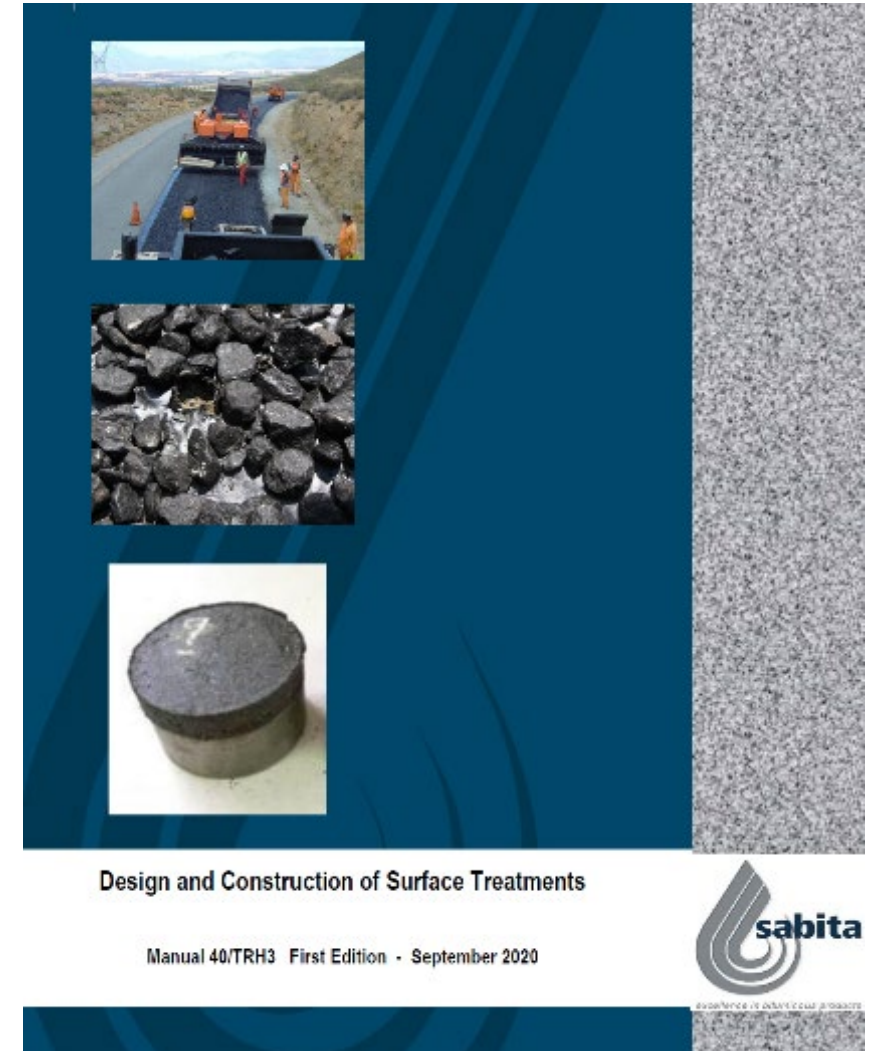


- Part A • General
- Part B • Materials
- Part C • Performance
- Part D • Seal type and binder selection
- Part E • Design
- Part F • Construction
- Part G • Quality assurance
- Part H • Repair of premature failures



- **Equipment**
- **Preparation**
- **Pretreatment**
- **Aggregate management**
- **Trial sections**
- **Weather limitations**
- **Binder application**
- **Aggregate application**
- **Rolling**
- **Brooming and cleaning**
- **Opening to traffic**
- **Slurry mixing and application**
- **Rejuvenation sprays**

