



# Blading



## CIRCLE CHECK

is a systematic inspection of your vehicle to ensure it is safe to operate.

check for fluid leaks while approaching the vehicle

1. Under the Hood
2. Walk Around
3. In Cab

Inspect your grader daily

## Purpose for Surface Blading

- To fill in ruts, cut out washboard and spread gravel uniformly across road surface.
- Properly bladed road surfaces will provide a smooth ride with a suitable crown to facilitate drainage.



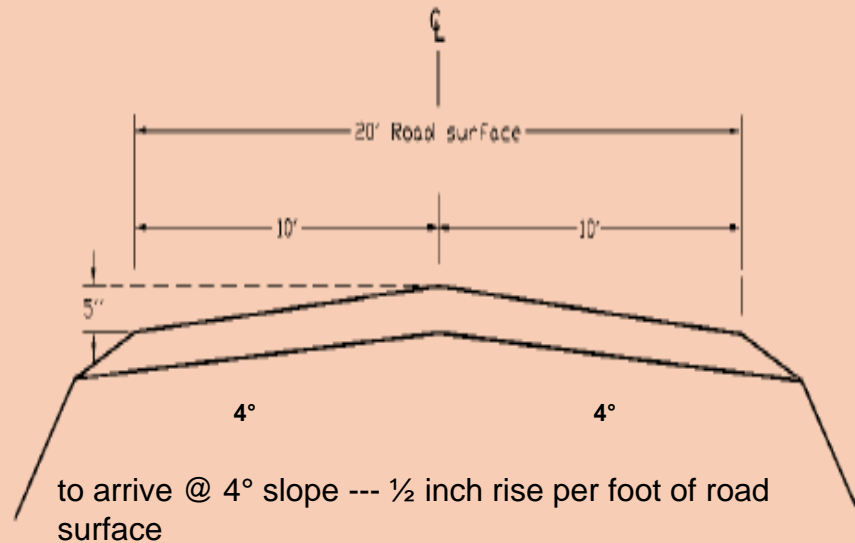
## Common problems

- Wet (too much rain)
- Heavy loads.
- Long dry periods.
- Poor materials.
- Over blading.
- Insufficient material.
- Too much loose material.





## Road Crown



## Proper X - section

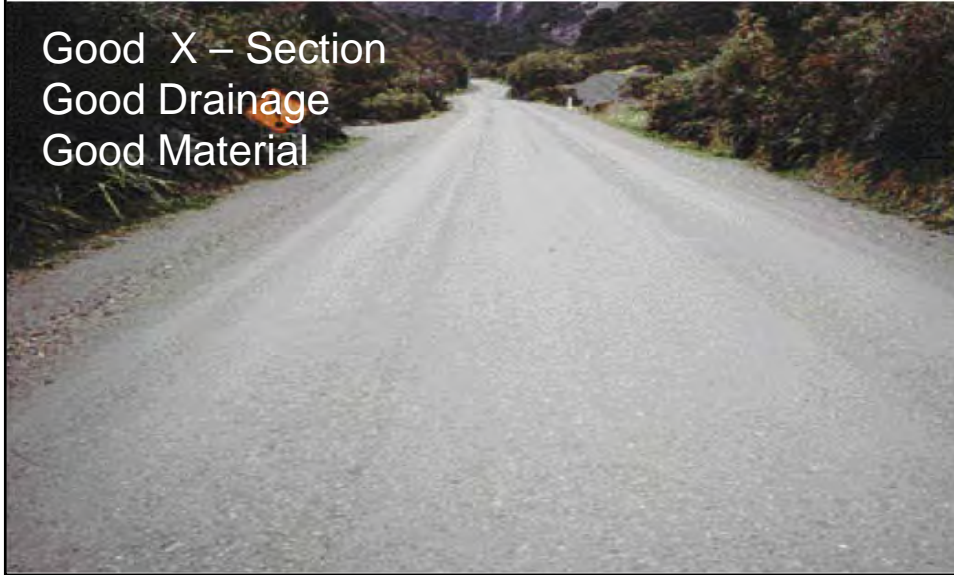
- Cut & Fan leaves a X - section of approx 4° slope on cut side of road surface and a 2° - 3° slope on the fanned side of the road surface.





## Characteristics of a good road

Good X – Section  
Good Drainage  
Good Material



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## Windrows



- Windrow should be on driving surface 1ft in from shoulder.
- Make cuts through windrow every 300 feet to prevent it ponding water.



