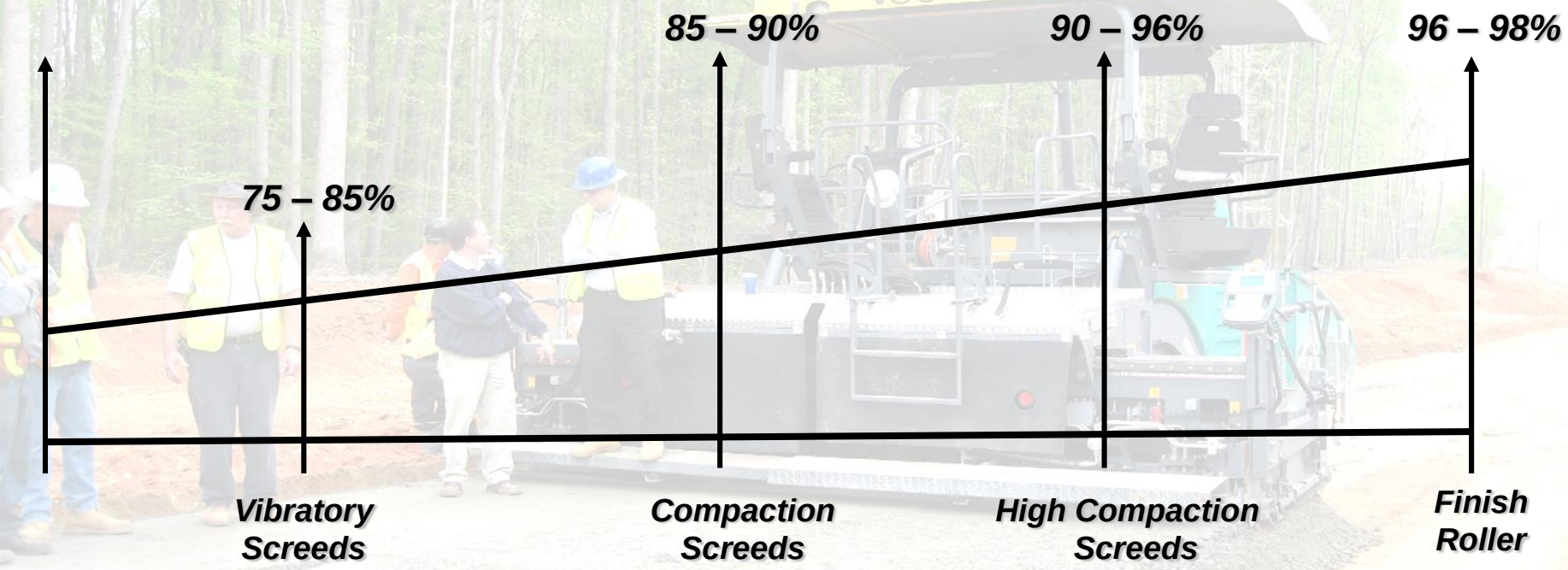
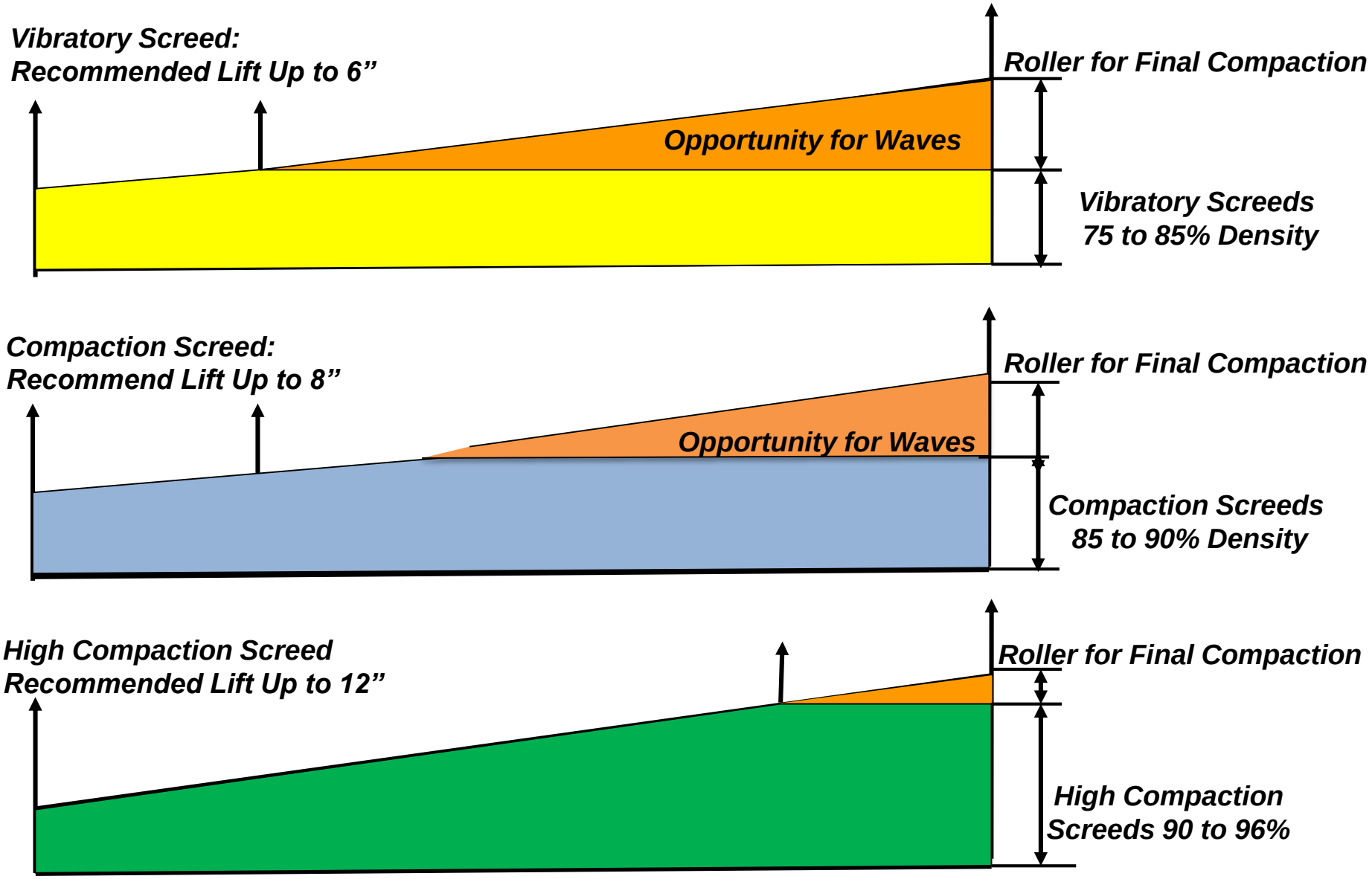
Average Density at the back of different type of Screeds:



