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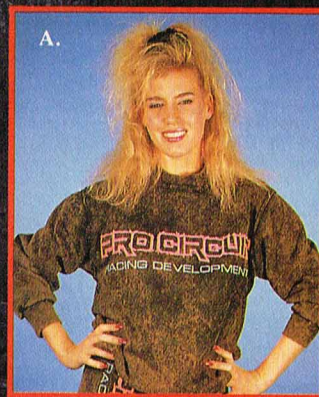
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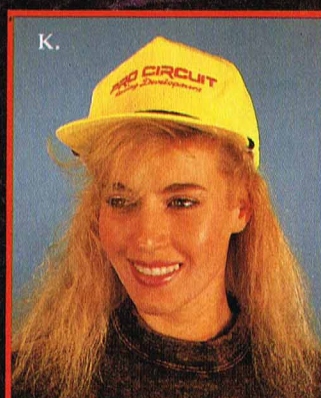
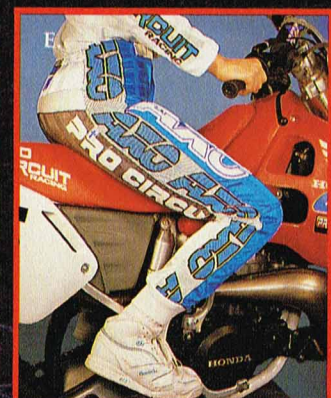
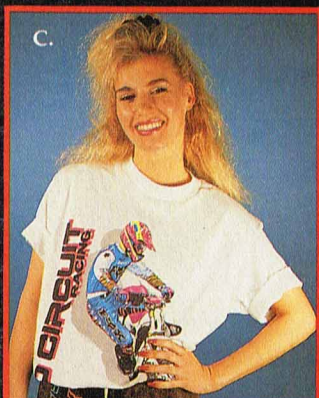
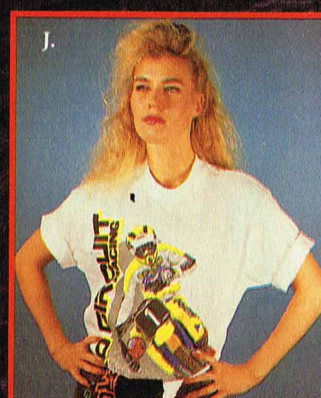
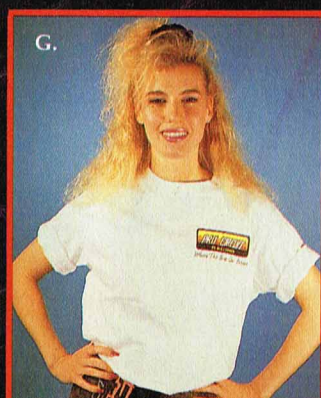
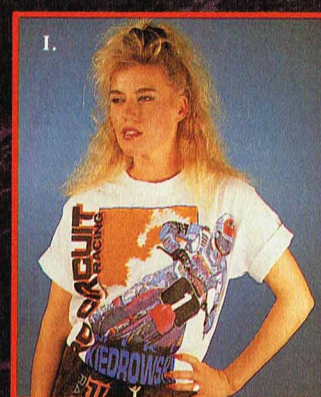
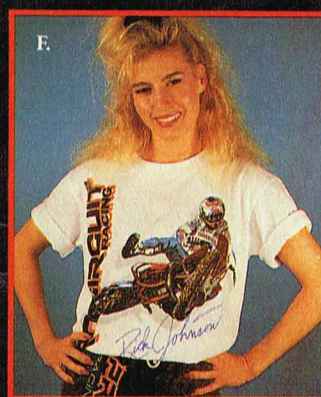
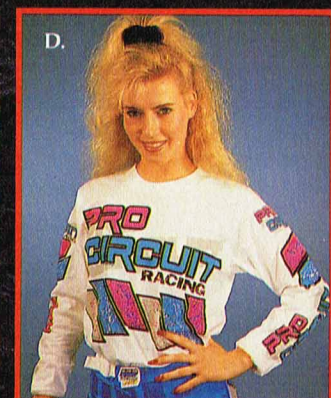
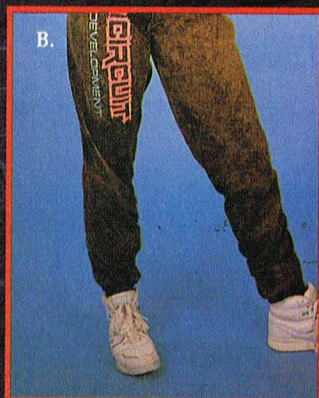
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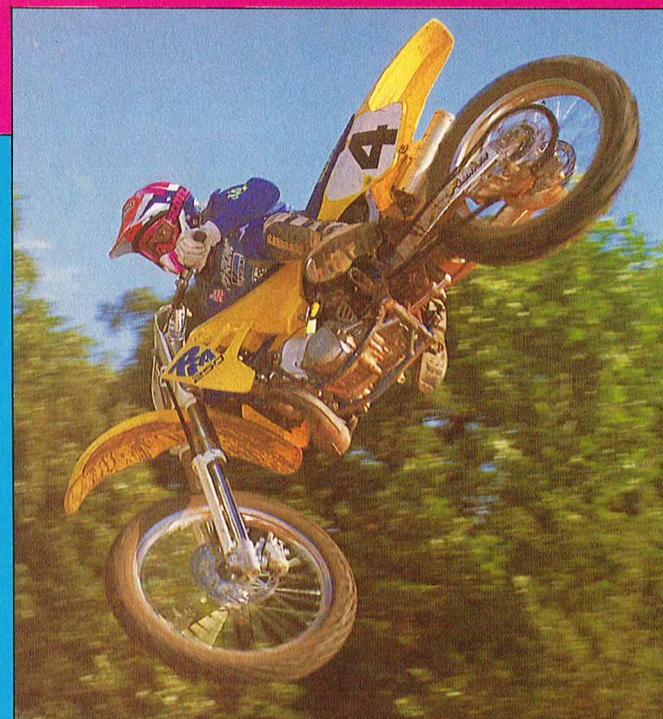
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ON THE COVER: 1991 motocrossers from Yamaha, Honda, Kawasaki and Suzuki vie for "raddest bike" honors without even moving. Kirby Concepts' custom-painted Arai MX-Pro helmet demonstrates how paint can identify you as a pro racer and say a bit about your role models at the same time. Photos by the press relations departments of the respective motorcycle manufacturers and by Kirby Concepts, except for Tim Tolleson's RM shot. Cover design by DeWest; color separations by Valley Film.

