

# Ultimate Riding Skills

## Part 2—What Motor Officers Learn That Could Save Your Life

by Steve Larsen

**L**AST MONTH WE covered the first week of the Motor Officer Training Class conducted by the Phoenix Police Department. It was a week of mostly low-speed exercises and maneuvers, teaching proficiency in tightly turning the bike while controlling the clutch, throttle and brake. This month we focus on Week 2.

### Week 2, Day 1

The first day of this second week is a review of mastering the motorcycle at low speed. And what's better than beginning in the mud? After spending a couple of hours reviewing last week's exercises, instructors lead students to a dirt area 150 feet by 75 feet that had been flooded the previous Friday. It is now a sea of mud.

A cone is placed at the far end of the mud pond. To pass, students must take the bike around the cone and return back to the start. Although theoretically possible, it turns out to be impossible to do and keep the bike upright. The front wheel well quickly cakes with thick mud and the front wheel no longer turns. Help from fellow students is all that gets several of the students through the exercise. When I quiz Nohta on the reason for this exercise he admits it is mostly to teach them to "stay out of the mud." The bikes are ridden to the nearby sanitation plant for a cleaning with high pressure hoses. The mud exercise is the first of several routines in which my participation is limited to photographing.

This second week of track work moves us to higher speed maneuvers. The ability to apply maximum braking and bring the bike to a quick stop is essential for motor officers. It is also critical to know how to avoid a collision when going too fast for your brakes to stop you. Motorcycles are highly maneuverable and brakes are not your only option for collision avoidance.

It's a sad fact that motor officers have a higher rate of accidents and fatalities than any other department in the police force. A reconstruction of these incidents shows that



proper braking could have reduced both the frequency and impact force of such accidents and saved lives. A lecture on braking helps us understand how a motorcycle, as an articulated vehicle, behaves very differently from an automobile. We're taught that a motorcycle acts more like a semi-tractor trailer rig than a car when braking. And, with the Kawasaki 1000 police bike, as with many motorcycles, over 70% of available braking force comes from the front wheel.

### Avoid High-Siding

Out on the course, the first exercise is braking in the dirt. Students begin by riding their bikes up to 15 mph and then locking up the rear brake as the motorcycle slides to a stop. This is not done before an important lesson on the dangers of "high-siding." A high-side occurs when a braking motorcycle tire, after being locked up, is freed to turn and regains traction. The rider tends to continue in the direction he/she was going prior to the traction being regained, while the motorcycle tends to change direction—*rapidly*. The result is a rider being catapulted off the motorcycle and is commonly referred to as "high-siding." What to do? "If you lock up the rear wheel, leave it locked up" is the advice.

Once mastered at 15 mph, speeds are increased to 25 mph and then 35 mph, before moving the exercise to asphalt. It turns out that braking on asphalt is easier than braking on dirt, and speeds quickly move from a start of 15–20 mph, to 45–50 mph. A radar gun is used to ensure each student is reaching the specified speed before hitting the brakes. We learn to shift body weight during the slide to compensate for the lateral move-

ment of the bike, and are surprised at how controllable the bike is in a broadside skid.

Next up is maximum braking using only the front brake. First on asphalt and then dirt, students begin at 10 mph and momentarily lock up the front wheel, gradually increasing speed. Unlike the rear brake, when the front brake locks up, you release it—*immediately*. In fact it is critical that you avoid any prolonged locking of the front brake, to avoid washing out the front tire and dropping the bike. This time we don't go much past 35 mph before we do the exercise using both brakes. Then we take the speed up to 45–50 mph. As students find how quickly the motorcycle can be brought to a stop with aggressive use of both brakes, instructor Jim Morrison stands far downfield showing their best stopping distances using only the rear brake which had been recorded earlier. Most students stop in one-quarter to one-third of the space they needed when using only the rear brake. This is a graphic depiction of what happens when one properly uses both brakes to their maximum effectiveness...or fails to do so.

### Broad-Slide

Being able to maneuver the bike in a slide is the lesson of this next exercise. Nohta considers this a last ditch effort to avoid a collision. Each student begins at a speed above 40 mph, locks the rear brake and begins the slide. As the speed of the motorcycle slows to 10–15 mph, the rider transfers body weight to the desired direction, encouraging the rear of the motorcycle to slide to a 90° angle. Although not the most efficient way to stop, this evasive maneuver can be used at the end of a stop when you



Deep sticky mud fills the fenders and stops the bikes in their tracks. Only the assistance of fellow students allows completion of the course.