# Pretreatment

# Patching

... preparation and pre-treatment





# ETB Patching

... preparation and pre-treatment



# BTB patches covered







# Geotextile Patching









... preparation and pre-treatment



## ... preparation and pre-treatment





# Geotextile patching

- **After rut fill and texture treatment**
- **Only where cracks reflect**



- **Alternative on LVRs**





# Texture treatment





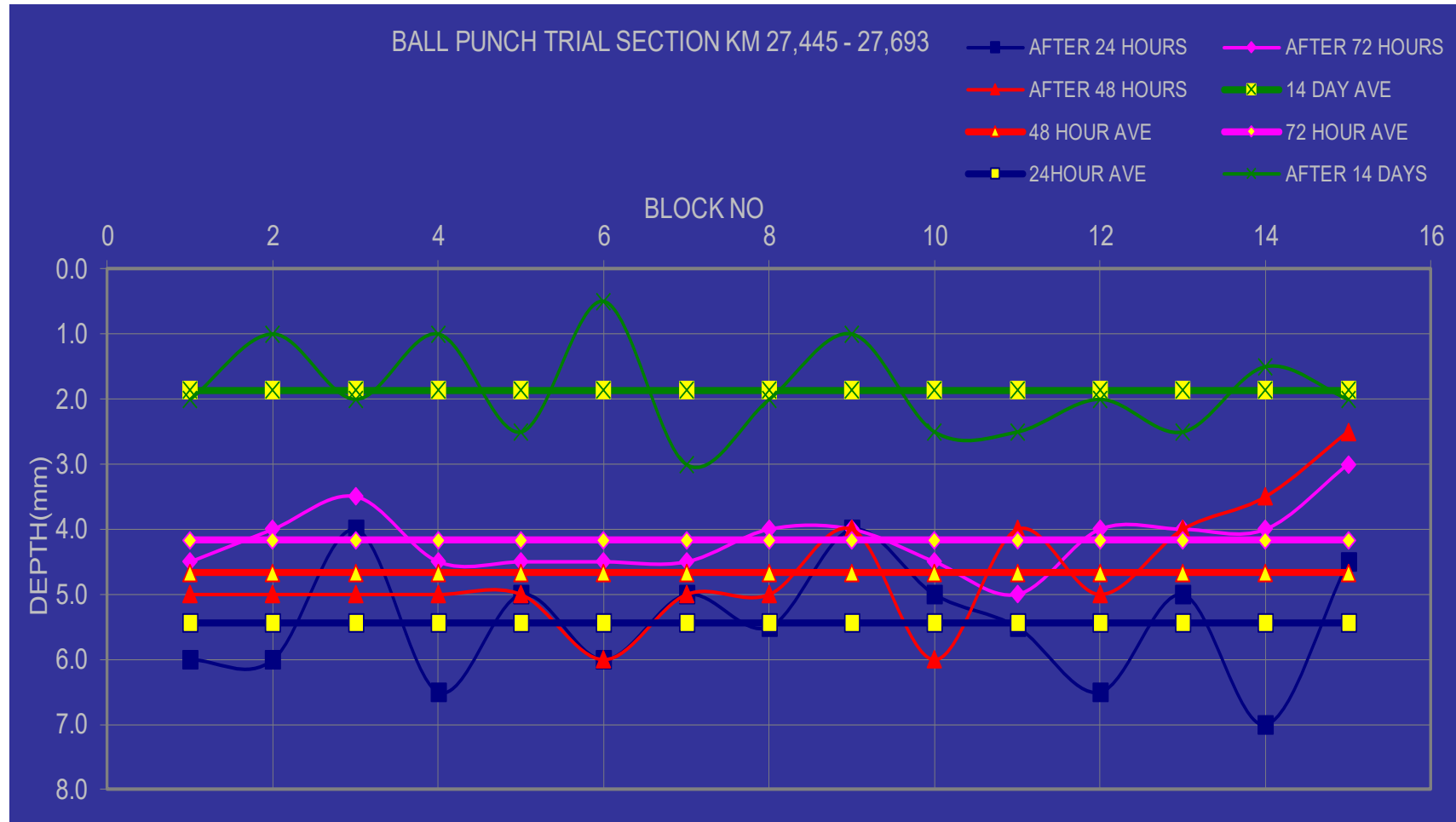
... preparation and pre-treatment



... preparation and pre-treatment

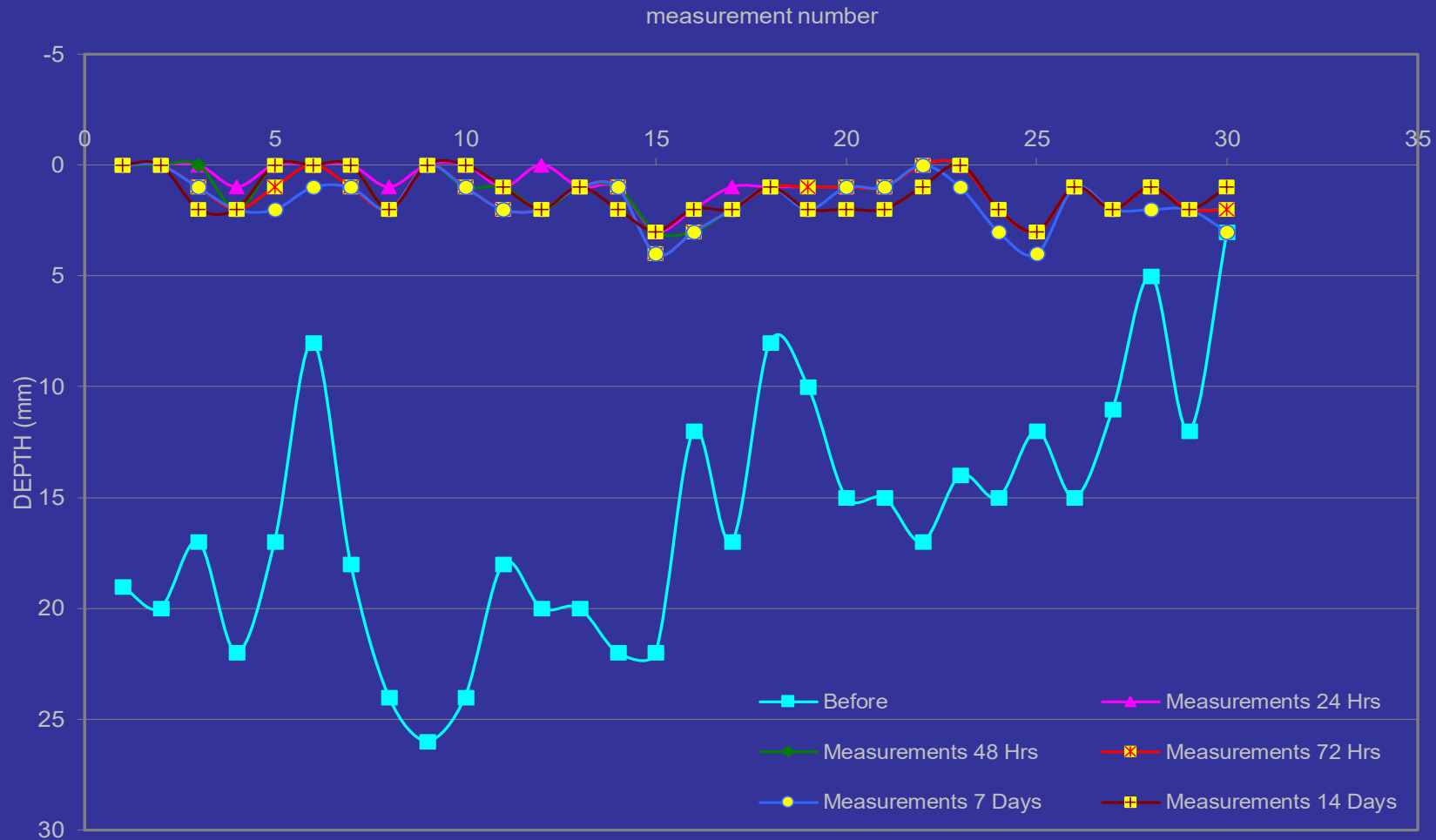


# Ball pen checks on rut fill





# RUT MEASUREMENTS TRIAL SECTION KM 27,445 - 27,693 RHS



# Spray porous old patches





# Process

# Prime coat



# Tack coat



# Chip spreading



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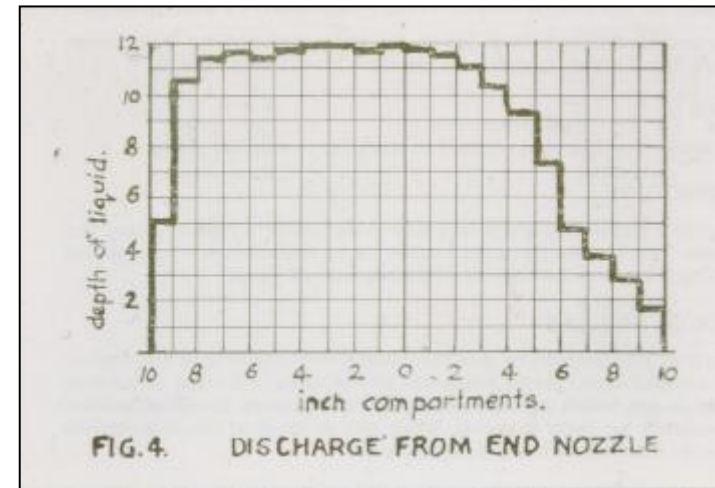
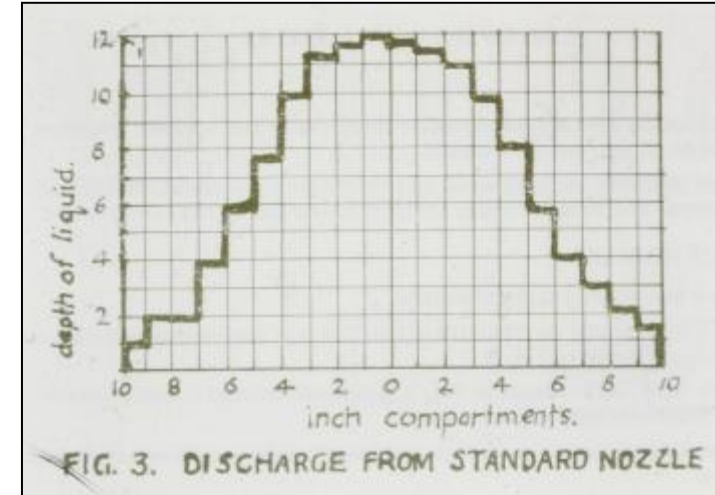
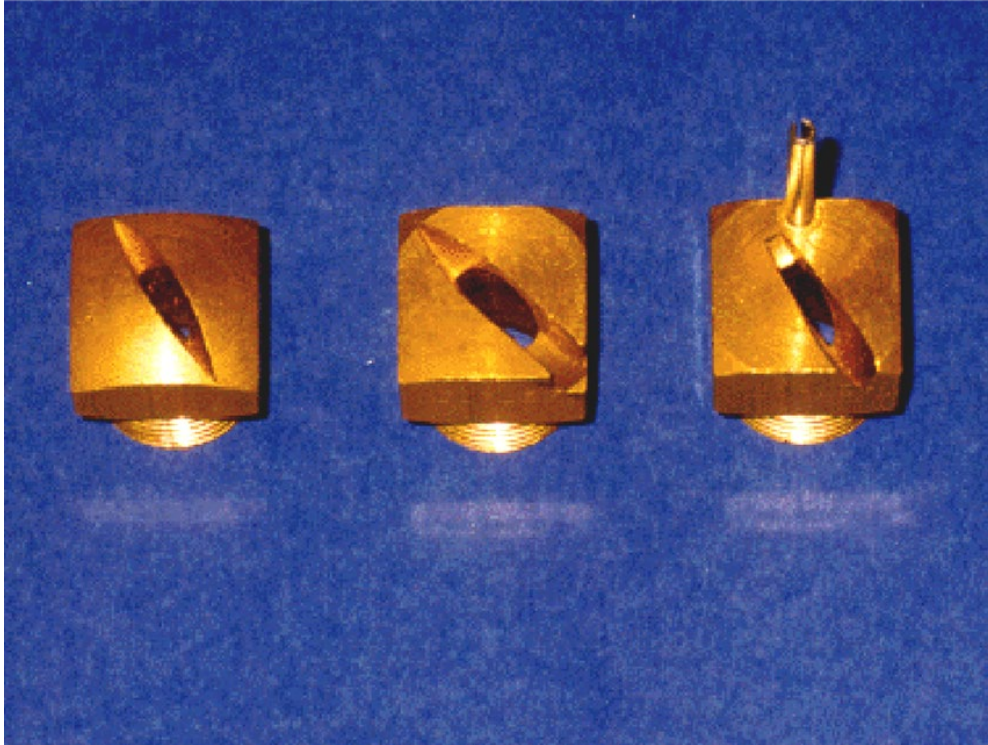






# Spray control









# 'Bakkie' test



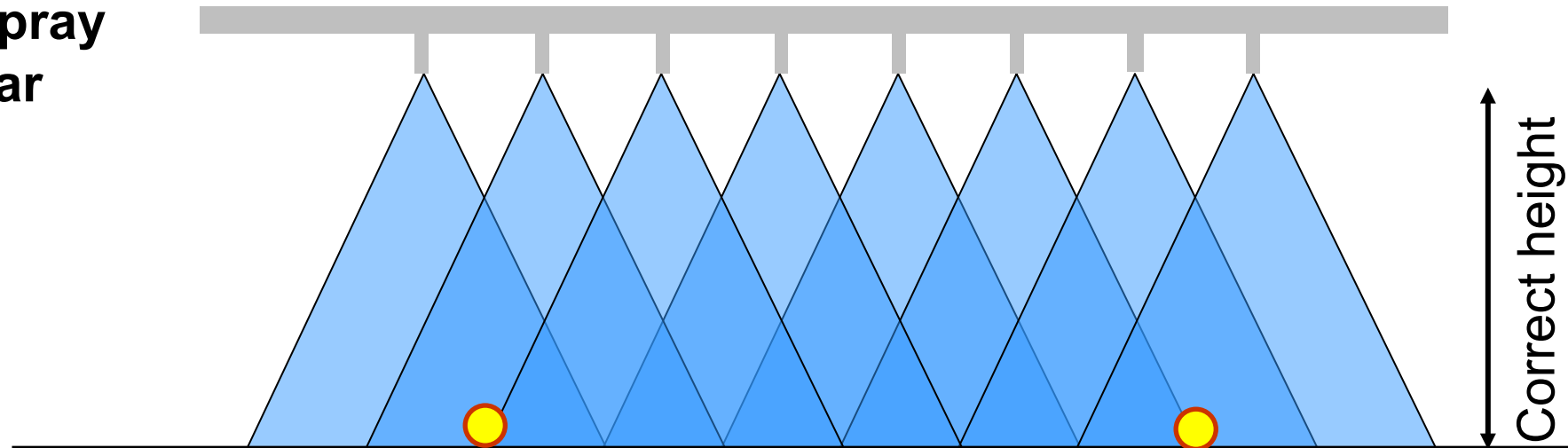
Visc @ spray temp, cSt	Variance, %	Binder type
40 – 100	+ - 5	Penetration Cutback Emulsion
120 – 200	+ - 7	PMB's
2,000 – 3,000	+ - 10	Bitumen rubber