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The junkman

By Tim Tolleson

Thumping up to cruising speed on the XT600, I made my way into the left lane of the freeway, heading for the office. Just as the traffic was coming to its usual stop, I spotted Joe Kosch and our new DR350S on the center median. Normally, I'd stop to assist a fellow dirt biker on the side of the road, but Joe Papa is no ordinary rider.

Joe's a junkman.

Dan Smith has his vision honed to spot a rock outcropping 100 yards ahead on the trail at 100 mph. Well, Joe Kosch can spot a spark plug at 50 yards and tell if it's salvageable or not at about 50 feet.

So, there was Joe on the side of the road, waving and grinning like he'd just found a gold nugget the size of a KTM 540 piston. I waved back and split lanes towards the office, wondering what bit of tasty flotsam Joe Papa had discovered. The grin was massive, so it had to be something really good, like a Craftsman half-inch-drive ratchet or a pair of vise grips.

I got to the office, fully expecting Joe to be a couple of minutes behind me. About 30 minutes later, I was getting worried because it's dangerous to stop on a California freeway and Joe hadn't arrived yet. Finally, he appeared, grinning sheepishly. Somehow, he'd had the DRS on reserve and was, indeed, out of gas on the center median. He had leaned the bike over to scavenge the last ounces into the carb and make it across the highway; then he had pushed the bike a mile or so to the next station.

I felt really bad but Joe wasn't the least bit distressed at me leaving him stranded. During his push, he'd found a really neat funnel, so he was a very happy camper.

So it goes. Most dirt bikers are a fiercely competitive lot who would stuff their best friend through a water truck to win a trophy. Joe, the master of the casual pace, finds his trophies on the side of the trail—fortune's contingencies.

Some wonder, with Joe being a member of the *Dirt Bike* staff, why he hoards used plugs or bent levers like a squirrel gathers nuts for winter. With all of the perks of getting the newest bikes, gear and gadgets, why be a junkman?