## The Straight Blade effect



What typically causes this Road condition?





## Straight-Blade



**Can cause a poor road x-section**



## Tight Blading





## Corrugation /Washboard

- Blade against the washboard.
- Double blade – cut & re-lay



## What causes this?

- Lack of moisture
- Hard acceleration
- Aggressive braking
- Poor quality gravel





## Control of speed

- Operating speed in blading operations must not be excessive.
  - It is virtually impossible to do good work above a top speed of 3 to 5 mph.
  - 
  - When the machine begins to “lope” or bounce, it will cut depressions and leave ridges in the road surface.
  - The maximum speed for good maintenance can vary, However in virtually any condition it is difficult to exceed 5 mph and still do a good job.
- This type of washboard was caused by excessive grader speed.
  - Note: the angle of the washboard.



This type of washboarding appears at an angle across the roadway with ridges and depressions two to three feet apart. It is caused by excess grader speed.



## Dry Surface Blading

- Causes dust problems
- Excessive blade wear
- Blade Dry, to smooth out the washboard or rough surface **without** excessively cutting the surface.
- Spot blading, just do the rough spots







## Wet Surface Blading

- Ability to shape
- Restore crown and X - section
- Intent is to cut and “true up” the road surface



## Water Ponding

- Water enters road bed and softens surface
- Contributes to pre-mature road failure.



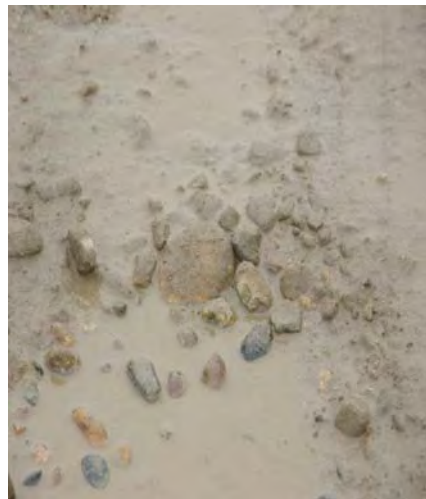
## Water Ponding

- Results in the loss of fine material



## Water Ponding

- Loss of fine materials result in loss of aggregate material





## Too much loose material

- Holds water between each ridge of gravel
- Can cause traction problems or loss of control.



## Secondary ditches

- Traps water and softens road
- Shortens road life span

Secondary ditch over six inches deep



Secondary ditch over six inches deep.



## Erosion Problems



## Shoulder Trimming

- Restores / redefines the edge of the driving surface
- Salvages gravel
- Parent sub grade material, for mixing with pea gravel to stabilize
- Fill failures Temporarily
- Weed and brush control





## Trimming (Scrubbing)

- Restores and redefines the edge of the driving surface
- Salvages gravel
- Can bring in parent sub grade material, for mixing into the gravel to stabilize it (needed especially for “pea” gravel)
- Used to fill failures (Temporarily)
- Also used for weed and brush control



## Good Shoulder Trimming







## Pulling Shoulders and covering

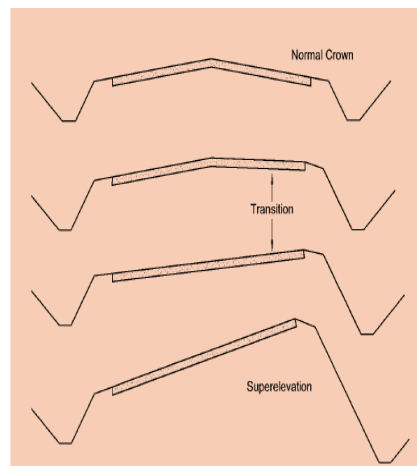
- The existing surface gravel is cut loose and windrowed to the opposite side of the road
- The secondary ditch is then cut slightly deeper and the material is placed on the roadway
- The material from the high shoulder is then pulled into the cut that has just been made.
- The windrowed gravel is then brought back over the recovered material and the roadway is restored to proper crown and shape. The high shoulder has been eliminated.

Generally, this material will have to be worked several times with the grader to break it up enough to spread it evenly.