A variety of skills are taught on a steep 25° incline: Starting, stopping, U-turns and a cone weave. Pursuits in parks, irrigation canals, loading docks, etc. demand such abilities.

realize you have only another two to three feet to avoid a collision. As before, once committed, it must be completed to avoid a high-side.

After doing this several times and coming to a stop, students learn to apply power and right the motorcycle, riding in the new direction rather than bringing the bike to a stop. The exercise is repeated on both dirt and asphalt. Proper broad-slide technique is required as part of the timed qualification course.

### Brake & Evade

But what happens when you are still going to hit someone, even after you've applied maximum braking? Knowing what to do when a car pulls in front of you or you come out of a blind spot to find an obstacle or an accident in your path is critical. Back on the track, a Brake and Evade exercise is set up (Figure 1). This exercise brings together maximum braking, hand and eye coordination, balance, down-shifting, leaning and use-of-space skills. The idea is to teach evasive maneuvers when braking distances are too short for the speed being traveled.

Each student begins by riding toward a barricade at 20 mph, eventually reaching 45–50 mph. Using a combination of maximum braking and downshifting, they reduce the speed of the motorcycle to 10–15 mph. Then, just before hitting the barricade, the student makes a 90° turn, travels approximately 15 feet, makes another 90° turn and exists through a gate in the barricade. A radar gun confirms that students accelerate to a speed that would make stopping impossible, even with maximum braking. The whole idea of the exercise is how to evade a situation when your braking distance is

too short for the speed at which you are traveling. After students master both right and left directions, a cone weave is incorporated into the evasive maneuver.

### Evasive Lane Change

Motorists who fail to see motorcycles are one of the greatest dangers for motor officers. Being able to make rapid lane changes to avoid hazards is a skill that can save an officer's life. Prior to the exercise, instructors talk candidly about where to aim if it becomes clear you are going to collide with an automobile. When encountering a driver turning left in front of you, you should attempt to go around the rear of the vehicle. This is done on the theory that the vehicle will continue along the path it is traveling until the instant of impact. (If he/she did not see you in the first place, they are not likely to stop mid-turn, right?) Steering around the front of the car exposes you to a longer period of time when you could be in conflict with the turning vehicle. If you do collide, you are better off going over the trunk of the vehicle than into the roofline. Either way, you're going to get hurt.

To demonstrate and develop rapid lane changing skills, the Evasive Lane Change (Figure 2) exercise is set up. Beginning at 20 mph and going up to 45–50 mph, students practice staying off the brakes as they enter the course and avoid the simulated hazard by sharply pushing the handlebar one way and then the other.

### Week 2, Day 2

As students practice the previous day's exercises, instructor Jim Morrison discusses with me Kawasaki's announcement that 2005 is their last year for producing the KZ1000 police motorcycle. "It's been a

great bike and it holds up extremely well, given what we put them through," Morrison explains. "Running radar, I sit with it idling until someone goes by doing 60 mph in a 40 mph zone. Then I'm on it hard to catch them, then on the binders hard to stop. Then it sits while I write the ticket and then ride back to my spot and repeat." And that's not the half of it. "In parades we crawl along at 2-mph in Phoenix heat with an air-cooled engine. That's tough duty."

Currently the Phoenix Police Department has 161 police motorcycles. This includes 131 that are assigned to motor officers, 10 trainers and 20 spares. Once on the motor squad, officers are assigned a bike, which is theirs until turned in for a newer one. Approximately 25 new bikes are rotated into the squad each year, with the same number going out. Retired bikes become spare bikes for officers to use during repair periods, then become trainers, and are finally auctioned off.

### Road Hazards

Roadways are littered with all types of debris and other hazards. It is not always possible to drive around an obstacle; sometimes the motorcycle rider will ride over it. The Road Hazard Question Mark exercise provides experience in maintaining control while riding over debris. The trick to driving the motorcycle over debris and other miscellaneous hazards in the Question Mark Pattern exercise is to lock both elbows and wrists, minimizing the hazard's effect on control of the motorcycle. It is important to keep the front wheel straight, in the direction you want to go, when going over the hazard. Wait to make steering corrections until after the front wheel has rolled over the hazard.



Sometimes a motorcyclist has no choice but to ride over hazards. To maintain control, lock both elbows and wrists, and keep the front wheel straight until after you've rolled over the hazard.

### Dealing With Inclines

One of the most striking physical aspects of the Police Training Facility is a large, paved, sharply-inclined hill along one of the tracks. The 175-foot long area with a 25-degree incline becomes the location for the next series of exercises designed to get students comfortable with riding inclines. Motor officers in Phoenix ride in city parks, irrigation canals, mountain regions and may be called upon to ride down loading docks or maneuver in parking garages.

