Riding mowers have increased risk for tip-over and loss of control when used on hills and slopes. Factors such as ground conditions (bumps, wetness, and steepness), load distribution (baggers, rollers, towing), mowing speeds, mower maintenance, and tire treads all have the potential to reduce stability on slopes. It is the operator’s responsibility to ensure they comply with safe operating procedures and know the limitations of the machine to prevent incidents.

To prevent slope-related incidents operators should always:

- Inspect your equipment prior to and periodically throughout mowing operations. Operators should:
  - Inspect the mower’s tires (damage, pressure), tread, and lug nuts.
  - Test equipment functions (steering, brakes, drive, etc.) to ensure they are working properly.
  - Inspect the mower’s Roll-over Protective Structures (ROPS) and seat belts for damage.

- Prepare the mowing area:
  - Walk the area and pick up debris such as rocks, sticks, bottles, cans, wires, etc.
  - While scanning the area for debris, locate other potential hazards such as ditches, drop-offs or embankments.

- Know the slope limitations of your machine.

<table>
<thead>
<tr>
<th>Mower Manufacture and Model</th>
<th>Models</th>
<th>Maximum recommended grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>Groundsmaster 4wd 72” Toro</td>
<td>328-D</td>
<td>10 degrees (all directions)</td>
</tr>
<tr>
<td>Mower, groundsmaster 11” Toro</td>
<td>30448/4000D</td>
<td>15 degrees (all directions)</td>
</tr>
<tr>
<td>Z-Mower 72” Ferris</td>
<td>IS3200Z</td>
<td>15 degrees (all directions)</td>
</tr>
<tr>
<td>Z-Mower 72” Toro</td>
<td>74269</td>
<td>15 degrees (all directions)</td>
</tr>
<tr>
<td>Cat Skid Steer - Caterpillar</td>
<td>287-D</td>
<td>18.4 degrees (across slope) / 25 degrees (continuous forward/reverse on slope operation) / 35 degrees (intermittent forward/reverse on slope operation)</td>
</tr>
</tbody>
</table>

For mowers that are not listed consult the machine’s owners’ manual.

- Assess the slope conditions and know the steepness of the work area.
  - Option 1: Use an angle measuring device or a smartphone to determine the slopes steepness:
    - Use your smartphone (B): Many smartphones have a clinometer located under the compass application or you can download an app to your mobile device that measures the slope, or
    - Use angle finder tool like a compass (C) or a digital angle gauge (D) to read the degree angle.

  Step 1: Place the ≥ two feet long straight edge along the steepest part of the lawn’s slope. Put the board up and down the slope.
  Step 2: Place the smartphone or angle finder tool on the straight edge and read the angle in degrees. This is the slope of your lawn.

  - Option 2: Use a ruler and a level to manually determine the slope’s steepness:
    - Using a ruler and a level in the deepest level of the slope (Figure 2).
    - Positioning the ruler to make it straight, use a level to measure the difference.
    - Utilize the formula below to calculate degrees of slope:

      \[
      \text{Percent Slope} = \frac{\text{Height} \times 100}{\text{Length}}
      \]

      Figure 1 - Measuring slopes with smartphones/angle finder tool
      Figure 2 - Using a ruler and a level
Example: Using a ruler and a level, you found the height is 15 inches and the length is 60 inches.

\[
\text{Percent Slope} = \frac{15'' \times 100}{60''} = 25\% \quad \text{Slope or Grade}
\]

Then use Table 2 to convert from Percent to Degree(s).

### Use Personal Protective Equipment:
- Wear safety glasses, hearing protection, long pants and protective footwear as required by unit. High-visibility vest is required when working on or near roadways.
- Do not wear loose fitting clothing or jewelry because it could become caught in moving parts.

### The Do and Do Not of mowing operations:
- Always keep the ROPS in the raised and locked position, except when towing on trailer.
  - Do not wear the seat belt when the roll bar is in the down position.
- All movements on slopes must be slow and gradual. Reduce speed when making sharp turns and when turning a hillside. Do not start or stop suddenly.
- Do not mow on slopes greater than the manufacturer’s maximum grade.
  - To prevent side rollover, mow up and down instead of traversing slopes.
- Avoid mowing slopes when grass is wet. Slippery conditions reduce traction and could cause sliding and loss of control.
- The cutting deck must be lowered when going down slopes for steering control. Use precaution when using any attachments as these can change the stability of the machine. Never use attachments that are not authorized by the manufacturer.

### Be aware that loss of traction may occur going downhill:
- Weight transfer to the front wheels may cause drive wheels to slip and cause loss of braking and steering.
- If tires lose traction, disengage the blades and proceed slowly off the slope.
- If engine stalls or machine loses headway and cannot make it to the top of a slope, do not turn machine around. Always back slowly straight down the slope.

### Do not mow near drop-offs, ditches, steep banks or water. Wheels dropping over edges can cause rollovers, which may result in serious injury, death or drowning. Use a hand trimmer near drop-offs, ditches, steep banks or water.