# Equipment checks



Spray  
bar



$1/3$

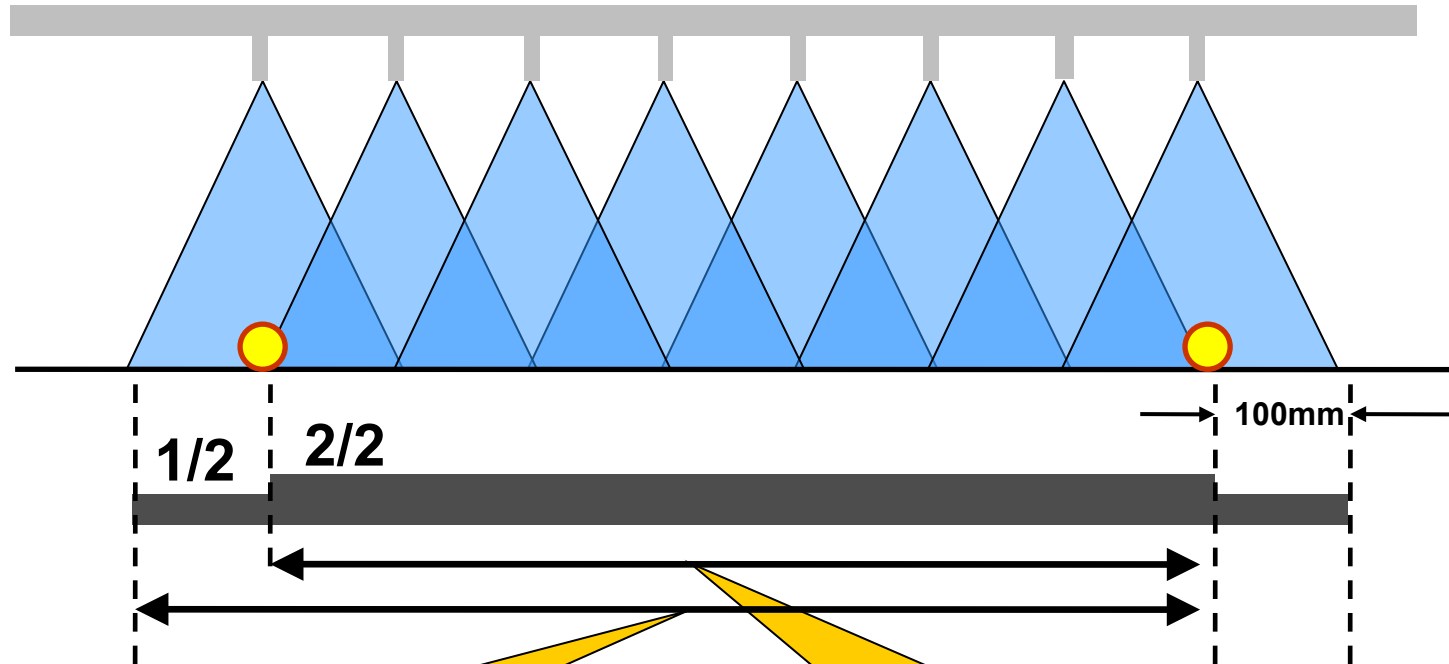
$2/3$

Effective spray width

Uniform Triple overlap

● Possible Stringline positions

Spray  
bar



Correct height

Effective spray width

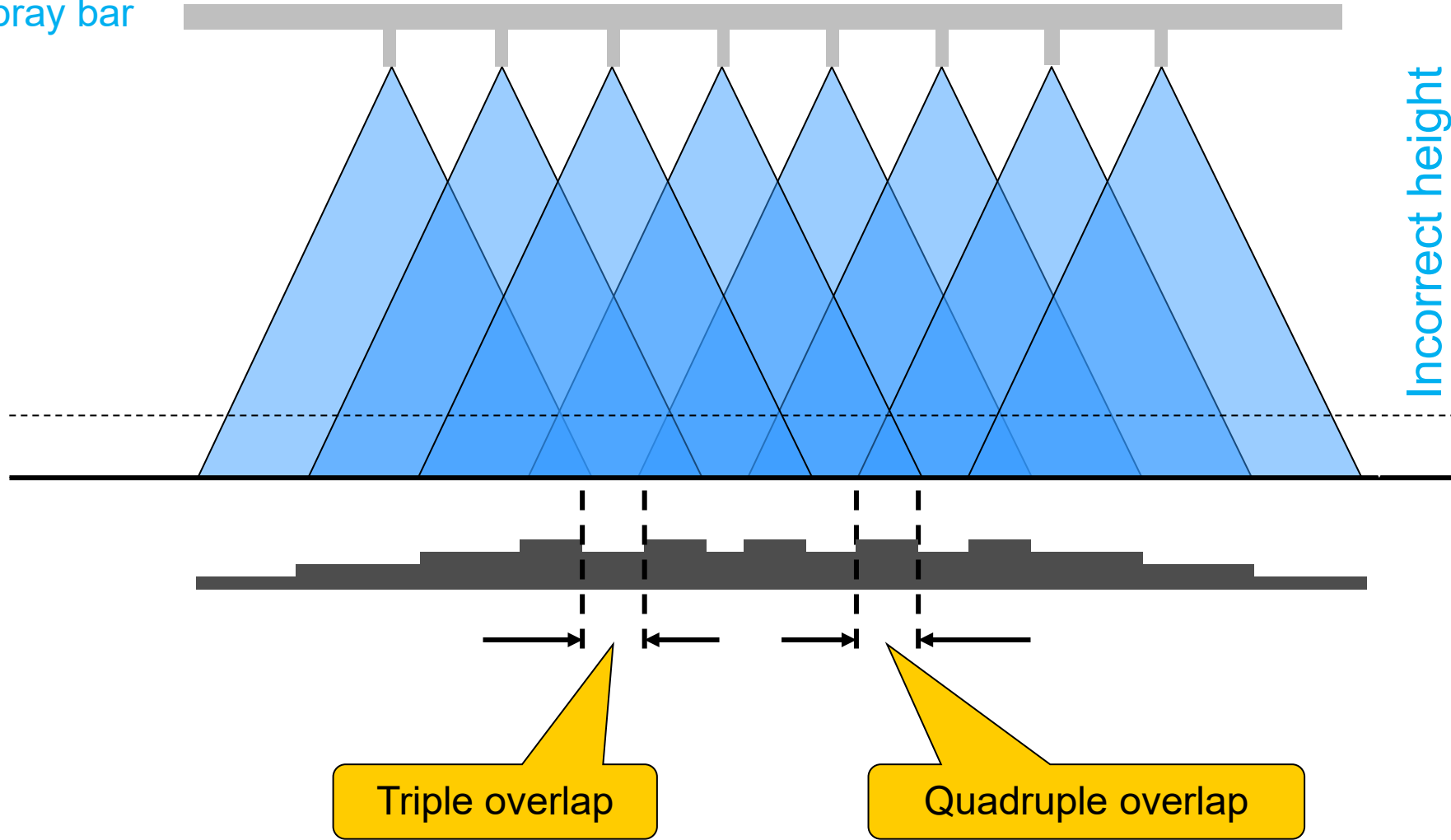
Uniform Double overlap

 Possible Stringline positions

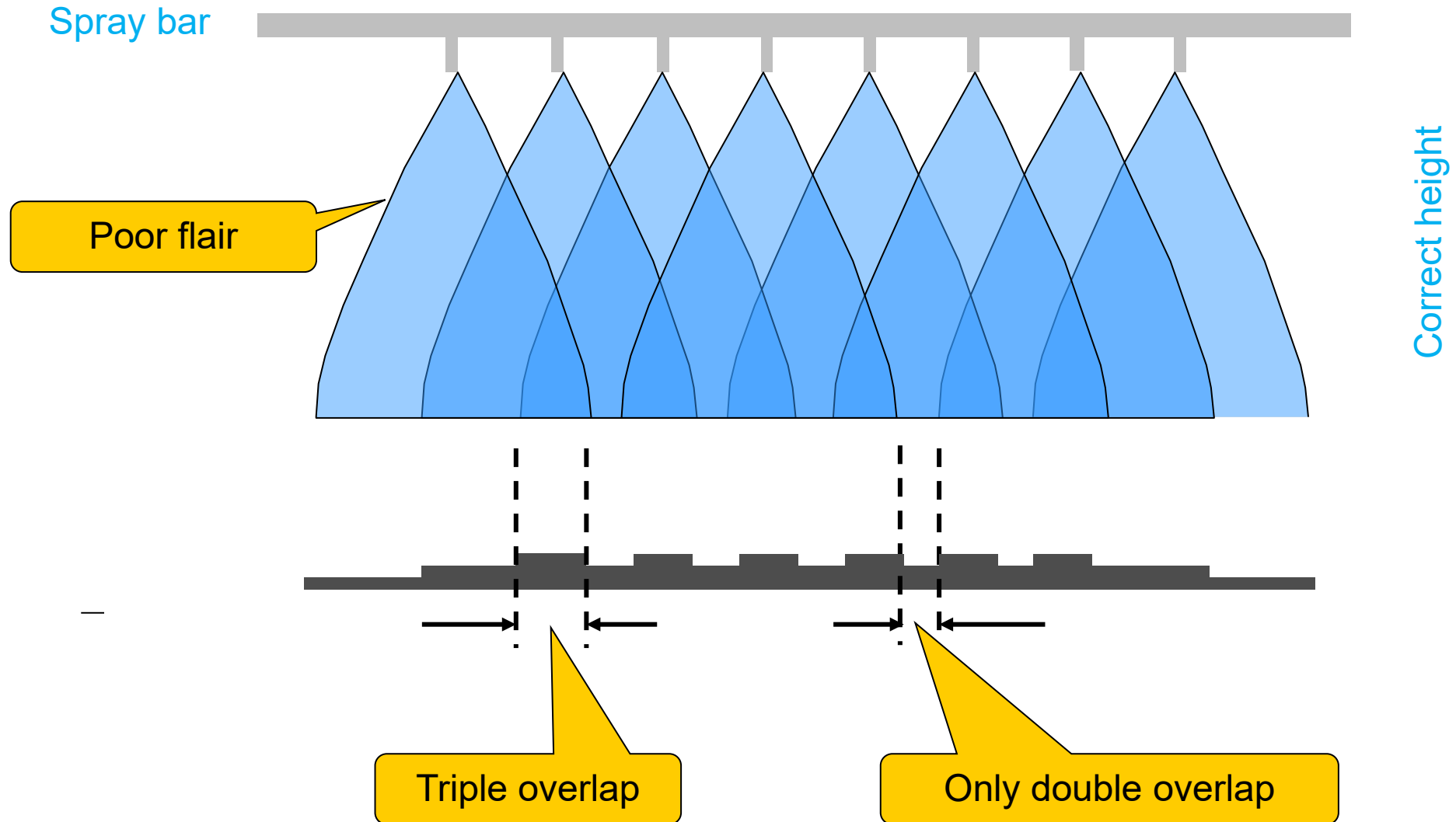


# Binder application

Spray bar

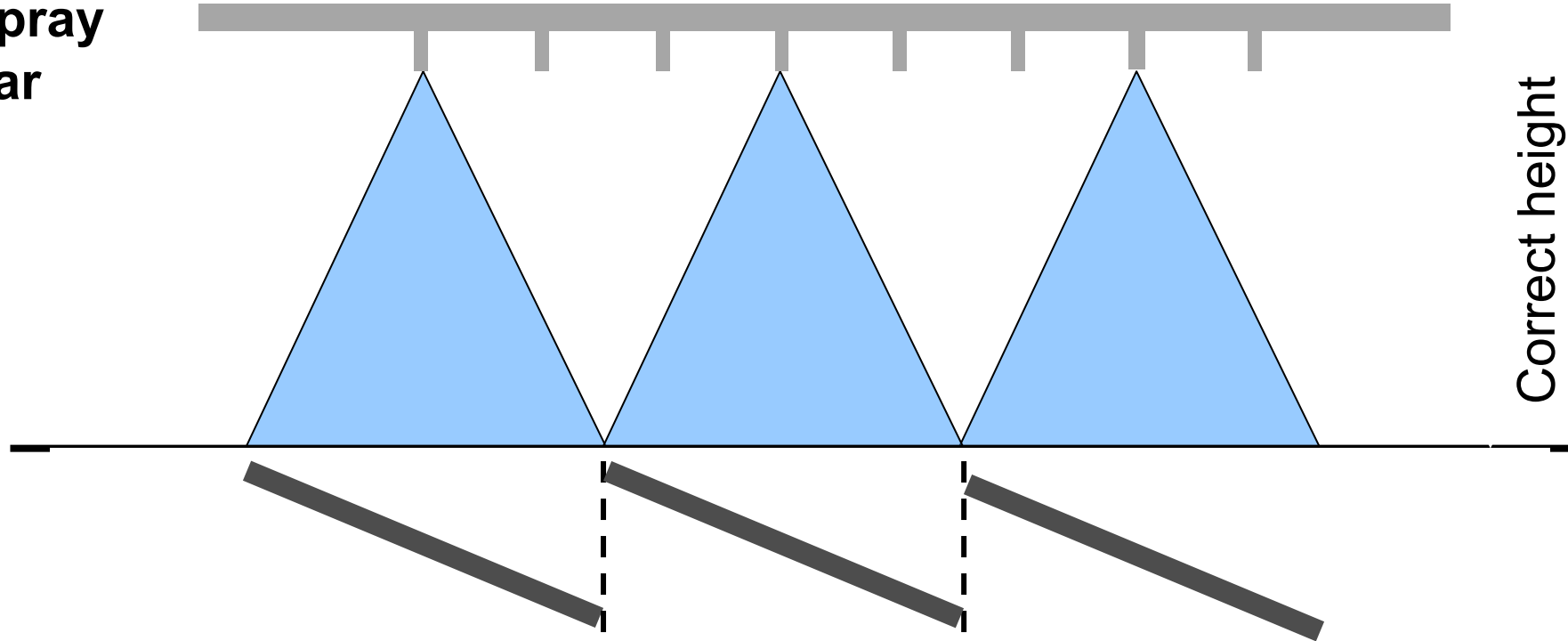


# Binder application



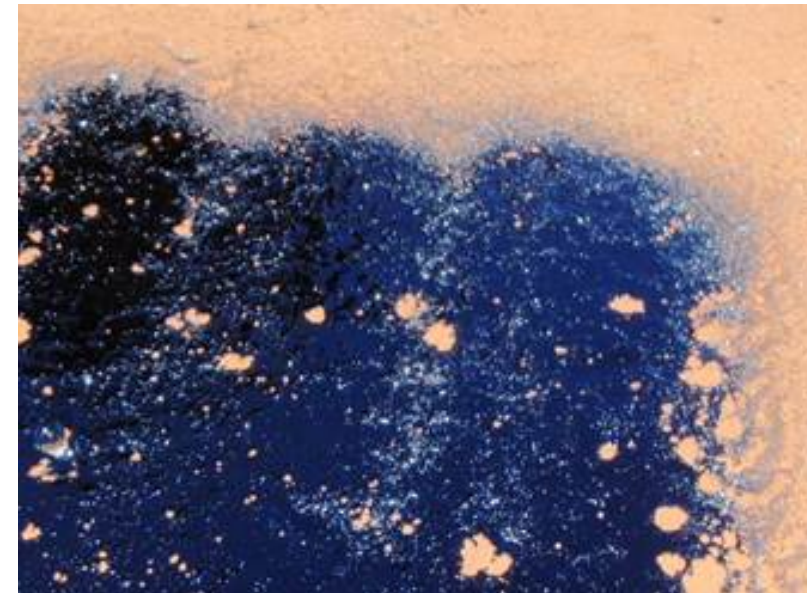