The first exercise has students ride part way up the incline, then apply only the front brake to keep the bike from sliding backwards. This does not work. The incline is too steep, and the bikes slide backwards, dragging the front wheel. As the bike reaches the bottom, it stops a couple of feet after the rear tire reaches the flat area. This leaves all but the tallest officers with their feet unable to reach the ground. The bikes tip over, unless the officers are quick enough to release the front brake and regain balance going backwards. Switching to the rear brake, students find it holds the bike on the hill. Best, of course, is to use both brakes when stopped on an incline, but it's good to know that the lowest brake will be the most effective on an incline.

Next we practice stopping parallel to the incline. The key to success is to put the uphill foot down, even if it is the brake foot. After this, we progress to the proper clutch, brake and throttle control for moving and turning on an incline. The power must be kept up and the clutch engaged until the turn is complete. Losing either will cause a fall.

A set of cones is placed along the incline, and students make left and right U-turns around a cone and then move to performing

a cone weave on the incline. Students are required to stop facing the incline, kill the bike and then get it back in service.

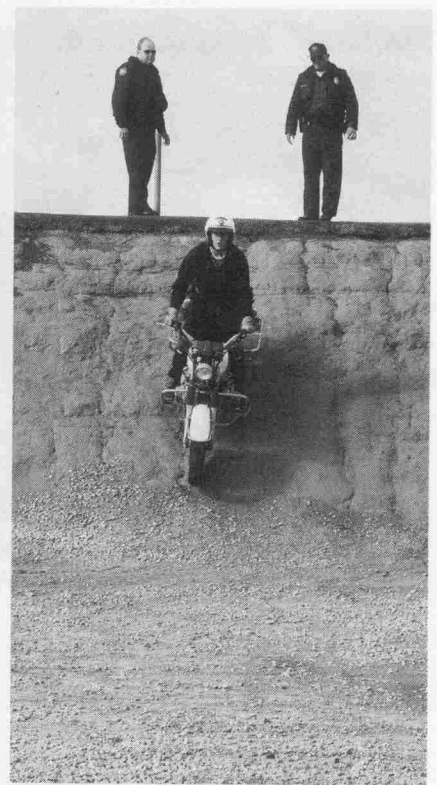
### Falling From The Sky

The end of the incline exercises is a real attention getter. Each student rides his bike to the very top of the incline. They are then instructed to lower the front wheel off the blacktop and onto the dirt top edge. This back side of the hill is a nearly straight drop down, covered with dirt, ruts and gravel at the bottom. You would be foolish to try and walk down it. With the bike poised in this position, the instructors explain you are to ride the bike down the backside of this hill.

Nochta tells me he's had students make it all the way through the class and tell him, at the top of this hill, "I'm not sure I want to be a motor officer this bad." The record for pausing at the top before going down is close to 30 minutes. Unfortunately, this exercise is mandatory and after some agonizingly long pauses, every student (in this group) goes down the hill without incident.

### The Sickle

During the first week we'd all heard about "the sickle." Most of us had visited the painted outline of the sickle without the cones on it and shook our heads. However, today is the day we ride the sickle, sending another batch of cones to the random disarray pattern. The sickle is a decreasing radius circle which takes the KZ-1000 motorcycle to its absolute maximum turning capability (Figure 3). The decreasing radius circle is what happens when you run out of available space, discovering, for instance, in the middle of a U-turn, that the turn was misjudged and you are out of room. What do you do?



The incline exercises complete with a near-vertical drop down the dirt backside of the paved incline—so intimidating that some question their desire to become motor officers at the sight, but finally, all complete the drop without a single accident.

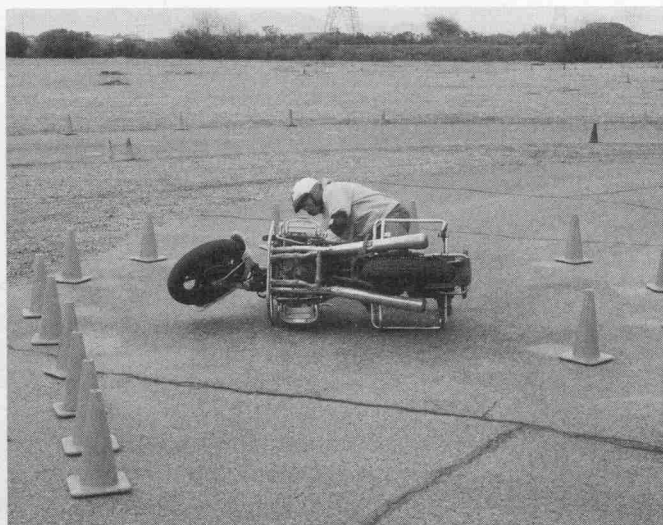
Instructor Sampson shows us the proper technique. You ride deep into it and make the turn. Once into your turn, you lock the forks and dip the motorcycle, using the clutch, brake and throttle in unison to bring the bike back up straight, then quickly reverse the fork direction, apply power and ride out of the exercise.