Screeds & Roller Compaction Comparisons:

Recommended Lift Thickness for Different Screeds:



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High Density VS Conventional Screed to Lay RCC

High Density Screed – 6” Compacted

- *Very Good Surface Structure*
- *No sign of foot print*

Conventional Screed 6” Compacted

- *Poor Surface Texture*
- *Could sink up to 1”*

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Controlling Material Consistency

- *End of Load Segregation*
- *Moisture Consistency*

  Very Critical for Smoothness and Surface Texture Consistency

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Use Material Transfer Vehicles where Possible – Belt Type

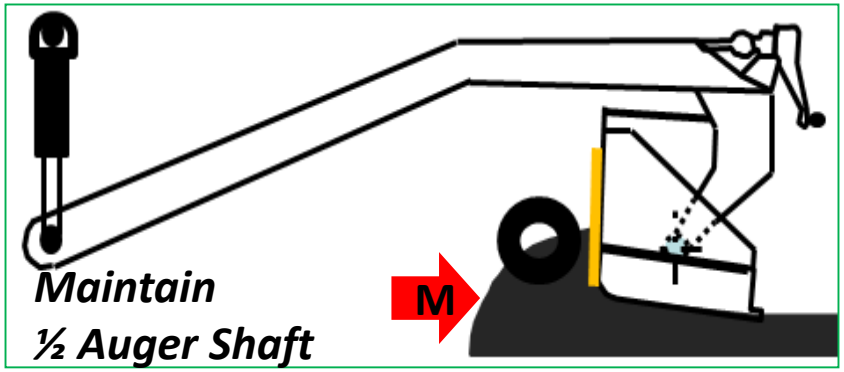
- *Non-contact Continuous Paving*
- *Better control of Material Consistency*