# Check bar height

**Spray  
bar**





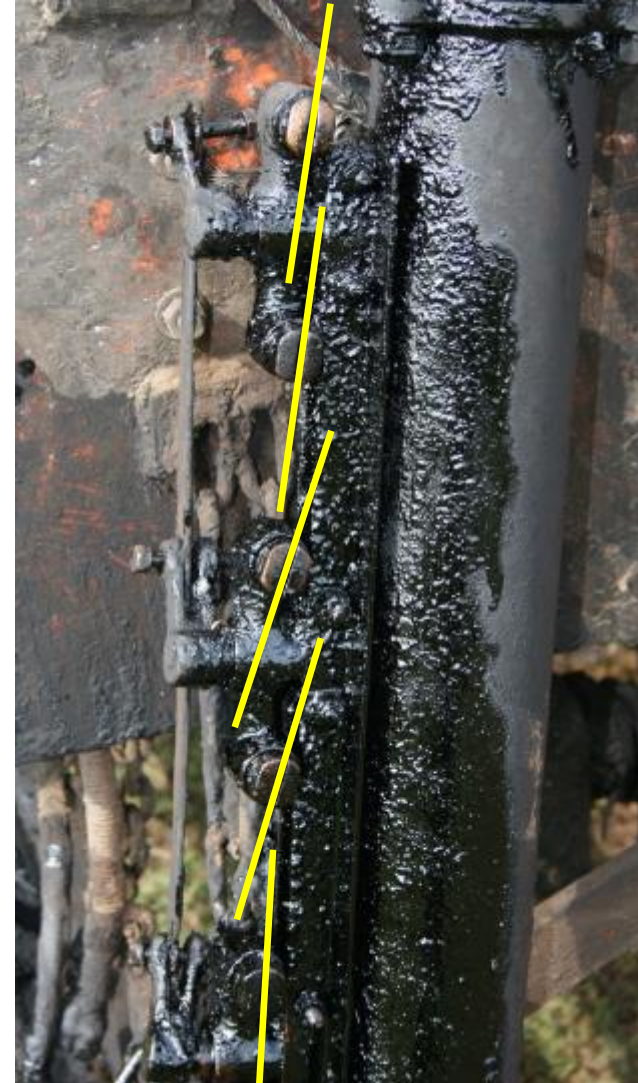
# Effect of Spray bar height



# Nozzle angles

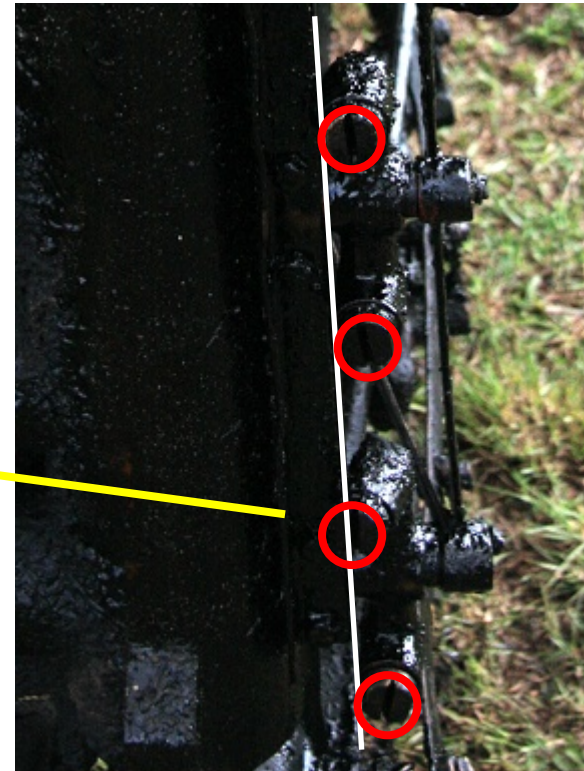


Observed





# Nozzle alignment

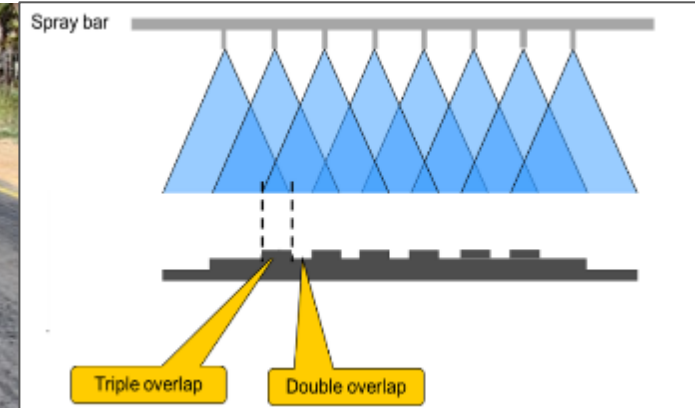


Observed

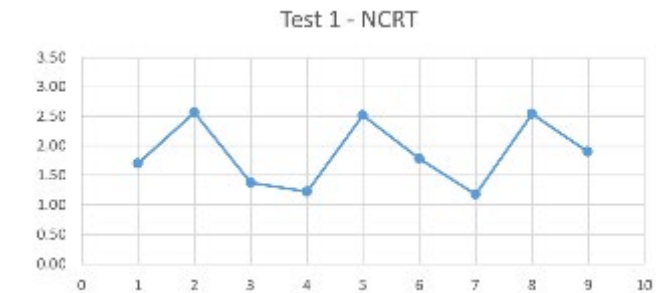
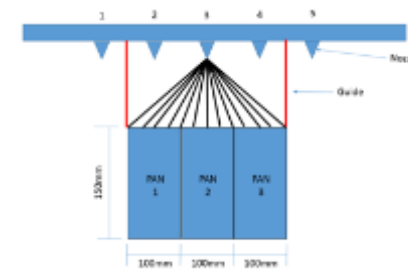
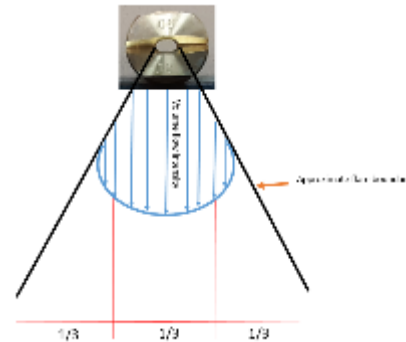


- **Equipment certification**

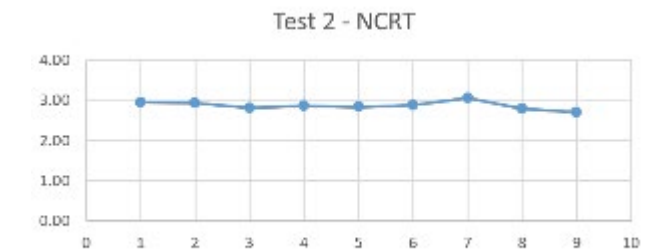
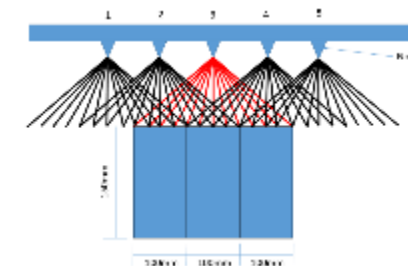
- ❑ Spray flair distribution (SANS 3001-BT25)