## Transition from a normal crown to a super elevation (Curve)

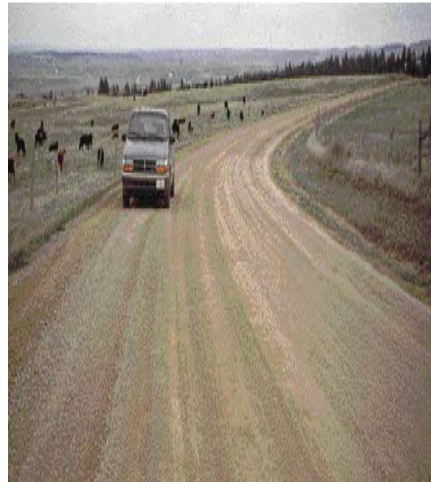
- Typically this slope will taper from approximately 6° slope from the low side of the curve to the high side, however the correct amount of slope or “banking” of a curve can only be determined by engineering analysis.
- There is also a device available for determining the safe speed of a curve called a ball bank indicator.
- If you are unsure of correct slope on a curve, get professional advice if at all possible.





## Proper Curve Elevation

- Crowning of the road should be tapered off starting 300 Ft. (100 m) from curve.



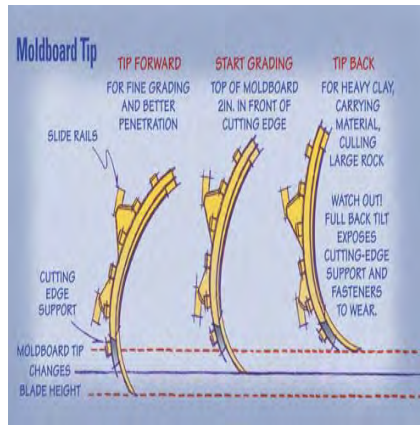
## Improper Curve Elevation





## Moldboard settings

- A grader moldboard tips forward or back to put the cutting edge at the best angle to cut or roll material.
- To penetrate hard surfaces or to cut the road surface tilt the blade forward.
- To carry or roll material tilt the blade back.



## Railway Tracks

- Use caution when working around tracks
- Stop 15 meters from track, assess situation, proceed only when safe
- Try not to put material on the rail
- If you contact the rail call the rail company





## Road Crown at approaches

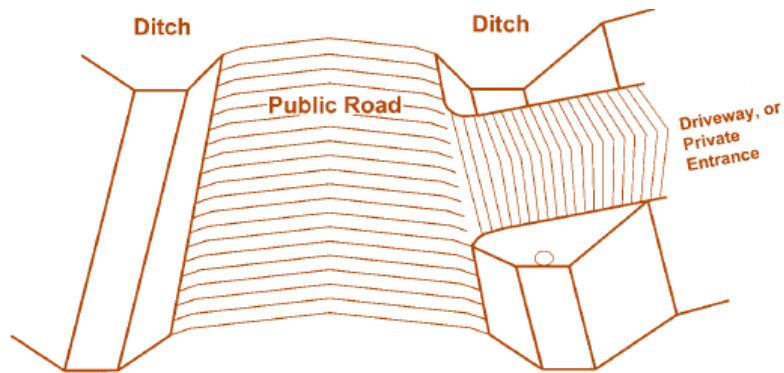


Figure 8: Proper matching of driveway and road edge

- Eliminate the crown 30 Ft. (10 m) from the road.



## Road Crown at Intersections

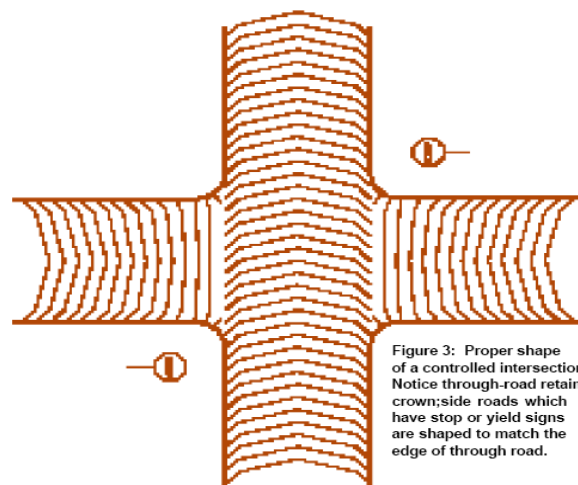


Figure 3: Proper shape of a controlled intersection. Notice through-road retains crown; side roads which have stop or yield signs are shaped to match the edge of through road.

- Eliminate the crown 30 Ft.(10 m) before the main road.



