# HMA Paving Operations 2023 Yield Calculations 

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\begin{aligned}
& \text { Plan Quantity Check of HMA Mixture. } \quad 41,577-15,842=25,735^{\prime} \\
& \text { POE } 415+77 \text { POB } 158+42 \quad \text { Sta } 329+27.22 \text { Back }=\text { Sta } 337+26.05 \text { Ahead } \\
& \text { Station Equation } \\
& 33,726.05-32,927.22=798.83^{\prime} \\
& \text { Length of Paving }=25735-798.83=24,936.17^{\prime} \\
& \text { Proposed plan width from typical plan section. } \\
& 11+11+3+3+0.5+0.5=29^{\prime} \\
& \text { Calculate Area in Syds } 24936.17 \times 29 / 9=80,350 \text { Syds } \\
& \text { Plan application rate } 1.5^{\prime \prime}=165 \mathrm{lbs} / \text { Syd } \\
& \text { Calculate proposed plan quantity } \\
& 80,350 \text { Syds X } 165 \mathrm{lbs} / \text { Syd } / 2000 \mathrm{lbs} / \text { ton }=6629 \text { tons } \\
& \text { Project plan quantity of HMA } 5 E 3=7437 \text { tons } \\
& 808 \text { tons or } 12 \% \text { extra }
\end{aligned}
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\begin{aligned}
& \text { Calculating length of paving } \\
& \text { Plan application } 165 \mathrm{lbs} / \text { Syd }\left(1.5^{\prime \prime}\right) \\
& \text { Paving Width } 15^{\prime} \\
& \text { How many feet will } 45 \text { tons cover? } \\
& \text { Convert tons to pounds } \\
& 45 \text { tons } X 2000 \mathrm{lbs} / \text { ton }=90,000 \mathrm{lbs} \\
& \text { Calculate Area covered by } 90,000 \mathrm{lbs} \text { at } 165 \mathrm{lbs} / \text { Syd application rate. } \\
& 90,000 \mathrm{lbs} / 165 \mathrm{lbs} / \text { Syd }=545 \mathrm{Syds} \\
& \text { Convert area to } \mathrm{Sft} \\
& 545 \text { Syds } \mathrm{X} 9 \mathrm{Sft} / \mathrm{Syd}=4905 \mathrm{Sft} \\
& \text { Calculate length paved } 4905 \mathrm{Sft} / 15^{\prime}=327^{\prime} \\
& 45 \text { tons paved at a rate of } 165 \mathrm{lbs} / \mathrm{Syd}, 15^{\prime} \text { wide should go } 327^{\prime} \text {. } \\
& 327^{\prime} / 45 \text { tons = } 7.27^{\prime} / \text { ton }
\end{aligned}
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Calculating Yield on the first pass with a tapered joint.
$87+25$ to $90+15$
Width = $12^{\prime}$ lane
Taper joint = 1.5'
44.35 tons placed

What is your yield?

Calculate Length $9015-8725=290^{\prime}$
Calculate Width (1.5 / 2) $+12=12.75^{\prime}$
Calculate area in Syds 12.75' X 290' / 9 Sft/Syd = 411 Syds
Convert tons to pounds 44.35 tons $\times 2000 \mathrm{lbs} /$ ton $=88,700 \mathrm{lbs}$
Calculate Yield 88,700 lbs / 411 Syds = $216 \mathrm{lbs} /$ Syd

Ticket for the last load of the day $=32.84$ tons
150 ' remaining to pave.
Width $=12^{\prime}$
Previous load yielded 168 lbs/Syd.
How many tons should be remaining after paving is complete to be returned for nonpayment?

Calculate area in Syds 150 X 12 / $9=200$ Syds
Calculate required mix in pounds 200 Syds X $168 \mathrm{lbs} /$ Syd $=33,600 \mathrm{lbs}$
Convert pounds to tons
$33,600 \mathrm{lbs} / 2000 \mathrm{lbs} /$ ton $=16.8$ tons needed to complete paving.
32.84 tons -16.8 tons $=16$ tons to be returned.

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## Yield for the day

Accumulation of tickets for the day $=1090.61$ tons
Start of paving station $86+35$
Night joint station 157+79
Paving width $12{ }^{\prime}$
Calculate Length 15779-8635 $=7144^{\prime}$
Calculate area paved in Syds 7144' X 12' / $9=9,525$ Syds
Convert tons for the day to pounds $1090.61 \times 2000=2,181,220 \mathrm{lbs}$
Calculate Yield 2,181,220 lbs / 9525Syds = $229 \mathrm{lbs} /$ Syd
Plan application rate is $220 \mathrm{lbs} / \mathrm{Syd}$, how many tons over plan for the day?
$9 \mathrm{lbs} /$ Syd X 9525 Syds $=85,725 \mathrm{lbs}$
$85,725 \mathrm{lbs} / 2000 \mathrm{lbs} /$ ton $=42.86$ tons over or $4 \%$ over.