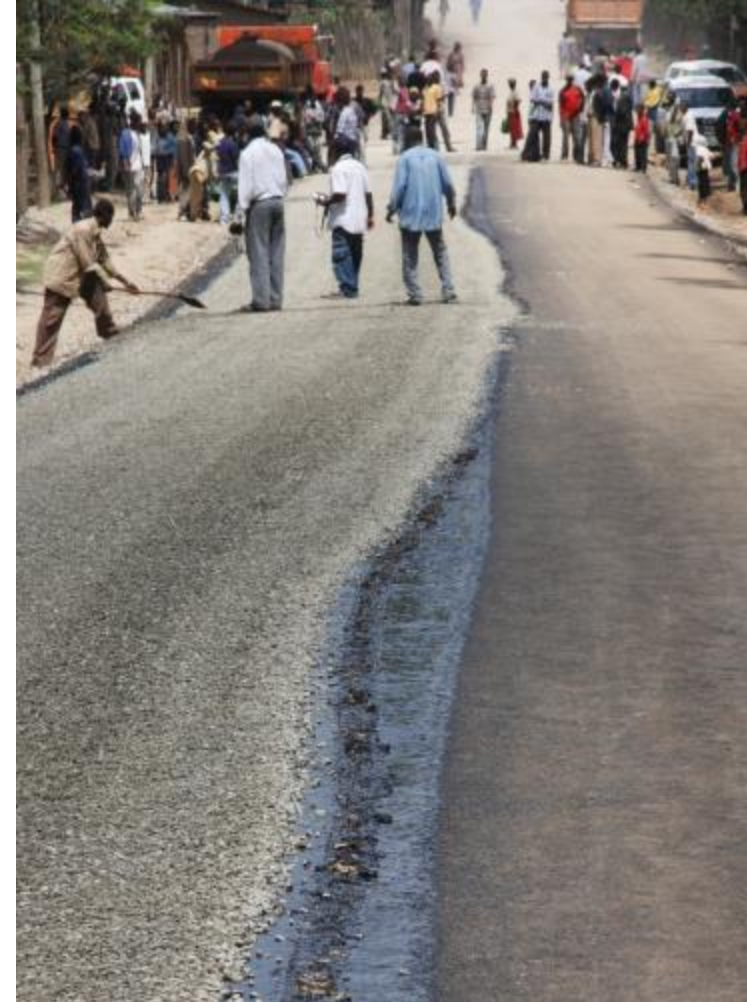
- ❑ Testing completed



- ❑ On-site equipment being finalised



- **Damage caused**
  - ❑ Chip spreader wheel running on bitumen

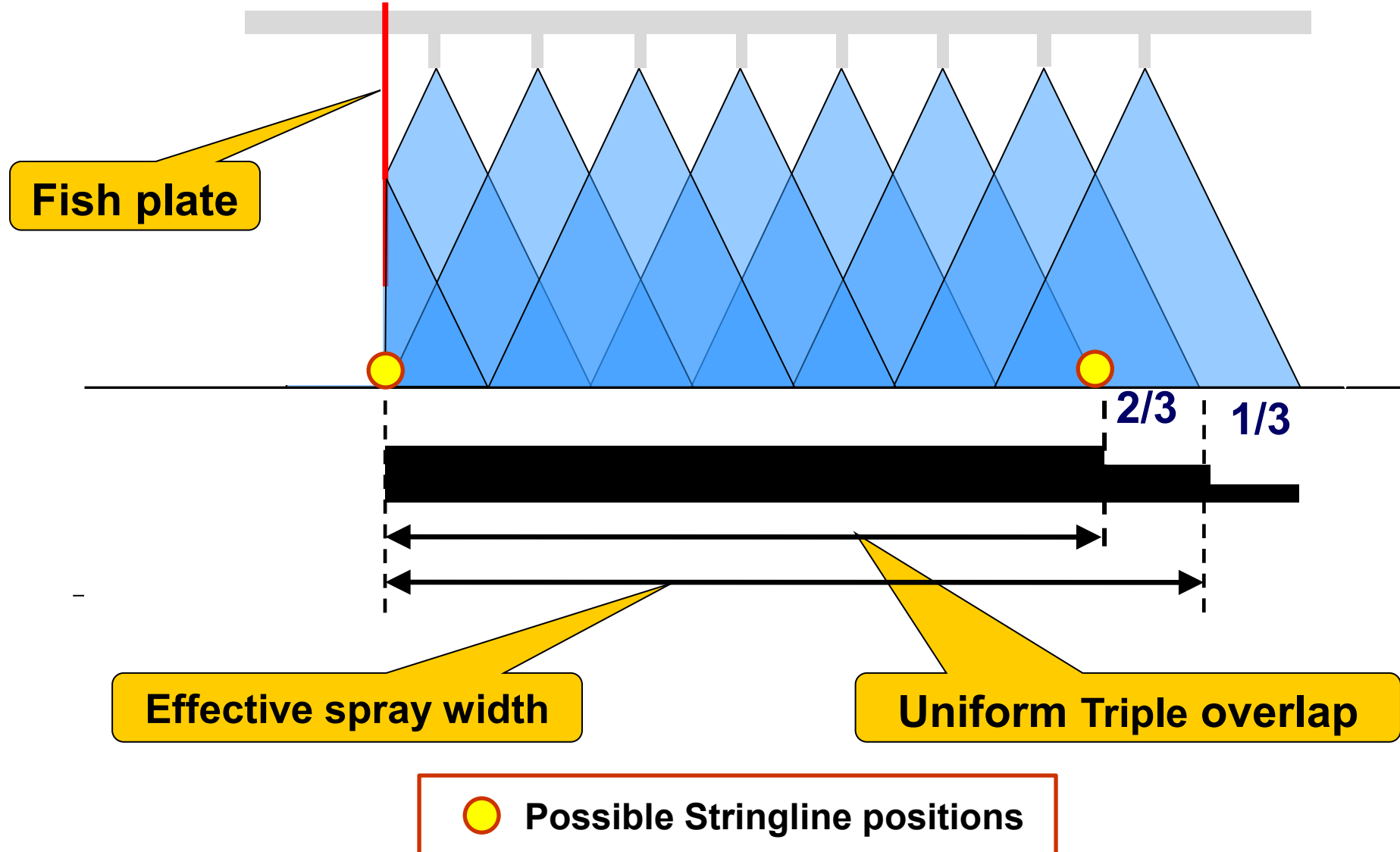


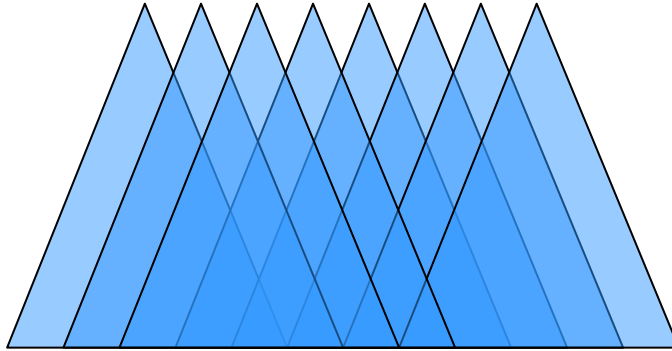
# String line essential





# Binder application





Uniform Triple overlap

Joint overspray  $\frac{4}{3}$



# Aggregate application

Triple overlap



Note: No joints in wheel track/ under yellow line





**Observed**



**Cause**



**Observed**



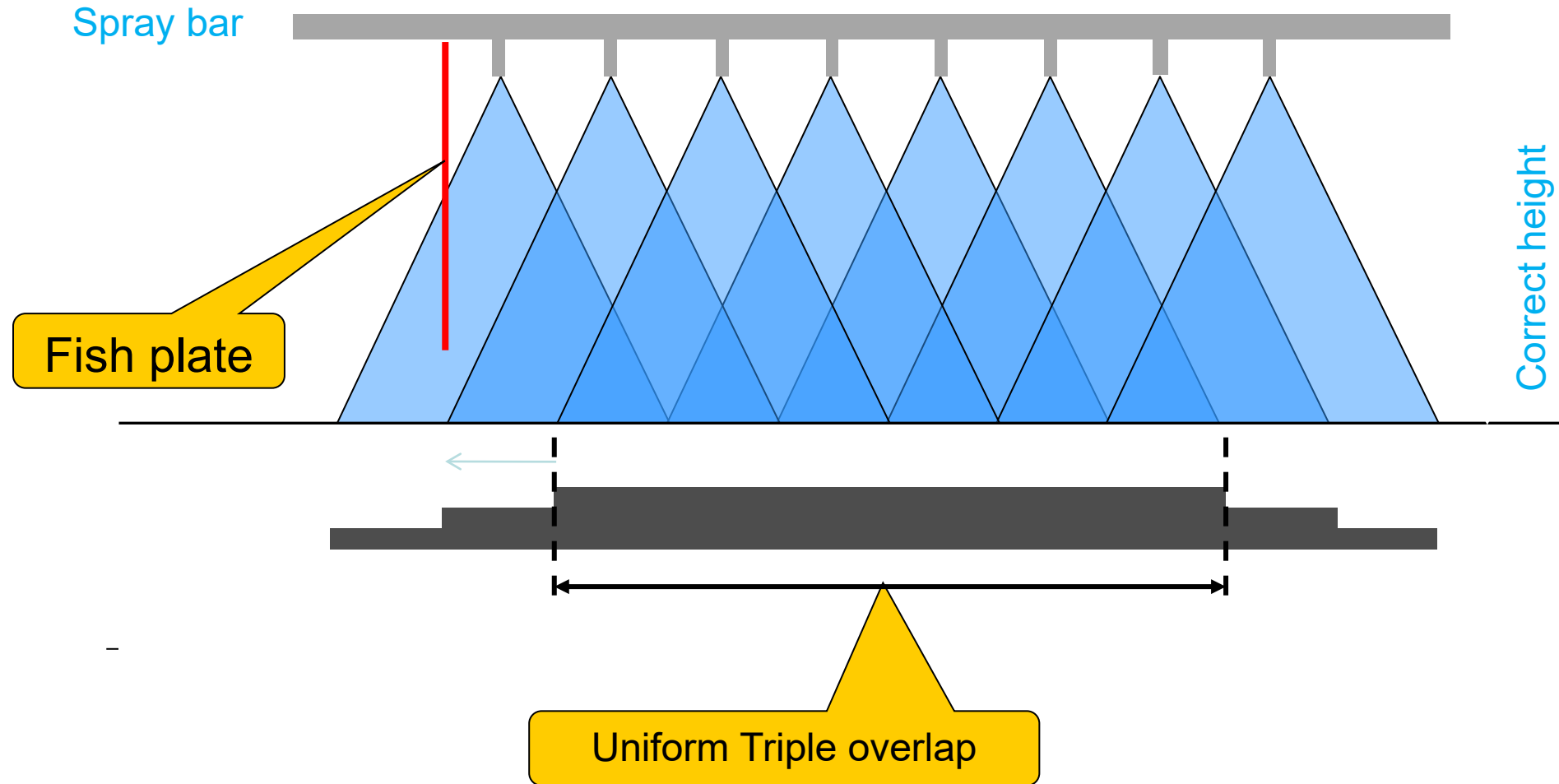
**Recommended**

# Dipstick ??? OHS

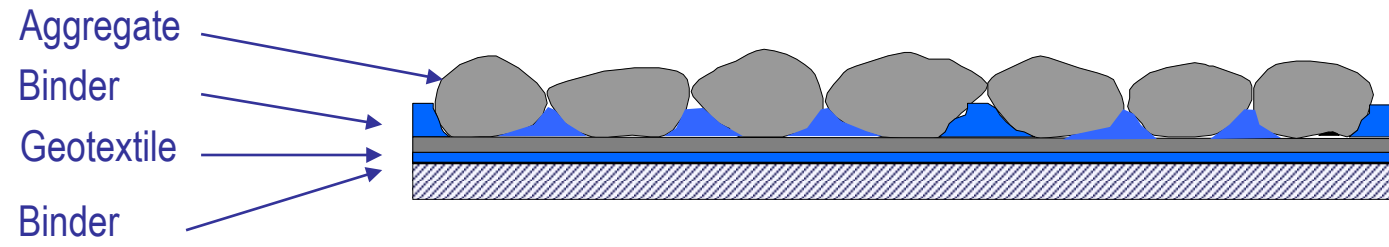




# Binder application



# Geotextile seals



# Geotextile placement







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# Aggregate application

# Chip Spreader



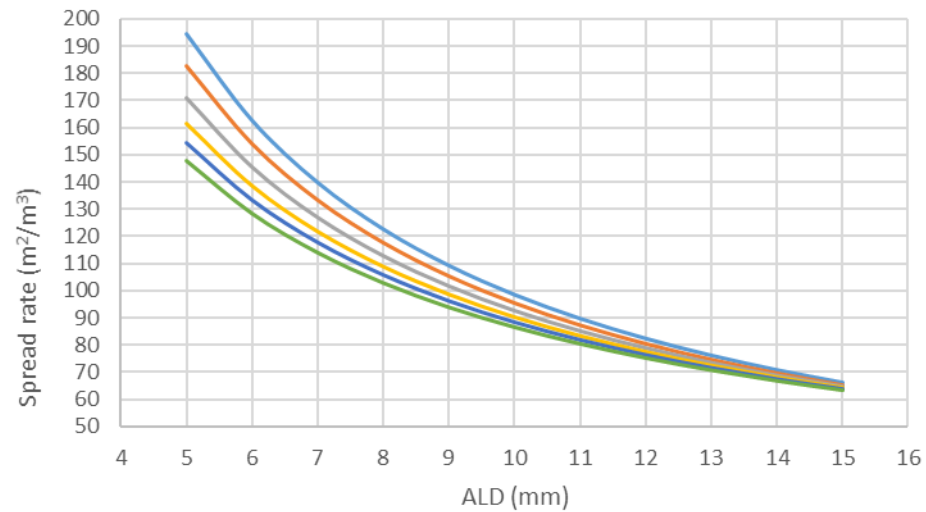


Dust



# Aggregate spread rates

Approximate aggregate spread rate



- Unmodified binder Single seal, all Cape seals & 2nd layer of Double seals 1 1/2 configuration
- S-E1 & SC-E1 Single seals
- S-E2, SC-E2 and S-R2 Single seals
- 1st layer Double seals - 1 1/2 configuration
- 1st layer Full Double, Split seals, Stone +1/3, Stone + Sand seals and 2nd layer of full double seals
- S-R1 Single seals