In Joe's own words: "There are a lot of reasons. Most important is I want to conserve our natural resources. By putting to use a manufactured item that has been discarded, I'm preventing the needless production of a similar item. In the process, I save a bit of my own money—a resource that is often in perilously short supply. It's unfortunate that American culture is so attached to the idea of newness that the very term 'junkman' has a negative connotation. We should be looked upon as heroes!"



Joe's junk bike collection is quite impressive. Arranged artfully around his house, garage and yard are a '74 CZ250, '76 RM125, CB350, CB160, CL350, CB400, eight-speed Husky 400, CZ400, ignitionless Bul 360, CL70, '56 Vespa and CZ250 Enduro. Joe's CZ250 vintage racer is a sight to behold, with its butterknife front fender brace, automotive gas cap (the original came off in the heat of battle, creating more heat in its absence) and junk-find rear knobby. "There have been occasions when I've visited a motocross track as much for the junk tires as the racing excitement—now watch Goat Breker ban me from Perris Raceway; he's got a fine selection at his track. Not long ago I spotted a Goodyear 'Power Cushion' bias-ply there. If I'd only found it when I owned the '63 Oldsmobile *Crash & Burn* ambulance! Some people think a dirt bike hauler needs custom paint and a high-end sound system to be trick. I'm impressed with any vehicle that has four matching tires."

His local ride spot is a great source of prime junk, like the Greeves Challenger frame with a Harley-Davidson side-stand welded on it. "Someday, someone will throw away the motor, too." Once Joe Papa almost ran over a discarded toilet there and, of course, he salvaged parts to fix the broken commode at his domicile. I have no doubt whatsoever that Joe will someday find a motor and tranny for that Greeves chassis.

Joe's wife, Carol, has developed a similar habit of collecting the displaced debris of society. Whenever she comes across a stray dog or cat, she takes it home and cares for it until a suitable home can be located for the pet. Joe feels the same way about the bikes he collects—he'll give one up only if he's sure that the machine will be loved and coddled.

Though most of Joe's bikes are vintage, his junk mania hasn't turned into vintage mania, typical of the enthusiast who will

spend big bucks and long hours to obtain the cleanest, most impressive example of a given machine. "All that polishing takes too much time—which I don't give up so easily. When I score a find, I'll do what it takes to get it running and the controls working properly, but I'd rather ride than restore."

Bikes are just part of a junkman's obsession. Joe's toolboxes are filled almost entirely with reclaimed lost or discarded tools. "When I lend a tool and it doesn't come back, so what? It didn't cost me anything." Plastic buckets are another prime junkman magnet. "They're great for washing junk bikes and parts, plus they make decent bike stands." Bungee cords are a Joe Papa favorite (partly for their usefulness in holding junk bikes together). "I suppose there were times where I risked my own life and those of others just to pick up a good bungee cord—both the elastic motorcycle and black rubber trucker varieties—but there's a natural high that comes with every good roadside find."

Once Joe Papa went to the shed to pick up an RM250 but had forgotten that he'd loaned out all of his tie-downs. No problem for the junkman; he arrived for the photo session on time with the bike strapped in with junk-find bungee cords—about 100 of them. The bike looked like a scene from *Gulliver's Travels*.

Joe's hooked, a lifelong member of the junkman society. "There's nothing quite like the sights and smells of a well-stocked salvage yard, with the oil-soaked dirt and rotting upholstery. It makes a junkman feel alive! However, nothing beats the Christmas Eve-like butterflies that come before the neighborhood Large Item Pickup Day, with visions of salvageable junk bikes dancing in my head!"

If you really want to make the junkman's day, leave a Motoplat for a '73 Bultaco 360 out where he can find it. □

