

PRODUCT TEST

The Last Helix You'll Ever Need

The Shockwave Clutch allows cam-degree changes on the trailside.

You know the guy. The one who's always holding up the group.

Many foursomes have three people who are anxious to ride. Buddy number four? He's the one with the helmet off, the hood up and the tools out. On one hand, you want to keep moving and you're frustrated he's always holding you up. On the other hand, you admire him for being such a perfectionist. He always knows how we wants his sled to perform, he can detect the slightest inaccuracy in performance and he knows how to get it dialed in.

He calibrates his suspension for the best ride every time the conditions change. He adjusts the jetting so his machine has the ideal throttle response. He carries spare clutch parts and isn't afraid to make changes to anything trailside or mountainside.

Well, there is good news and bad news. The bad news is that these guys will never have the perfect sled, and as tinkerers, they will continue to make adjustments on the fly. The good news is with a Shockwave clutch, things can move more quickly so you can get through a few more tanks of fuel before sunset.

Not only is the Shockwave a time-saver, but it is the last helix anyone will ever need. If you are looking for peak clutch performance, the Shockwave inventor Kent Lee has you covered.

The Shockwave Clutch, originally for Yamaha snowmobiles but now for all brands, features a simple adjustment collar that changes the clutch ramp angles by single degrees or even less. A quarter-turn on the Shockwave corresponds to one degree of ramp profile change. It can also adjust the placement of peak RPM in the power curve, and reduce or increase the top engine RPM.

Translation? This setup turns you into a clutch tinkerer, and adjustments are quick.

By The Numbers

It didn't take us long to find some horsepower hiding in our Venom. By adding the \$399 Shockwave, this was cheap horsepower, too.

Our staff '04 Yamaha SXVenom was hauled to Motorsports Plus, in Inver Grove Heights, Minnesota, where owner Jeff Fischer strapped our Shockwave-equipped sled to his track dyno. Fischer's shop was the exclusive distributor of the Shockwave in the product's first year, but now other shops are jumping on board.

To give you an idea of the time savings, we made more than 40 runs on the dyno in the course of just a few hours, and there were clutching changes after every three or four runs. Doing that many dyno pulls with a conventional clutch setup that would require removal of the helix and probably would have taken all day.

Run 4 was the one documented with the stock Venom with the factory clutches and settings. When it came time to play with it, we first used a straight-cut helix set to the stock ramp angle of 47 degrees. Note that in Run 8, we picked up a few horsepower in the mid-range even with the stock-degree setting and we revved out a little quicker to get to the heart of the powerband. In stock form, our Venom put 52.9 HP to the track vs. 55.6 HP with the Shockwave. Note, too, the peak RPM. With the Shock-

SHOCKWAVE CLUTCH

PRICE: \$399

COMMENTS: The Shockwave clutch offers near limitless driven clutch adjustments that can be done in a snap, trailside. This is the only clutch helix a sled needs.

Motorsports Plus: 651/455-5657



The Shockwave installs in minutes. Adjustments to the helix degree settings are made with an allen wrench to loosen a set screw, and simply turning the collar.

wave, the engine was allowed to rev a bit more, which might have contributed to the increased power to the track.

After the machine was shut down, we took an allen wrench to loosen the set screw. The Shockwave was turned one full rotation, which represents 4 degrees of clutch ramp angle. With its 51-degree helix setting, peak horsepower again increased to 56.4 in Run 11. With the steeper angle, the engine revved to a peak of 9435 RPM. Run 14 was another full turn on the Shockwave for a 55-degree setup. The engine didn't build its RPM as quickly or as high. It reached 8988 RPM and produced 57.3 HP. It did, however, have a broader powerband.