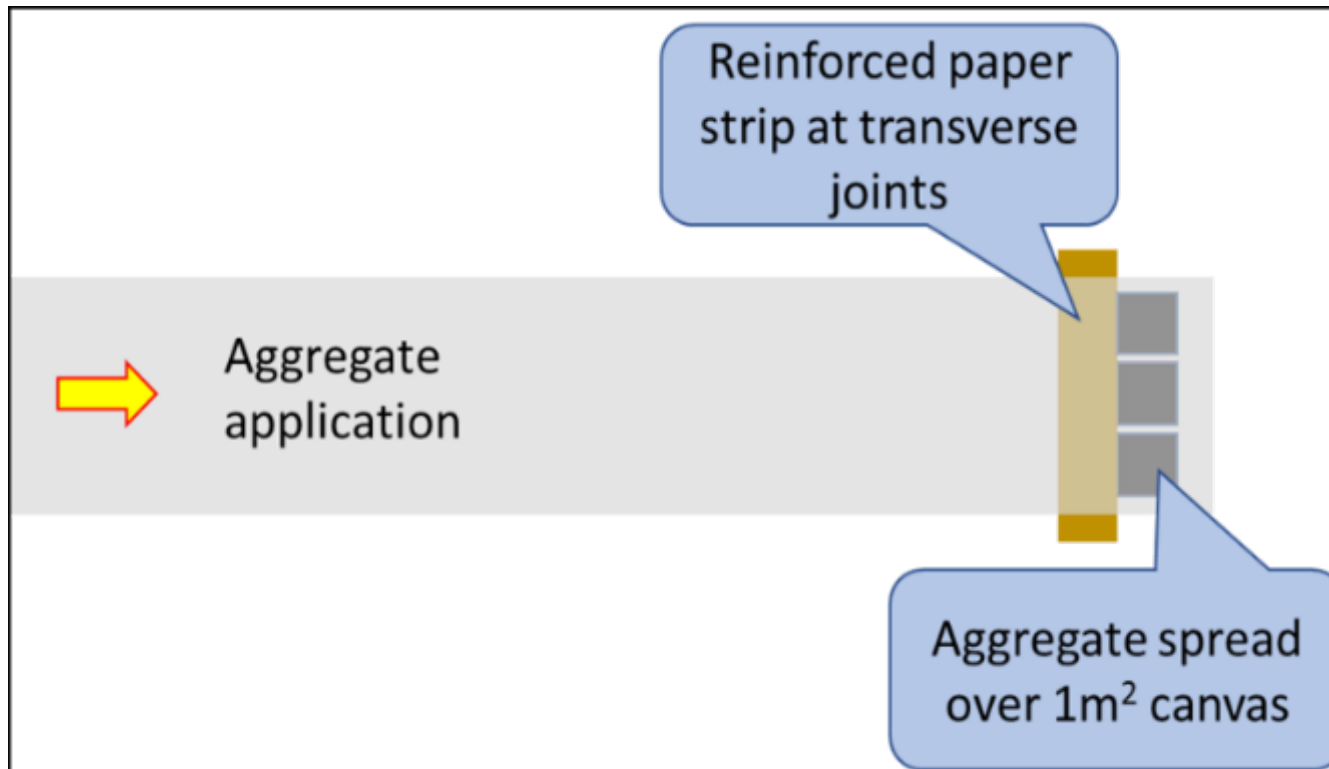


# Aggregate spread

- Same seal and binder application
- Different aggregate spread rates



# Spread rate check



... Heavy steel – (8 – 12 ton)







... Pneumatics – (20 – 27 ton)