DIRT BIKE

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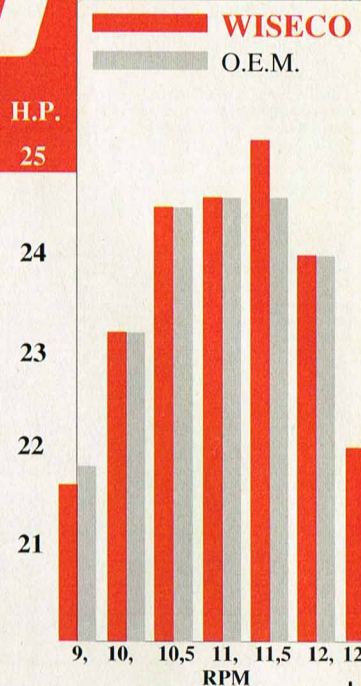
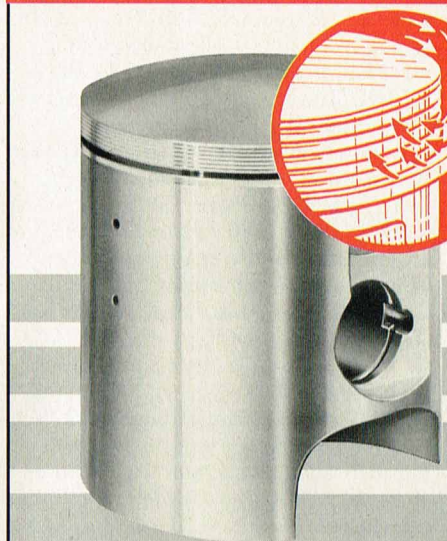
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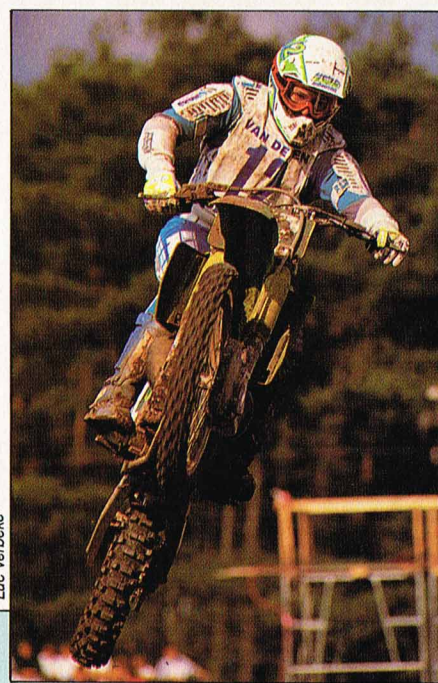
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LILES THROWS AWAY GP SEASON

Georgia's Billy Liles had a dream season going into the 500 Grand Prix wars. He'd won the opening round in Holland and backed it up with a win in Switzerland, a sixth in Austria, a third in France and a second in Finland. Liles had enjoyed a slight points lead (156-149) over Eric Geboers, who had won in Finland. Disaster struck Liles while practicing for the Italian 500cc GP, round six of the 12-race series. Liles crashed heavily over a steep tabletop and broke his right femur, ending his season and handing the lead to Geboers.

Geboers won both motos at Italy but was disgusted at the FIM's treatment of GP riders and said, if something wasn't done to make tracks safer for competitors, he would quit racing at the end of the season. Geboers lashed out, saying, "We have stupid regulations that ban double jumps but allow unsafe tabletops. What is this stupid drop-off here? It has finished Billy's season. The riders are the ones risking their necks, but they're the ones being pushed around like pawns. The FIM treats us like pigs."

We'd hoped to see an America-vs.-the-World battle at the 500 USGP finale, but now it looks like it'll be a Geboers-vs.-Thorpe battle, with Belgian Dirk Geukins a possible spoiler for the championship.

250 GPs A EURO RUNAWAY

The early 500 and 125 GP points standings may have been American benefits, but the 250 GP class is a whole different

story. Trampas Parker's move to the 250 class was overshadowed by Alessandro Puzar, who had come on strong at the end of the '89 125 GPs and carried the momentum into the '90 season. Puzar won the first three rounds convincingly, with Parker second in points, struggling with an intestinal infection. Trampas only scored two points at the fourth round, while Puzar blazed to another 1-1 finish. Michele Fanton passed Parker in points that round.

Round five saw Dave Strijbos take the first-moto win, but the second Czech moto was canceled when Strijbos crashed and was dragged off of the track, unconscious. Disaster also struck Parker, who injured his shoulder during practice in Czechoslovakia. Puzar then went on to score maximum points at Holland. After six rounds, Puzar leads Strijbos, 210-128, with Van den Berk, Fanton, Parker and Pekka Vehkonen third through sixth. Vehkonen broke Puzar's win streak in France, but the Italian Suzuki star will no doubt wrap up the 250 title with several rounds remaining.