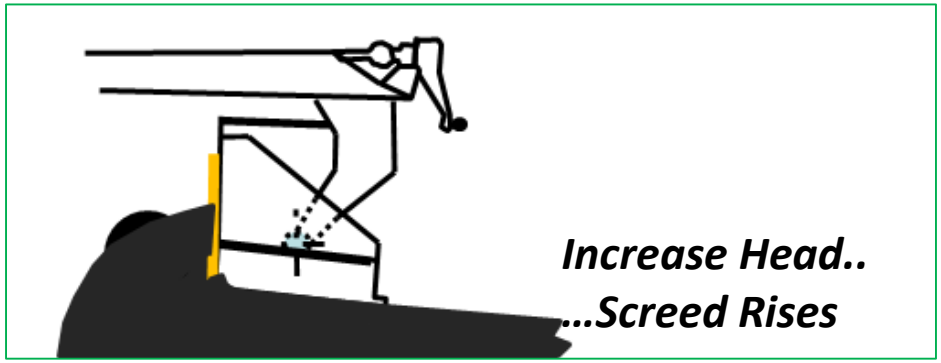
Steer Straight – Keep the screed in Equilibrium

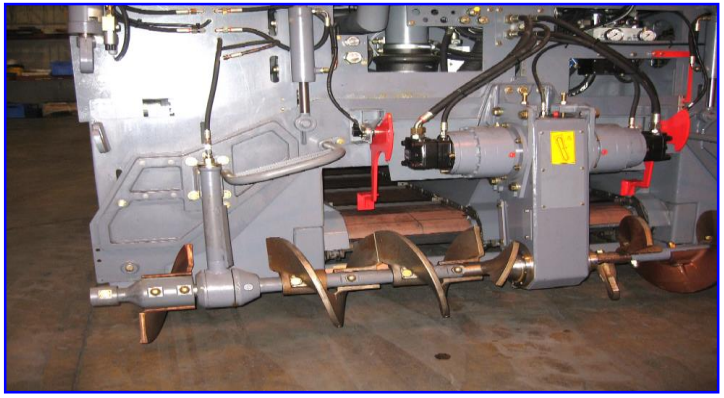
- *Use Steering Guide and steering reference*

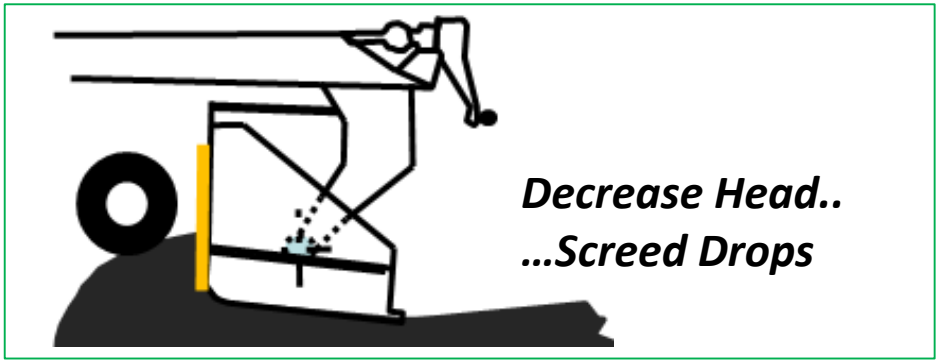
Maintain Consistent Head of Material:

- *Mat depth fluctuates with the head of Material*









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Use Proper Eager plates for Joint Compaction

- ***Joint Raveling usually the first point of RCC Failure***
- ***Follow specifications / Ensure Fresh Joints or saw cut***