- Full cover within 5 min
- Slow 5-8km/h





# Aggregate matrix – traffic compaction



After rolling

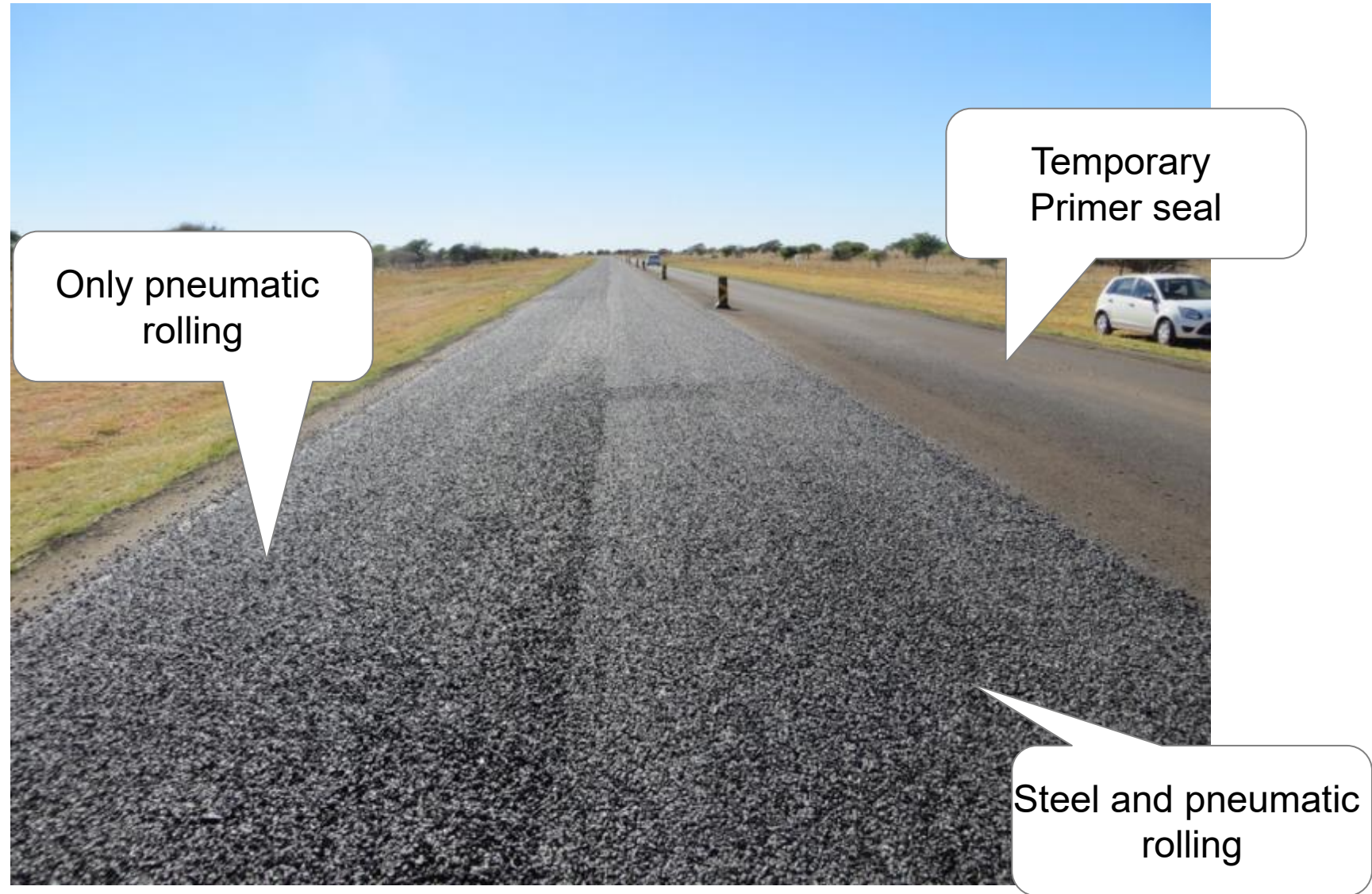


After traffic compaction





# Effect of rolling on texture



Only pneumatic  
rolling

Temporary  
Primer seal

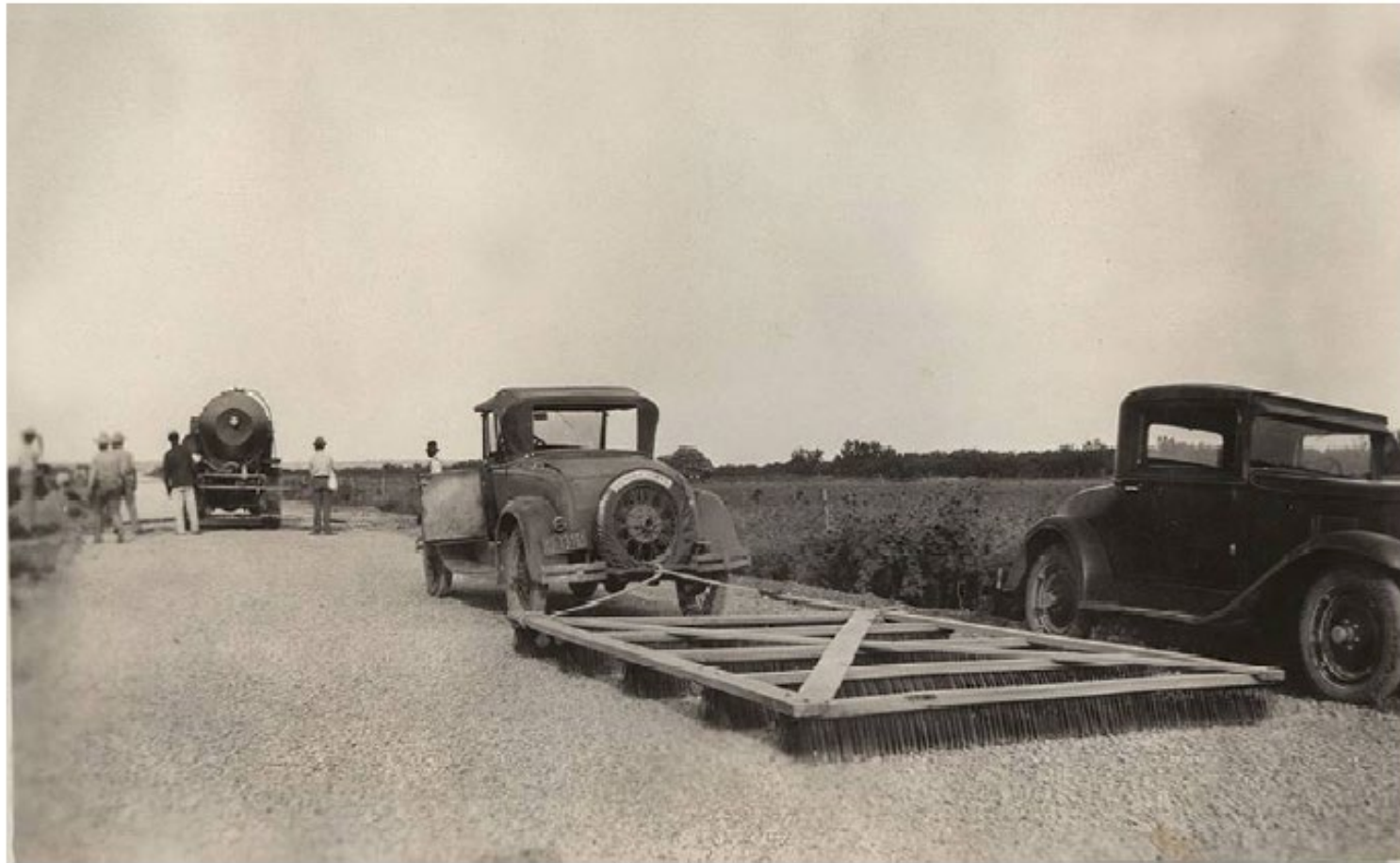
Steel and pneumatic  
rolling

# Drag Broom



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Sweeper

# Rotary broom



# Wear on broom

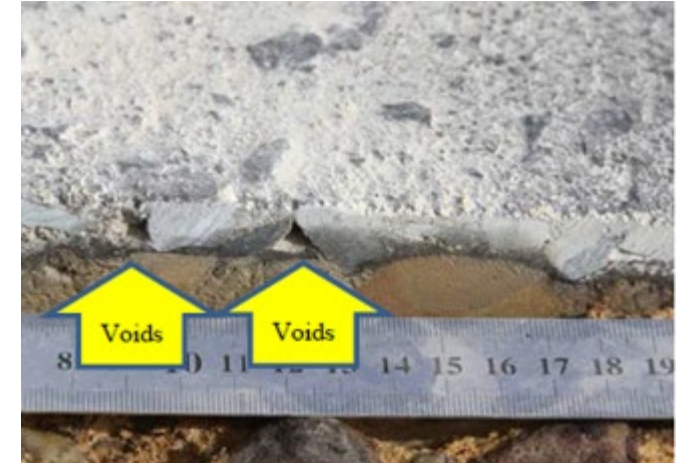




# Vacuum broom



- Aggregate spread
- Slurry problems





# Slurry component



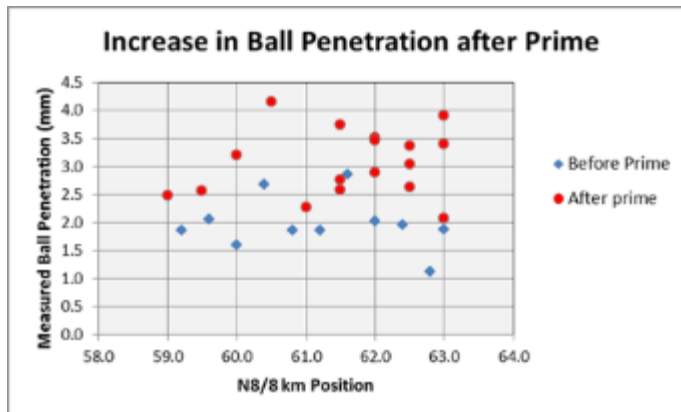
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- S-E2 (SBS)