Paving 1.7 miles at $165 \mathrm{lbs} /$ Syd. Contractor is over paving at CL and planning to mill out. MDOT will pay for $2^{\prime \prime}$ over but contractor is paving 6 " beyond CL . What is the deduct?
4"/12=0.33'
$1.7 \mathrm{miles} \times 5280^{\prime} / \mathrm{mile}=8976^{\prime}$
8976' x 0.33'/9 = 329.12 Syds
329.12 Syds x $165 \mathrm{lbs} / \mathrm{Syd}=54304.80 \mathrm{lbs}$
$54304.8 \mathrm{lbs} / 2000 \mathrm{lbs} /$ ton $=27.15$ tons

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## Number of Detail 7 joint repairs?

5.1 miles, 2-12' lanes $11,016^{\prime}$ Payt Joint and Crack Rear, Pet 7
$11,016^{\prime} / 24^{\prime}=459$ Full width joints $\quad 459 / 5.1$ miles $=90$ joints $/ m i l e$
$5280^{\prime} /$ mile $/ 90=59^{\prime}$ approximate joint spacing.
At a width of $2^{\prime}$ and a depth of $5^{\prime \prime}$ how much hand patch for each joint?
$\left(2^{\prime} \times 24^{\prime}\right) / 9=5.33$ Syds $550 \mathrm{lbs} /$ Kyd $\times 5.33=2,933.33 \mathrm{lbs}$
$2933.33 \mathrm{lbs} / 2000 \mathrm{lbs} /$ ton $=1.47$ tons of Hand Patch/joint
Hand Patch for the project? 1.47 tons X $459=675$ tons of Hand Patch

Hand Patch required for a day's production of 2 miles, 1 lane?
$\left(2^{\prime} \times 12^{\prime}\right) / 9=2.67 \mathrm{Syds}$
2.67 Syds X 550lbs/Syd = 1468.5 lbs $1468.5 \mathrm{lbs} / 2000 \mathrm{lbs} /$ ton $=0.73$ tons
0.73 tons X $180=131.40$ tons for the day

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Calculate the speed of the paver to match the delivery of the mix for continuous
paving. Paving 12' lane at an application rate of 330lbs/Syd. The contractor can produce and deliver 300 tons/hour.
2000lbs/ton / 330lbs/Syd \(=6.06 S y d s /\) ton
6.06Syds/ton X 9Sft/Syd = 54.54Sft/ton
54.54Sft/ton / 12' = 4.55'/ton
\(4.55^{\prime} /\) ton X 300tons/hour \(=1365^{\prime} /\) hour
\(1365^{\prime} /\) hour \(/ 60\) minutes/hour \(=22.75^{\prime} /\) minute
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\begin{aligned}
& \text { Yield = ? } \\
& \text { W=12' } \\
& \text { L=2000' } \\
& 250 \text { Tons } \\
& 12^{\prime} \times 2000^{\prime} / 9=2666.67 \text { Syds } \\
& 250 \text { tons X } 2000 \mathrm{lbs} / \text { ton }=500,000 \mathrm{lbs} \\
& 500,000 \mathrm{lbs} / 2666.67 \text { Syds = } 187 \mathrm{lbs} / \mathrm{Syd}
\end{aligned}
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Yield=?
W=15'
L=3000'
450 tons
$15^{\prime} \times 3000^{\prime} / 9=5,000$ Syds

450 tons $\times 2000 \mathrm{lbs} /$ ton $=900,000 \mathrm{lbs}$

900,000 lbs / 5,000 Syds = $180 \mathrm{lbs} /$ Syd

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How much mix is needed?
W=12'
L=1000'
$D=2$ "
$12^{\prime} \times 1000^{\prime} / 9=1333.33$ Syds
1333.33 Syds X $220 \mathrm{lbs} /$ Syd $=293,332.6 \mathrm{lbs}$
$293,332.6$ lbs / 2000 lbs/ton = 146.67 tons
What is the minimum gallons of bond coat that should be applied?
$\mathrm{W}=15^{\prime}$
$\mathrm{L}=1500^{\prime}$
Calculate area $15^{\prime} \times 1500^{\prime} / 9=2500$ Syds
Calculate gallons 2500 Syds $\times 0.05 \mathrm{gal} / \mathrm{Syd}=125$ gals

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> What is the minimum gallons of bond coat that should have been applied for the day?
> W=15'
> $L=10,560^{\prime}$
> $\left(15^{\prime} \times 10,560^{\prime}\right) / 9=17,600$ Syds
> 17,600 Syds $\times 0.05$ gals $/$ Syd $=880$ gals