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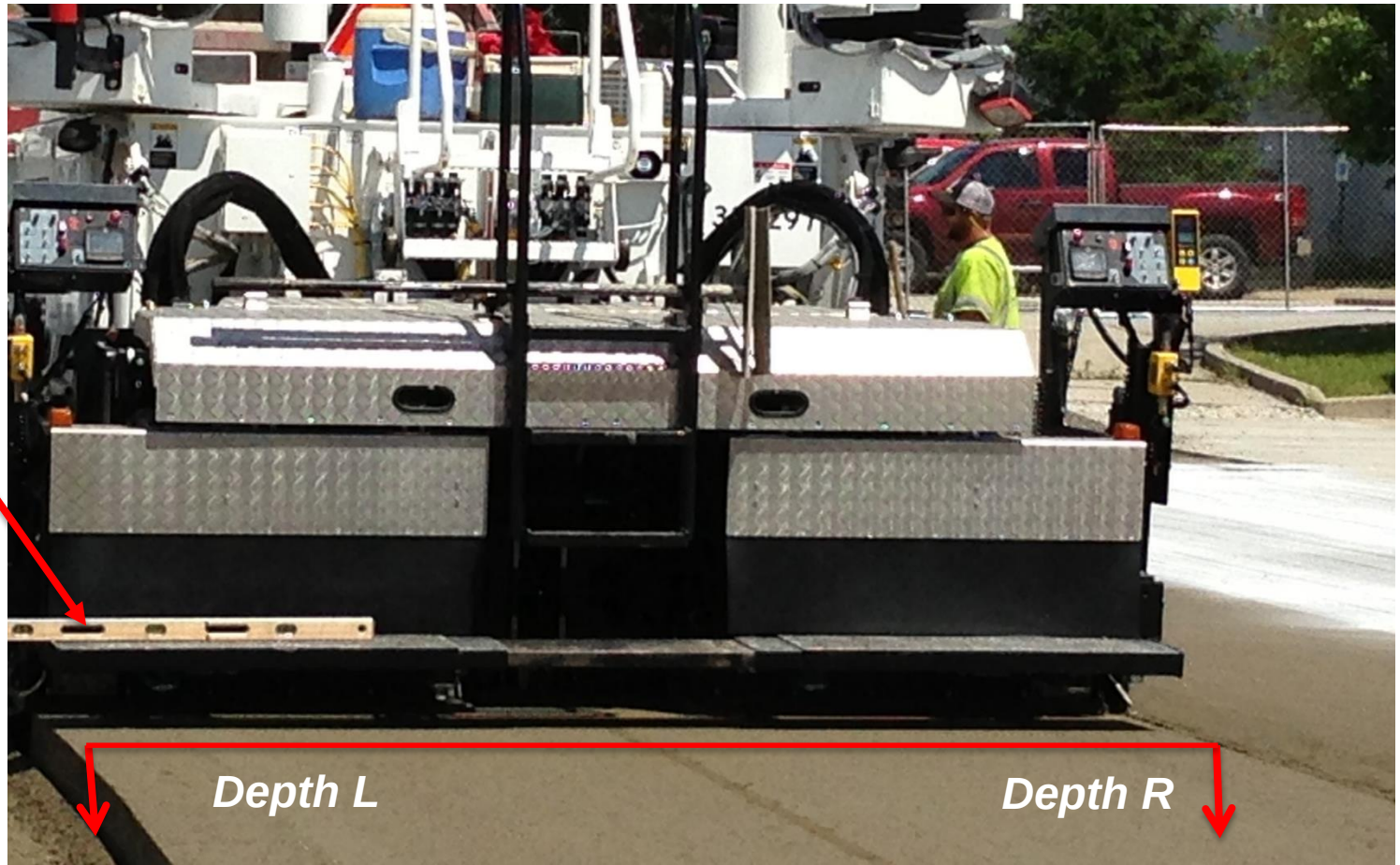
Wide Paving – Eliminate a Joint where Possible:

- ***Up to 32’ wide with Extendable screeds***
- ***Up to 50’ wide with Fix width Screeds – Limited Applications***