DONNY SCHMIT CONTINUES 125 GP LEAD

Donny Schmit held out for money at the end of the 1989 season, where he finished fourth in the 125s as a support rider, and found himself without a Suzuki ride for 1990. So he packed up and went to Europe to contest the 125 GPs. Like Trampas Parker in '89, Schmit has set the 125 GPs on its ear. He swept both motos in Italy, finished second behind Pedro Tragter in Holland, then finished fourth in Czechoslovakia to keep his early-season points lead over Holland's Tragter.

Donny then swept both motos of the French 125 GP, leading an American sweep of the top four positions. KTM pilots Mike Healey and Bobby Moore were split by Kawasaki's Tyson Vohland in France. Healey's second put him past Tragter in points, giving Americans the top two positions going into round five in Germany. Then Bobby Moore came alive, winning the German GP over Vohland and Badder Manneh. Moore moved to second in points, behind Schmit, 147-123.

ROESELER BLASTS TO BAJA WIN

Team Kawasaki's Larry Roeseler, Danny LaPorte and Ted Hunnicutt, Jr., took the overall win at the SCORE Presidente Baja International 500. Roeseler crossed the finish more than four minutes ahead of the second-place finisher, KTM-mounted Dan Smith, after starting more than two minutes behind the Dan Smith/Doug Hamel team.



Tom Van Beveren

1991 ATK 350ES DUAL-SPORT

ATK has introduced a line of 350cc four-strokes for 1991. There are four versions available, with either cross-country or motocross models in either kick-only or electric-starter with kick backup. The MXers have 2.2-gallon fuel tanks and safety seats for \$4995 or \$5995 (electric); XC models have 4.7-gallon tanks and full lighting for \$5440 and \$6480. The electric-start XC can be ordered with turn signals, making the bike street-legal in states not requiring metal fuel tanks.

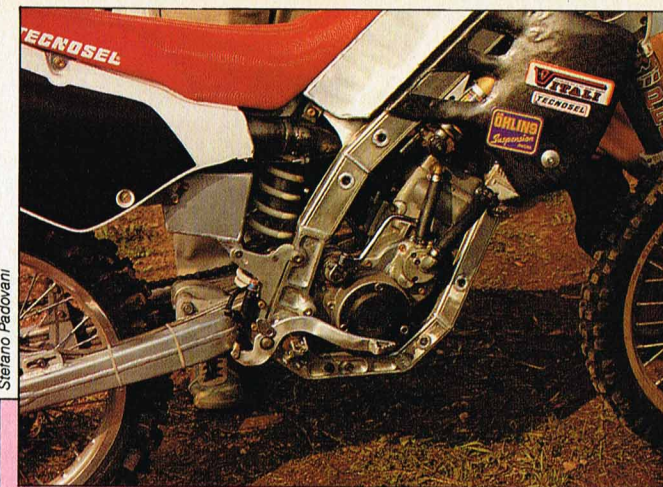
ISDE TEAMS CHOSEN, KAWASAKI BACKS OUT

America's World Trophy Team for the coming ISDE in Vesteras, Sweden, will consist of Randy Hawkins and Charles Halcomb aboard Suzuki DR350s, Kevin Hines on a KTM 250, Dave Bertram on a Suzuki RMX250 enlarged to 260cc for 500 class competition, Kawasaki KX125-mounted Jeff Fredette and KTM 125-mounted Jimmy Lewis. U.S.A.'s Junior World team will include David Rhodes, Kelby Pepper, Steve Hatch and Matt Savich. The Junior World team is comprised of riders no older than 23 years of age so that promising young talent can gain ISDE experience. Thirty-seven riders will compete on U.S. teams this year.

In a surprise move, Team Kawasaki withdrew its ISDE support. As a result, Larry Roeseler, Kurt Hough and Aaron Hough forfeited their positions on the World Trophy Team. America loses important Kawasaki technical support as well as key riders with the Team Green pull-out. Kawasaki-mounted Jeff Fredette is paying his own way to represent America in Sweden.

The Ride to Win fund was to have held an ISDE training camp taught by Bob Hannah and Dick Bursleson for the U.S. teams but it may be canceled as Ride to Win diverts funds toward the now lacking technical support for our teams.

Stefano Padovani



EXOTIC BIKES OF EUROPE UPDATE

Stefano Padovani sent us this photo of the most outrageous bike we've ever seen. This Italian-made 125 started life as a go-kart but had a gearbox and perimeter aluminum frame added to transform it into a GP-level dirt bike. It has an aluminum monocoque subframe/airbox and carbon fiber radiator shrouds, which double as the radiator's outboard supports. Ohlins provides suspension, and aluminum abounds on the beast.