Simple, you think? Anything, but. This exercise is one of the most difficult on the course and most misunderstood. Initially the size of the exercise seems impossibly small, but eventually all but one student manage to get through it. Of course, once proficiency to the left is obtained, it is on to the right sickle.

The sickle is in the qualification course going in both left and right directions. However, an exit gate is added to decrease the difficulty somewhat when doing the timed event.

### Week 2, Day 3 Counter Steering

After practicing Day 2 exercises for an hour or so, it's back to the classroom. Instructor Ricky Harbaugh uses a toy gyroscope on a string to illustrate countersteering and why, when the front wheel of a motorcycle is turned in one direction, the



**Left and Right:** The "Sickle" turn is the most difficult on the course, requiring an almost impossibly tight turn, first to the left and then to the right. To master it, the bike must be straightened up with the forks at full lock, then reverse fork direction, apply power and right out of the turn.

motorcycle leans and turns in the opposite direction. The lecture is aided by the fact that Instructor Harbaugh is a former physics teacher. Consequently we are treated to a number of formulas. In addition to counter steering, we learn about low-speed wobbles, high-speed wobbles and high-speed weaves. We learn what causes them and how to stop them. However, we are grateful to hear we will not be practicing them.

**Road Course**

Nochta gives us a primer on proper corner entry. As with four-wheeled vehicles, the wrong way to enter a corner is to ride into the corner to the inside, or tight, with a wide exit. The makes the apex of the turn about one-third of the way into the corner, and wrong. The right way is to ride into the corner wide, then turn deep and exit the turn

tight. This puts the apex of the turn about two-thirds of the way into the turn, called a "late apex," and is the correct way.

Deep and wide corner entry allows the motorcyclist additional space if needed for evasive maneuvers. In addition, deep and wide corner entry allows the bike to be in a critical lean less time, and therefore, exposes the rider to less danger.

We then move to the road course, a half-mile track, full of twists and turns. After practicing on the training bike for a while, I ride my Gold Wing GL1800 onto the track to see how well it can keep up with the trainers. Its extra torque keeps the Gold Wing in the hunt, but lack of clearance hinders it in the corners. No one passes me, but I don't pass anyone else, either.

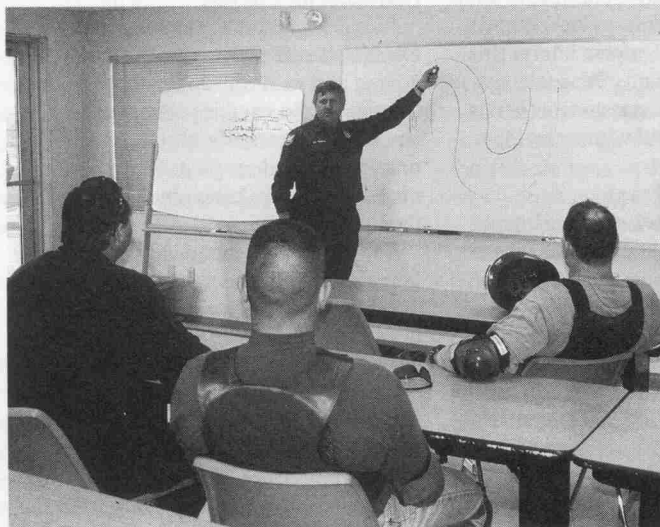
Next up is an introduction to the qualification or skills course. This is the timed

course that each student must pass to not only become a motor officer, but to qualify for being included in Week 3 training. Since the training in Week 3 is all on the street using full dress police bikes, passing the qualification course on Friday is an absolute requirement.

**Qualification Course**

Instructors explain the course in detail, along with all penalties and reasons for disqualification. Sampson then takes the students around the course, explaining common mistakes and answering questions. The course is used to measure each student's ability to do all of the individual exercises and put several tasks together.

The obstacle course is a timed event. It combines actual time of the run (raw time) with penalty time consisting of adding five



Instructor Nochta explains the proper "late apex" corner entry, to provide room for additional evasive maneuvers at the exit, and to expose the rider to less danger by minimizing the amount of critical lean time.



The author tries his own GL1800 on the police road course. The big Honda's extra torque is an advantage, but is nullified by its lack of ground clearance versus the KZ-1000 police bike.