- Solvents



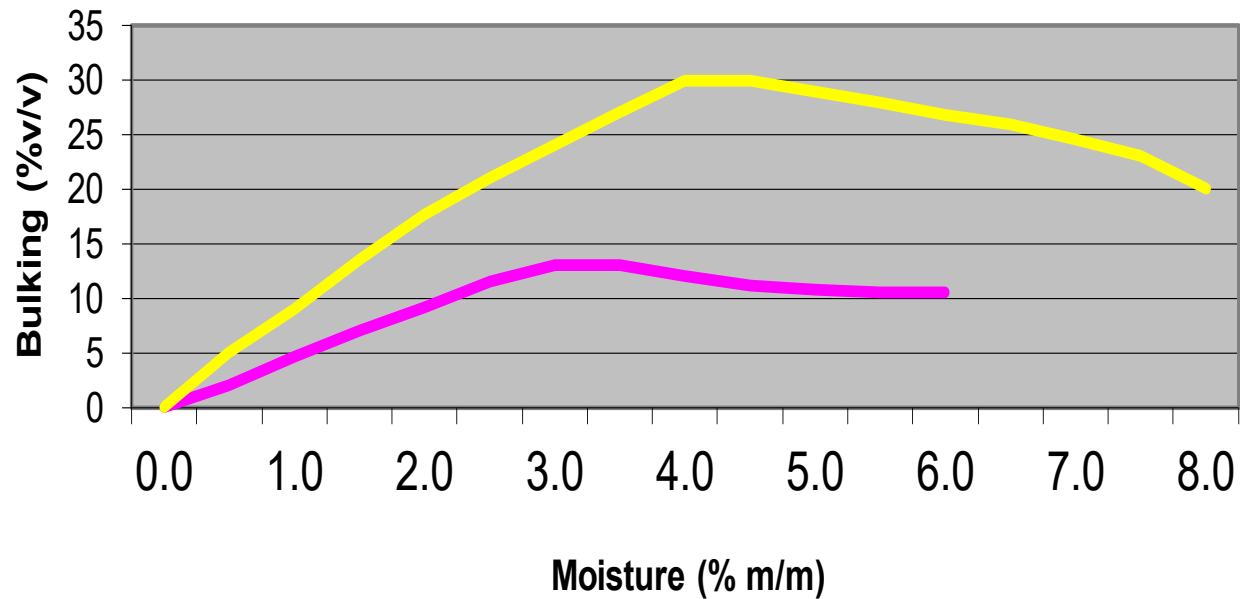
# Cape seal failures

- **Soft binder and high temperature**
- **Too dry slurry**



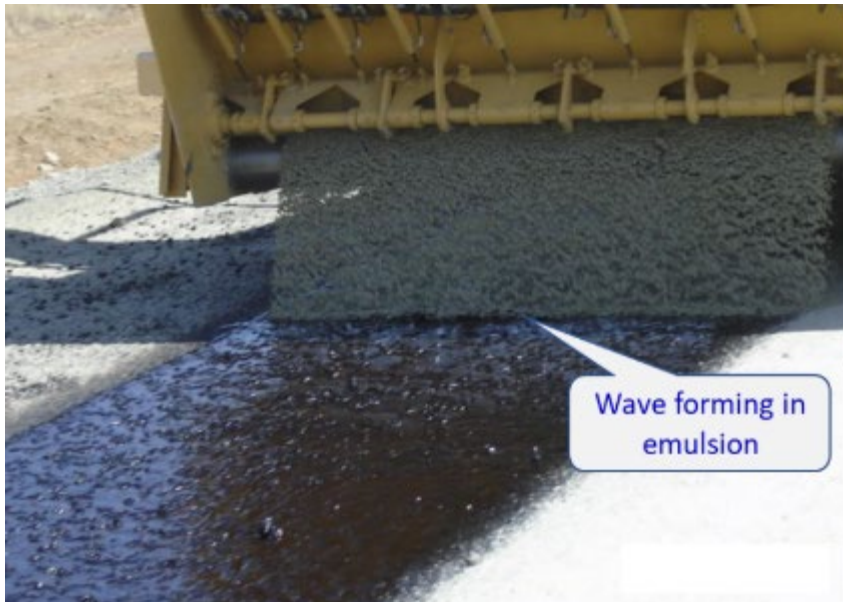
# Slurry aggregate – effect of moisture

**Bulking Coarse vs Fine**





- **Warnings**

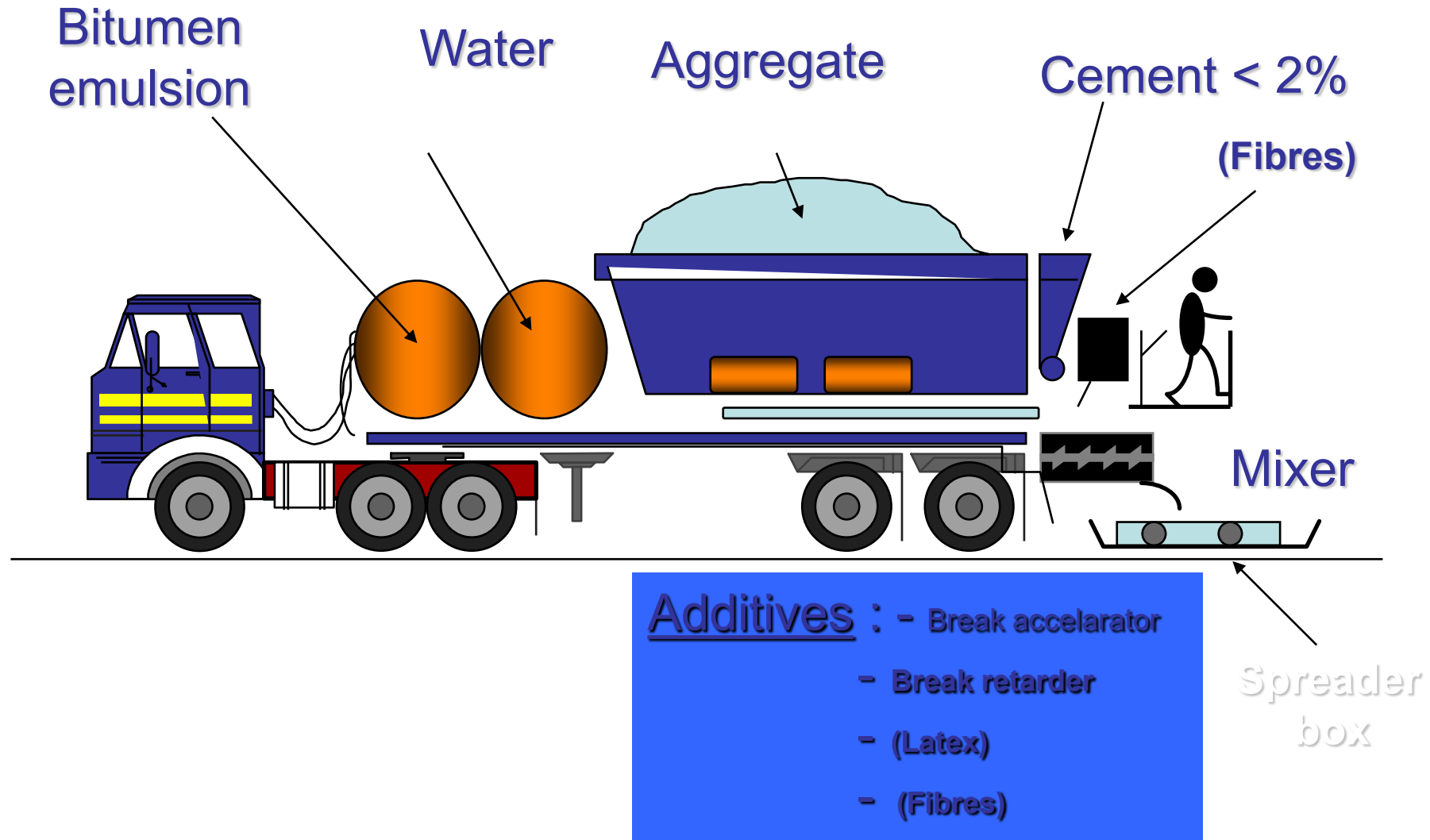


# Slurry Machine





# The Slurry Machine





# Slurry batch mixer

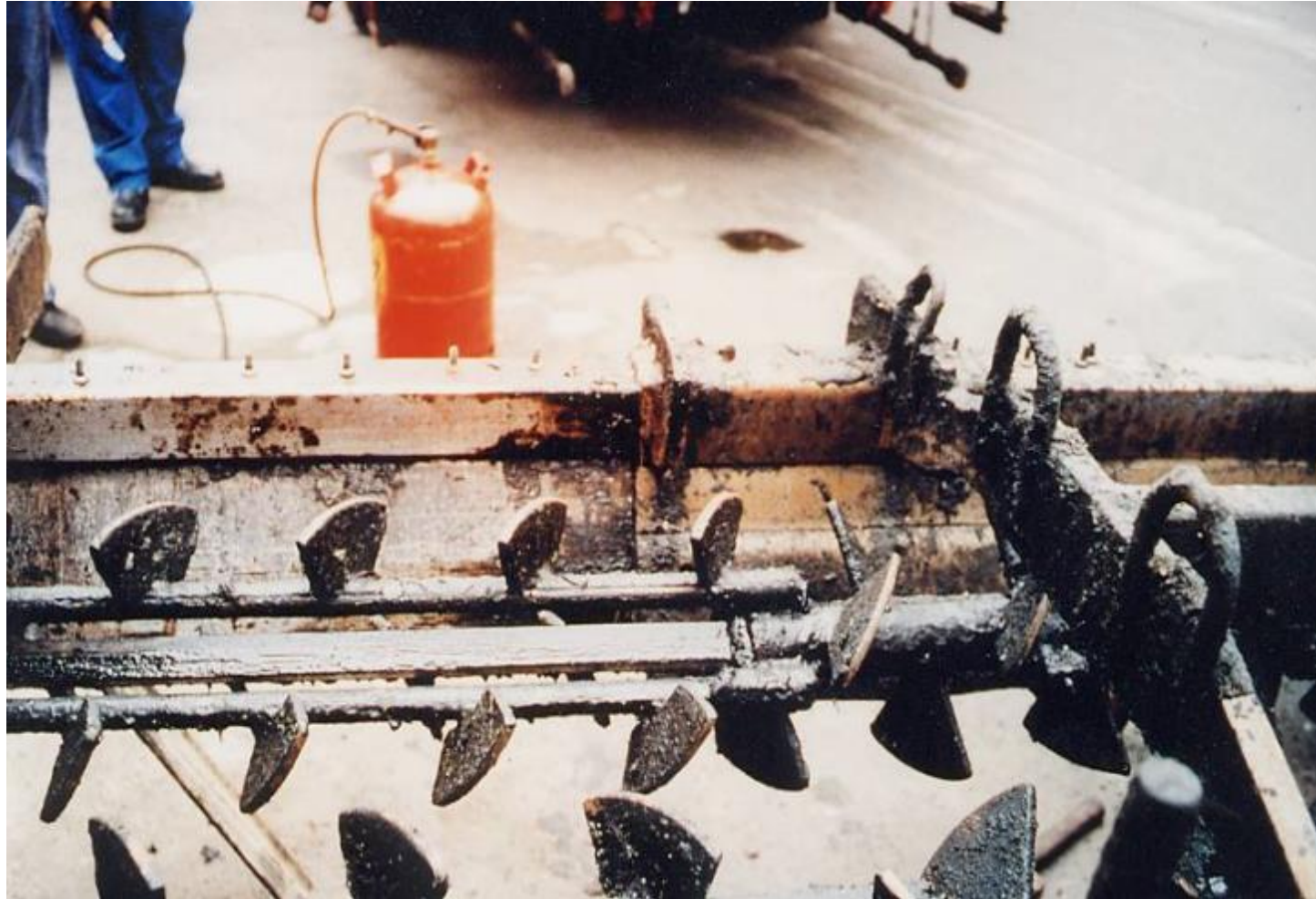


# Slurry machine





# Variable width spreader box





# RUTFILLING



# Slurry seal



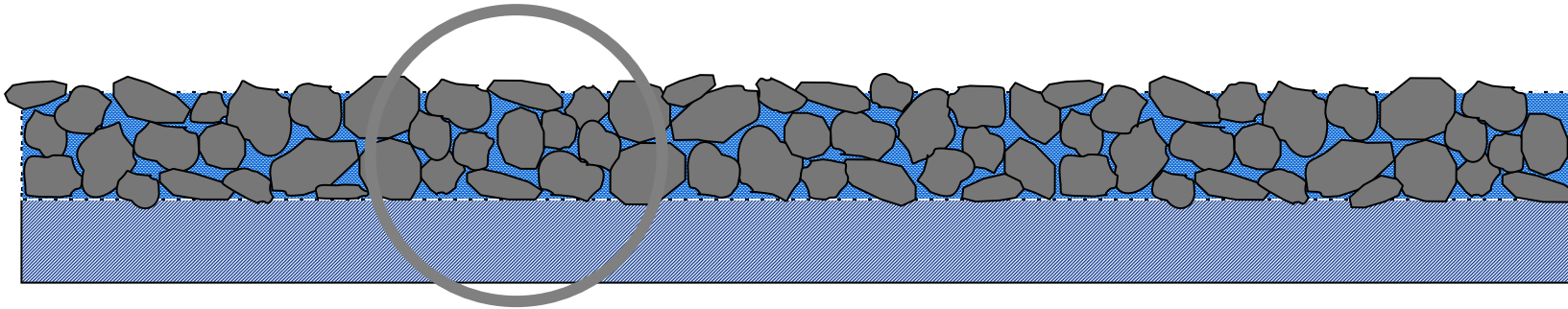




# Natural sand slurry

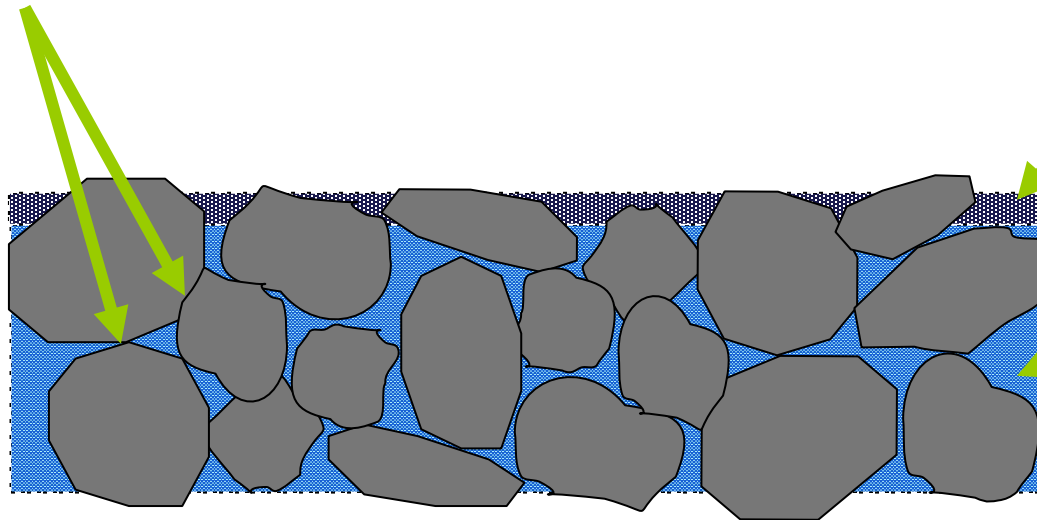


# SLURRY-BOUND MACADAM SURFACING



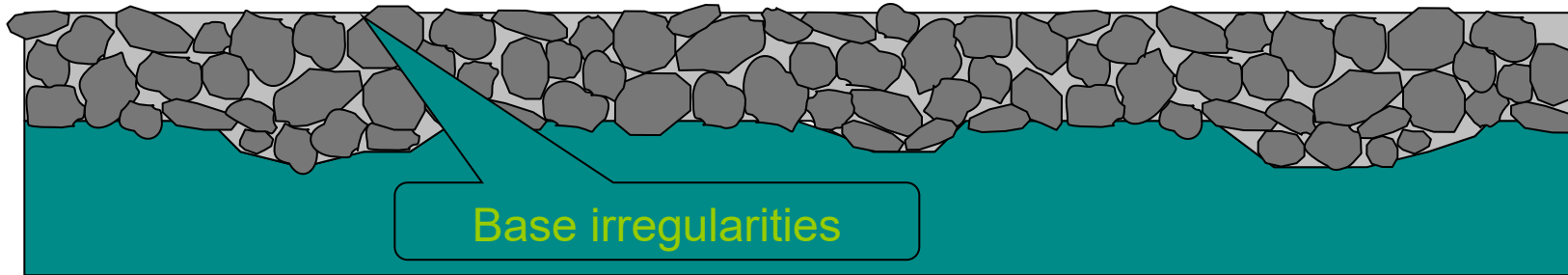
Stone to stone contact

Final slurry



Penetration  
slurry

# SLURRY-BOUND MACADAM SURFACING











Place

Roll static



Spread

Level



Protect



# SLURRY-BOUND MACADAM SURFACING



Apply  
slurry

Protect

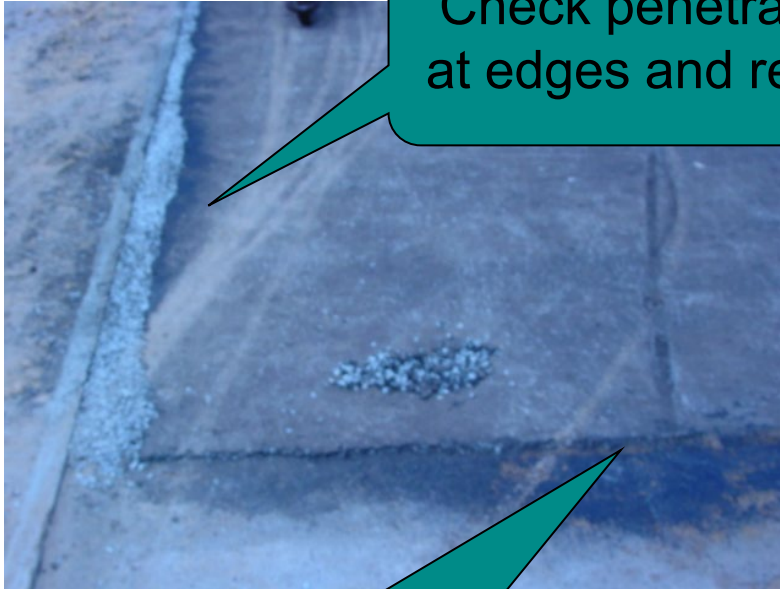
Vibratory  
roll



Smooth slush  
marks



# SLURRY-BOUND MACADAM SURFACING



Check penetration  
at edges and repair

Cut back to full  
penetration



Apply final slurry



Drag burlap

# SLURRY-BOUND MACADAM SURFACING



# Cape seal by hand





# Cape seal by hand



# Cape seal by hand





# Cape Seal by hand





# Cape Seal by hand







# Precoating

- **Issues**

- ☐ R&W Test ?
- ☐ Draining (environment)
- ☐ Clogging (impact on spreading)
- ☐ Wet vs dry
- ☐ Precoating plant





- Prevent soilwash on road
- Treat existing



# Sealing over the edge

- **Slower deterioration of edgebreaks**



# End