ATK HOT POTATO IN IDAHO

Ron "Needles" Naylor cleaned up at the Sun Valley, Idaho, GP, which was the seventh round of the AMA National Championship Hare Scrambles series. Naylor took his ATK 406 to an unheard-of victory margin of 15 minutes over second-place finisher Joe Zierman (ATK). Larry Roeseler was third. Tragedy struck defending Hare Scrambles Champion Scott Plessinger (KTM) on the start of the classic Grand Prix event. Plessinger hit a hidden rock at speed and suffered collarbone, ankle and shoulder injuries. He'll sit out the last two rounds.

On a lighter note, former KTM and Yamaha factory rider Broc Glover resurfaced at the Sun Valley GP after a disappointing '89 250GP season. The former 125 and 500 National Champ competed in a grueling mountain bike race before the SVGP and took the overall win.

MAMMOTH MOUNTAIN MX INVASION

The Old Timer and Over The Hill Gang invaded Mammoth Lakes, California, for two days of banging bars. Alan Olson topped the Old Timer Masters, while David Woods won the OTHG Ex-



Rich Thorwaldson was on the gas at the Mammoth Mountain Old Timer's MX, but a couple of bobbles at inopportune times dropped him to fourth in the OT Masters class.

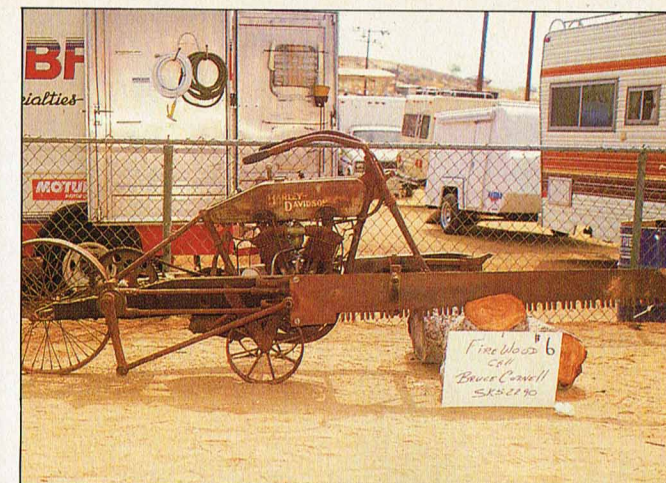
perts. More than 350 old guys braved snow, rain and mud during the first day of racing, then things cleared up for *primo* conditions on Sunday. If you think that old guys can't get it on anymore, check out this event. There was every bit as much bar banging and knob rubbing as the 250 Intermediates at a Loretta Lynn's qualifier.

During the next week of racing, Tallon Vohland leveled the 125 pros, Chicken Matiasevich slammed to the 250 win and Johnny O'Mara almost pulled off the 500 pro win for Kawasaki. YZ490-mounted Doug Dubach made a last-turn banzai move past O'Show for the win, but O'Mara had the best combined score (2-3-3) for the three classes and took home the \$5000 Top Pro award.

YAMAHA EXPANDS CONTINGENCY PROGRAM

Yamaha is making a big push for 1991 and has expanded its contingency program by a whopping million dollars, bringing the 1991 budget to \$1.7 million. This, along with the much-improved per-

formance of the '91 YZs, should get a lot more riders on white machines and into the winner's circle. Yamaha also announced '91 YZ prices: the YZ80B1 carries a suggested retail of \$1699, the YZ125B1 is \$3499 and the YZ250B1 costs \$3999. There is no 1991 YZ490. The



1991 HARLEY WOODS BIKE?

Dubbed the "EFITC" (Earth First Infested Tree Cutter), this Harley-powered woods bike was spotted at the World Four-Stroke Championships. Unable to make the bike agile enough to snake through tight woods sections like the current crop of motocrosser-based enduro machines, the H-D folks added a wood-cutting attachment to level obstacles. It may not be competitive in a National enduro, but we bet the loggers up in Washington would like to get their hands on a few.