With the 55-degree setting, the Shockwave was exposing its appeal like a Playboy centerfold. Compared to the stock Run 4, Run

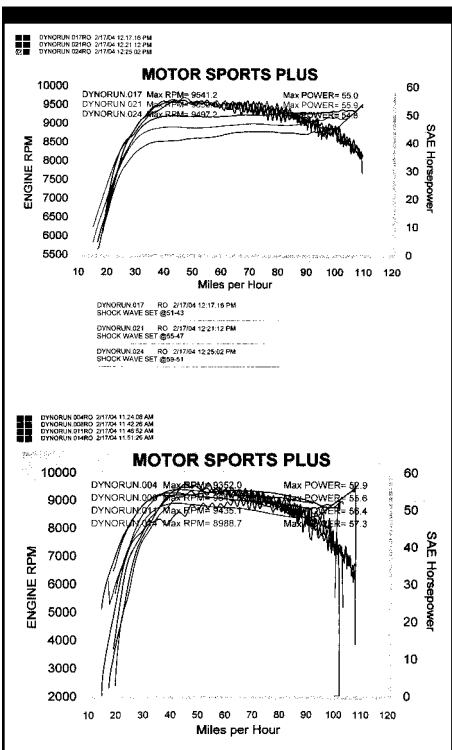
14 with the 55-degree ramp angle picked up about 9 HP at 40 MPH. That's in the heart of trail speeds. The fact it improved peak power by 4.4 HP is bonus material.

Satisfied with the performance gains, we began to play with a different helix. Fisher grabbed a multi-angle helix (an option with the kit) to see what would happen.

We wanted to see benefits to horsepower management on the top of the rev range. With the ramp changes with a straight-cut helix, the power started to fade as the clutches shifted out. That is not uncommon by any means, but we figured lessening the workload by switching to a lesser angle on the ramp profile as the clutch worked toward full-shift-out would show an improvement. Both Fischer and we were surprised when it didn't show a dramatic gain.

With a ramp setting of 51-43 degrees for Run 17, 55 HP went to the ground and the engine revved to 9541 RPM. Completing a full turn-out on the Shockwave changed the ramp profile to 55-47 degrees, which produced 55.9 peak HP and allowed the engine to rev to 9550 RPM in Run 21. One more full-turn-out produced 54.8 HP and 9497 RPM with its 59-51 degree setting during Run 24.

These graphs show how the shockwave clutch affects how much horsepower gets to the ground.



We experienced little power increase and not a big difference in power conservation techniques with the multi-angle setup. We think this has more to do with the powerplant in the Venom than any clutch work. Runs 17, 21 and 24 didn't have a dramatic reduction in peak RPM with the heavier ramp loads, but the operating RPM was considerably different. From 30 to 90 MPH track speeds during Run 17, the engine turned about 9100 RPM. In Run 21, the RPM was about 8800 for the same speeds. Run 24 showed more variation. It turned about 8400 RPM at 30 MPH and slowly climbed to about 8600 by the time the track spun 80 MPH.

At the end of our test, our best setup was a straight-cut helix in the Shockwave with the setting at 55 degrees. This was a suitable condition for a dyno room, but different snow conditions, applications and different elevations might influence the setting. The beauty of the Shockwave is its tunability to match those conditions.

Conclusion

At the end of our day on the dyno, we learned two things. The first was about the Shockwave. Its range of adjustability is stunning, and the ability to trail-side tune peak RPM in a matter of seconds is ingenious.

The second thing we learned was about our test mule. Our '04 Venom was practically impervious to peak-RPM sensitivity in regards to horsepower. It didn't care if we lugged it down to only spin to 8900 RPM or let it scream to 9800. The



We used a Dynojet dynamometer to quantify track horsepower with our clutching changes.

power loss in an over-rev so typical of two-strokes wasn't found in the Venom. There is still something to be said about 600-class triples. Especially with the multi-angle helix, our Venom also had a wide powerband in Runs 32, 35 and 39.

Either way, riding our baby triple on the trails with the Shockwave was a better experience. With the helix reverted back to the 55-degree setting that we found on the dyno, our corner-to-corner blasts were more exhilarating. In addition, our stock Venom was out-gunned from other manufacturers. Our clutch mod helped to level the playing field, so anyone riding the Venom wasn't in a constant try-to-catch-up mode on the trail.

The Shockwave is available as a helix for Yamaha clutches, or as a complete driven clutch replacement for Arctic Cat, Ski-Doo and Polaris snowmobiles. **SG**