

Suggested Discussion Areas:

Discussion Area 1: Cornering Overview

Facilitation Questions:

- What four actions are involved in cornering?
- How important is where you look in controlling the motorcycles direction?
- What is the term for how a motorcycle changes direction at speed?
- What should a rider do with the throttle in a turn? Why?
- Are there techniques that can help when making turns

Facilitator Information:

- The principle actions in cornering are: **Slow**, to a suitable entry speed. **Look** through the turn. **Press** the handgrip to initiate lean of the motorcycle. **Roll** on some throttle to stabilize the suspension and allow for the best possible traction.
- While it is always important to keep one's eyes moving in order to sweep or scan the surroundings, a rider's primary focus must be the direction he wants to go.
- Single track vehicles such as motorcycles and bicycles change direction by '*counter-steering*', the right handgrip is pressed slightly (to initiate motorcycle lean) to go right and the left handgrip is pressed to go left. Steering this way is counter-intuitive, hence the name, but it is the only way to make significant changes in the direction of a motorcycle when traveling above approximately 10 to 12 miles-per-hour.
- Speed should ideally be steady or increasing through a turn.
- When speed is steady or increasing, the suspension is stabilized at a midpoint in its travel, which in turn maximizes ground clearance and the ability of the suspension to deal with uneven surfaces such as bumps and potholes without losing traction.
- A good truism is: 'Slow more than you think you need to as you enter a turn. You can always add speed in a turn. Attempting to subtract speed in a turn is difficult and dangerous.'

Discussion Area 2: Proper Speed

Facilitation Questions:

- How do you determine a suitable speed for any given turn?
- Where is this speed established?
- What happens when you apply brakes while leaned into a turn?
- Is the effect on weight transfer essentially the same with a sudden roll off of the throttle?
- What two basic human instincts can CAUSE problems when going too fast in a turn?
- What is the suggested procedure for completing a turn where entry speed was too fast?
- What is 'Trail Braking'?

Facilitator Information:

- A *suitable entry speed* for any turn on a motorcycle can be defined as a speed that allows the rider to maintain or increase speed throughout the turn OR stop in the distance that she can see.
- Entry speed is always determined prior to the curve. The majority of slowing must occur while traveling in a straight line before leaning into the curve.
- Anytime the brakes are applied the weight of the motorcycle is transferred forward to the front wheel, greatly increasing traction requirements. If the front tire is leaned over at an angle in order to make a turn, most of the available traction is already being consumed by the lateral forces involved (keeping the tire from slipping out). This means traction available for braking is very limited.
- Sudden roll-off of the throttle or rapid deceleration has the same potential for problems as braking in a turn. Smooth, steady roll-on is desired.
- Human instinct or 'reflexive responses' can be troublesome for riders when going too fast in a turn.
 - The first problem is that if a rider feels they are going too fast, the reflexive response is to slow down now! The problem created by this reflex is if you apply brakes on a motorcycle that is already leaned over at a sharp angle to make a fast turn, the tires (especially the front) do not have enough traction available for significant slowing. Insufficient traction results in a tire skid causing loss of control and substantial increase in the likelihood of a serious crash.
 - The second of the dangerous reflexive responses is target fixation. This is where survival instincts take over and the rider reflexively focuses on a hazard such as a guard rail, other vehicle or road hazard, etc. The problem here is that a motorcycle operates via 'visual directional control' i.e. it goes where the rider looks! Continuing to look at the hazard virtually guarantees that the rider will hit the hazard. Riders must train themselves to look AWAY from the hazard and instead focus on where they want to go.
 - Suggested procedure for when a rider is in a turn and going too fast: LOOK where you want to go, lean slightly forward and inward on the bike (Chin toward the inside wrist), lean the bike more if needed and hold a steady throttle to allow the suspension to do its job until you are clear of the turn.

- “Trail braking” refers to any braking done while the motorcycle is leaning in a turn. The term originates from the technique of “trailing off the brakes” as you approach the apex. It is generally considered to be an advanced riding tactic used by expert riders, particularly in on-track riding situations. Novices attempting this technique may find it difficult to develop the subtle ‘feel’ for the extremely fine motor skills necessary to successfully exploit the advantages of trail braking. Those to whom trail braking is a new technique should get track or closed course experience in order to develop advanced techniques in a safe, controlled environment with proper instruction.

Discussion Area 3: Choosing a Line (Path of Travel)

Facilitation Questions:

- What is meant by a choosing a good ‘line’ through a turn?
- What is meant by “Outer-Inner-Outer” (or “Outside-Inside-Outside”) path of travel through a curve?
- Are there other preferred options for path of travel?
- What is the “Apex” of a turn?
- Why would the location we choose to apex a turn be important?
- What are the advantages of choosing a ‘late apex’?
- If your vehicle turns by leaning and the tires are very close to the centerline, where is the riders’ upper body?

Facilitator Information: (Handout – Lane Positioning: Apexing Turns)

- The ‘line’ one chooses to take through a turn is the exact path of travel the motorcycle will follow. Different lines are chosen for differing reasons: available line of sight, debris, road condition, traffic, relative speed, bike design limitations and other variables. These all affect the appropriate path of travel through a given turn. In any case the rider should allow for traction reserve. In other words, the rider should keep some extra traction available in the case of an emergency mid-turn.
- Outer-Inner-Outer refers to a path of travel that begins at the outermost lane position (right side portion of the lane for a left curve) then moves to the innermost portion of the lane in the middle of the curve and gradually returns to the outer-most part of the lane at the exit of the turn. This is the most common and affords the best line of sight as you enter the turn.
- There are a number of different path of travel (POT) options: O = Outer, I = Inner, and M = Middle: O-O-O, M-M-M, M-I-M, etc. Different situations may require any of these.
- The apex is the point of closest approach to the inside of the turn. It can occur at any time or point during the turn. Where the rider “hits the apex” can have a strong influence on safety, traction and exit position for the rider and bike.

- An early apex in a turn can cause the motorcycle to run wide at the exit of the turn. Early apexing is also very often a habit of people who ride too fast. The combination of riding too fast and an early apex with its resulting tendency to run wide at the exit of the turn and makes for a dangerous scenario.
- Choosing a late apex gives more control over the bike's traction and how the bike exits the curve. Traction management is also improved as well as continuing to improve the sightline in order to see further down the road.
- In general, a smoother, straighter path of travel requires less lean angle which allows for more ground clearance and more traction. Definitely preferred in situations such as imperfect road surface or a rainy day.
- Be careful of being near or touching the centerline in left turns. When the bike is leaned over the rider's head or upper body can protrude into the on-coming lane creating an extremely dangerous situation. And, that centerline can be slippery!