UNKNOWN BEATS THE BEST AT BLACKWATER

KTM 125 rider Thomas Norton of Norfolk, Massachusetts, bested a field of almost 500 riders, including off-road racing giants Terry Cunningham, Larry Roeseler, Scott Summers, Ed Lojak, Mark Hyde and more, to win this year's Blackwater. Norton's winning the race, famous for power-sapping deep mud obstacles, aboard a 125 makes his victory one of the motor racing world's most shocking upsets. The 16th running of the famous Davis, West Virginia, event was the sixth round of the AMA Wiseco/Yokohama Grand National Cross-Country Series. Mark Hyde, the winningest Blackwater racer in the event's history, followed Norton into the finish. Tim Shepherd, Scott Summers and Frank Keegan rounded out the top five. Team Honda XR600-mounted Scott Summers leads the series with a 26-point advantage over Team ATK's Gregg Zitterkopf. Only seven points separate the next three riders in the series points standings, Yamaha riders Ed Lojak and Jeff Russell and Kawasaki's Scott Plessinger.

WR250B has a suggested retail cost of \$4199. Word has it that the YZ250B1 motor mods carry over to the WR and the suspension is updated, but don't expect lights to come standard. Look for the unveiling of a secret '91 Yamaha in the November issue of *DB*. □

RIDERS WRITE

TIDDLER ON THE ROOF

Dear *Dirt Bike*,

It happens to all of us sooner or later. We get so wrapped up in the various processes of our endeavors that we lose our objectivity. We're so busy building ladders that we forget to check out the roof. Case in point: *Dirt Bike* magazine, April '90, page 30, "Budget Flier." If this is supposed to be a budget project, why did Mr. Wise spend money on sandblasting and painting the frame and cylinder and replace a perfectly good seat cover, fenders, fork boots and headlight assembly? Isn't that a lot of moolah to dish out for cosmetic fluffery? Being an IT200 owner myself, I can certainly appreciate the technical modifications. I've set up my bike almost exactly like the one in your article and find it most competitive. It's an absolute blast to ride, but at a much lower cost—and it still looks good. You also neglected to mention a few companies/items that IT200 owners should know about: Krause Racing (porting pipes, chains, sprockets), Noleen Racing (Yamaha suspension experts), Bark Busters (for peace of mind), Answer Roost Boost (stronger, crisper engine response), Cobra Sparky (an enduro necessity), Sun-line levers (easier to reach than stock), Barnett Clutch Kits (stronger and less expensive than stock), Boyesen Reeds (excellent performance gain for low \$).

I'll conclude by stating that, aside from this fluke, your magazine is as great as it ever was. I should know; I've read every issue since '74. Print this—you owe me.

Vincent Fuess
Dallas, TX

Vincent, you have a point, but you might do well to have a look at the roof, also. Project bikes, by their very nature, are costly. A budget project bike is something of a contradiction in terms unless one looks at the theme of the project: low cost, rather than the total for the items in the project. Imagine if we'd done a story on 1000 one-dollar modifications you can do to your dirt bike. Would you blast us for spending a grand on one-dollar mods? We do project machines for our entire readership; some will need the cosmetic parts, some will like the tech parts. That's why DIRT BIKE has been interesting and, on occasion, irritating readers like you since before '74.

EVIL TECHNOLOGY?

Dear *Dirt Bike*,

Since Earth Day, I cannot in good conscience ride my dirt bike any longer. The environment is far more important than a

superfluous dirt bike. Please cancel the remainder of my subscription.

Kevin Quarino
Brockton, MA

Kevin, we'd like you to reconsider your plans for your dirt bike and your DIRT BIKE subscription. Don't panic and fall into the hyper-environmentalist trap that calls you to cast off technology as though it's the only route to compatibility with the environment. Technology, properly managed, is the only way we can save the environment—and it will help us have some fun, too! Consider also that severing your ties with motorcycling will mean detaching yourself from a dedicated environmentally conscious group. Many AMA districts and clubs participated in clean-ups and other volunteer work on Earth Day, and their desire to better their environment isn't limited to one day a year. While these riders were out cleaning, many "mainstream" Earth Day participants left more litter than a typical rock concert audience at sites all across the country. Who's deceiving whom? In any case, be sure to recycle your cycle.

SUBJECT MATTER

Dear *Dirt Bike*,

Let's see you print this. It was a relief to see your article "Top Ten Enemies." I was about to give up on your magazine after seeing numerous recent irrelevant entries such as a bunch of guys standing on their handlebars (April '90), another whole page of nonsense about dirt bike dogs (April '90), a whole page of nonsense about the world's fastest refrigerator (May '90), two-thirds of a page of fluff about a party in Beverly Hills (May '90), nine pages of leftovers from *Motocross Action* magazine (between pages 27 & 39, May '90), large sections of recent issues devoted to advertising and a lot of talk about old bikes.