## Road Crown at Intersection (secondary)

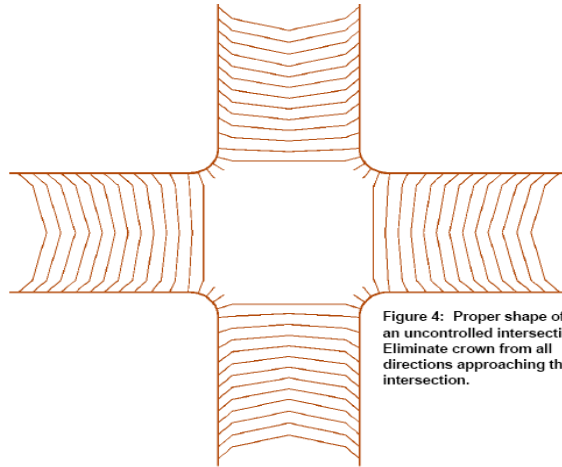


Figure 4: Proper shape of an uncontrolled intersection. Eliminate crown from all directions approaching the intersection.

➤ Eliminate the crown 30 Ft. (10 m) before the



## Road Crown at “T” Intersections

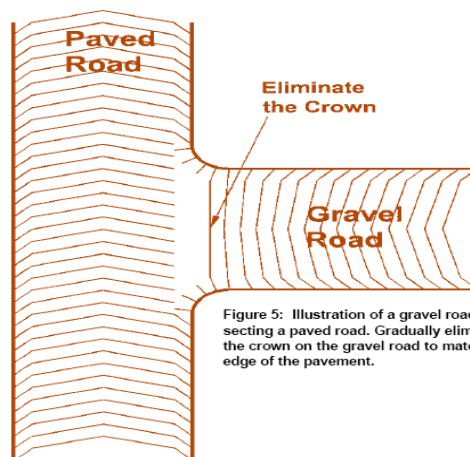


Figure 5: Illustration of a gravel road intersecting a paved road. Gradually eliminate the crown on the gravel road to match the edge of the pavement.

➤ Eliminate the crown 30 Ft. (10 m) before the intersection



# Blades

Sandvick

## Standard



## Carbide Tipped

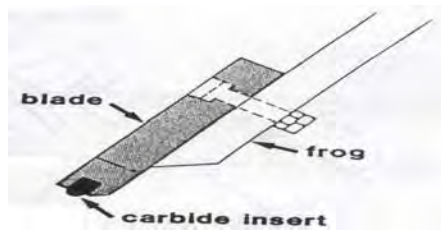


Problems from center wear in cutting edge.



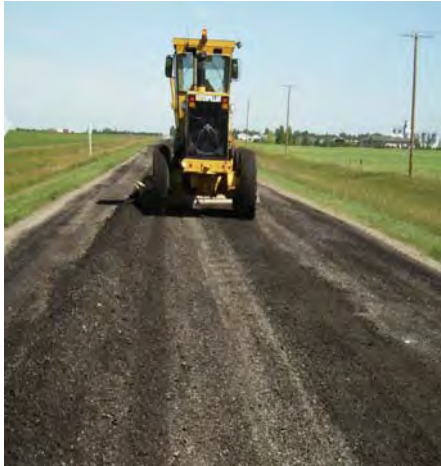
Roadway with parabolic crown. The outer edge of the road slopes too much. Gouging causes high shoulder, and center 1/3 of the road tends to be flat.

# Blades





## Sandvick Blading



## Lane KMS Bladed

- Normal average output would be between 12 & 35 kms (8 hour day).
- Where there are lots of approaches to blade, holes to fill or around R/R tracks daily output would be closer to the bottom end.





## Safe Grader Operation

- Three point contact
- Wear hearing protection if noise level exceeds 85 dBa
- No passengers
- Call before you dig
- Always wear your seatbelt
- Ensure blade and attachments are in appropriate position for travel



## Safe Grader Operation

- Never make adjustments to the grader or attachment without shutting down the unit (**zero energy**)
- Never use your hand to check for hydraulic leaks
- Start the engine from the seat only
- Operate at a controlled speed





## Exiting and Entering the cab

### ➤ 3 point contact



## Power line contact

- If equipment comes in contact with high voltage power line, try to remove the equipment from contact without pulling the line down
- Warn others not to approach
- Send someone to get power shut off (call Sask Power)
- Do not leave cab unless absolutely necessary
- The Equipment and ground has become energized ( touching the equipment or ground could lead to death or serious injury)
- If the operator must leave they should jump with both feet together land in control and hop away with both feet together for at least 10 meters from the equipment.
- **Do not take steps as you may step from low to high voltage and the difference can kill you.**





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# Questions ?