Controlling Depth Only (1D) using Physical Reference

- *Grade L and or R*
- *Grade L & Slope R……..or Grade R and Slope L*

Cross Slope



String line erected to used as Reference for Grade Control – Generally Expensive

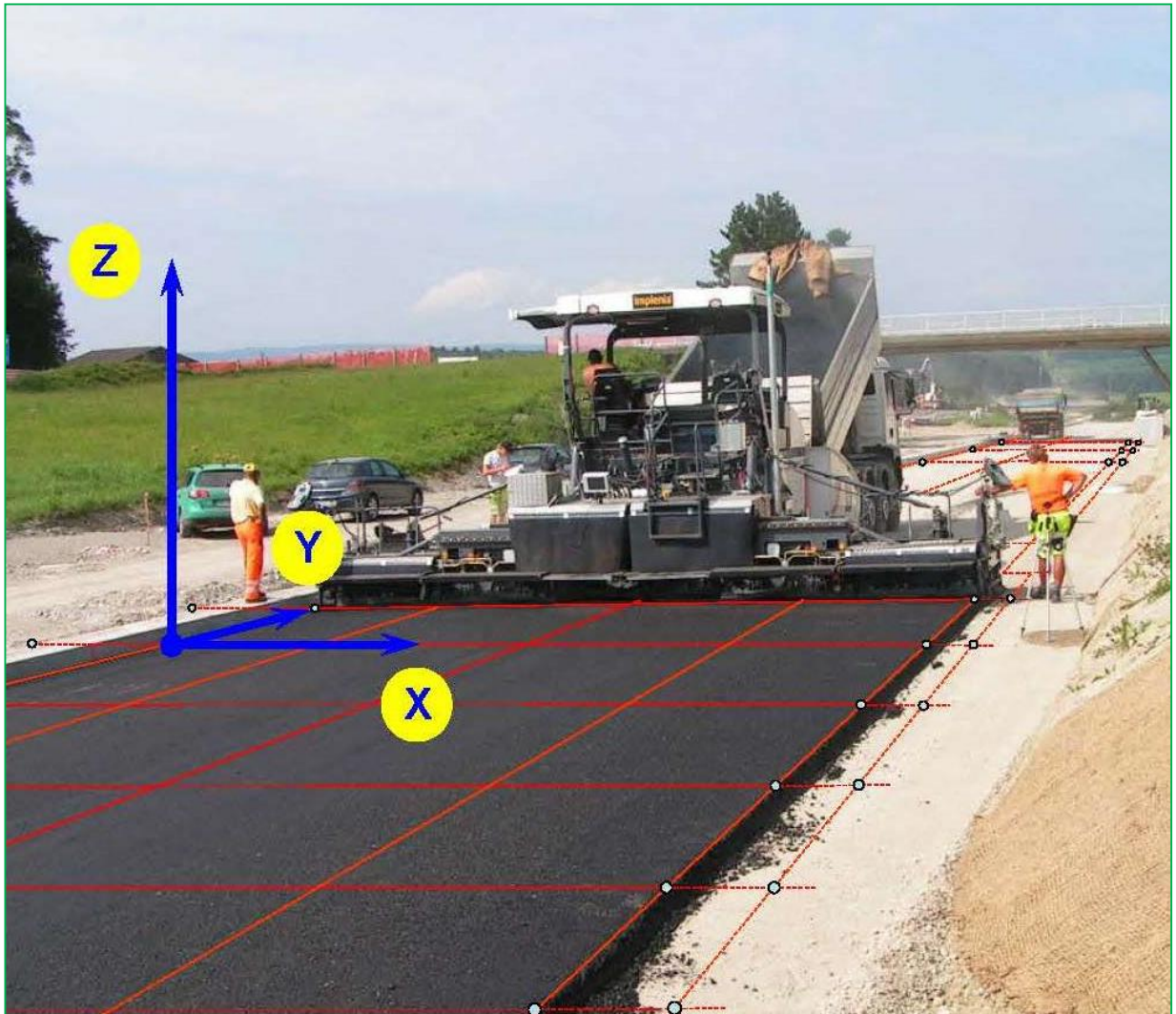
- ***New construction***

String Used as a Physical Reference

1 D Paving following Physical Reference: Controlling Depth LH & RH

- *Using 2 Averaging Ski*

3D Positioning – 1, 2 & 3D Paving



3D Positioning……. instead of Physical reference

- *No Physical Reference Required*
- *Multiple Equipment uses the same Data*

What is Required??

1. ***3 D Coordinates as Reference***
2. ***Positioning Systems***
2. ***Machine Controls***

Positioning Systems - Leica, Trimble or Topcon

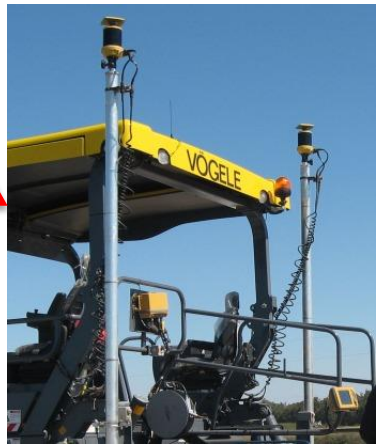
Machine Controls – Depends on whose Positioning System is used

- ***Vogele Machine Controls for Steering, Width & Depth control***

Leica

Vogele

Trimble



Using 3D Positioning on RCC Base for Slipform Concrete:

- ***Controlling Grade…..Screed Width…..and Direction (Steering)***
  - ***No Expensive String line for Steering or Grade reference required***

Using 3D Positioning on Runways:

- ***Controlling Grade……., maybe width…..Direction usually straight***

5 Mins. for Questions