Is your target audience dirt and trail riders or readers of *People* magazine? If I want humor I can buy *Mad* magazine, if I want fluff and fashion I can buy *GQ* magazine, if I want to read about motocross I can buy *Motocross Action* magazine. Maybe you guys should subdivide your magazine into a number of specialized publications such as *Dirt Bike Lamppoon*, *Vogue Bike* or *This Old Bike*.

Face it, you guys have been wasting a fair amount of magazine space and writing talent on stuff that has zero to do with trail riding. You have all you need to make *Dirt Bike* magazine excellent, so why not do it?

Jim Yost
Huntsville, AL

Jim, it's a relief to know you're not upset about our pulling that big trail riding

story out of the lineup for the May issue to allow space for the "Ten Worst" article. By the way, there's some pretty good fashion info in MAD.

OLDIES BUT GOODIES

Dear *Dirt Bike*,

I've enjoyed your magazine for many years now and it just keeps getting better all the time. Keep up the good work.

After reading the May '90 "From the Saddle," it really bugged me how the AHRMA has put so many restrictions on vintage bikes. Personally, I'd like to see obsolete classes. I've got an old '83 KTM 504 that I've been riding for six years. I'd love a new bike but can't afford one and I've been aching to race again. I'll bet there are thousands of riders out there just like me. Why not an obsolete class? Is there someone we could write to to show our interest? Just thinking of the possibility of racing again gives me the old pre-moto butterflies!

Roy McDowell
Sumner, WA

Roy, stop aching to race and get out there! A well-ridden '83 like yours can dice with the latest bikes in the less intense classes, provided it's in reasonable shape and the suspension is properly set up. If you're set on the obsolete class idea, gather some friends with similar-age bikes and approach the promoter at your local track. Show him evidence of the interest in terms he understands (entry dollars) and he'll go for it.

GENTLEMAN JIM

Dear *Dirt Bike*,

At the Seattle round of the Mickey Thompson Ultracross series, my family was walking around getting autographs before the race when we happened upon Jim Holley. What I got was much more than an autograph. In front of us was a man with his son, who was mentally and physically handicapped. Holley took the time to sign autographs while someone in his group helped the young man up on Holley's bike so his dad could take a picture. This is something the father and son will never forget and, by the lump in my throat as I stood watching, I knew it was something I will always remember every time I am able to go riding with my sons. I'm quite sure one young man and his father came away from the race with a memory that topped the ones the other 25,000 or so spectators got from the exciting racing that evening.

Thanks, *Dirt Bike*, for associating with a class act like Jim Holley over the years. This moves you up a notch or two in my book.

Rod Carlisle
Renton, WA

Jim Holley is a true professional's professional racer and a genuinely good person, a DIRT BIKE kind of guy if ever there was one. □

1990 FLAT RIVER GRAND PRIX



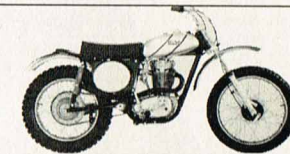
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CHECKPOINT

You are what you eat

By Rick Sieman

It was late in 1973. The weather was on the cool side and the skies had been dull gray the last few days. Then it rained lightly for two days. When the rain stopped, the temperature locked firm at 62 degrees, but the TV weatherman said all the rain clouds had headed for New Jersey, which, rumor has it, is their breeding ground.

I had to go riding. No one could pass up perfect weather like this, and I knew that the soil would be damp and that dust would be non-existent. I called all of my regular riding friends, but they were either working or already off somewhere.

I still had to go riding.

Then I called some people I don't even like, in search of a riding partner. No luck. One was recovering from an injury, another was recovering from a slam-dunk contest with a bottle of tequila and the other two were not to be found.

The urge to go riding was getting stronger.

So, rather foolishly, I decided to go riding alone. Now you've been told for years that you should always go riding with someone else, and that is, indeed, a sensible rule.

But I just *had* to go riding!

So I loaded up an enduro bike in the back of my trusty El Camino and headed for the mountains north of Los Angeles. I packed a lot of tools in the fanny pack and even added some extra air to the tires so I wouldn't get a flat.

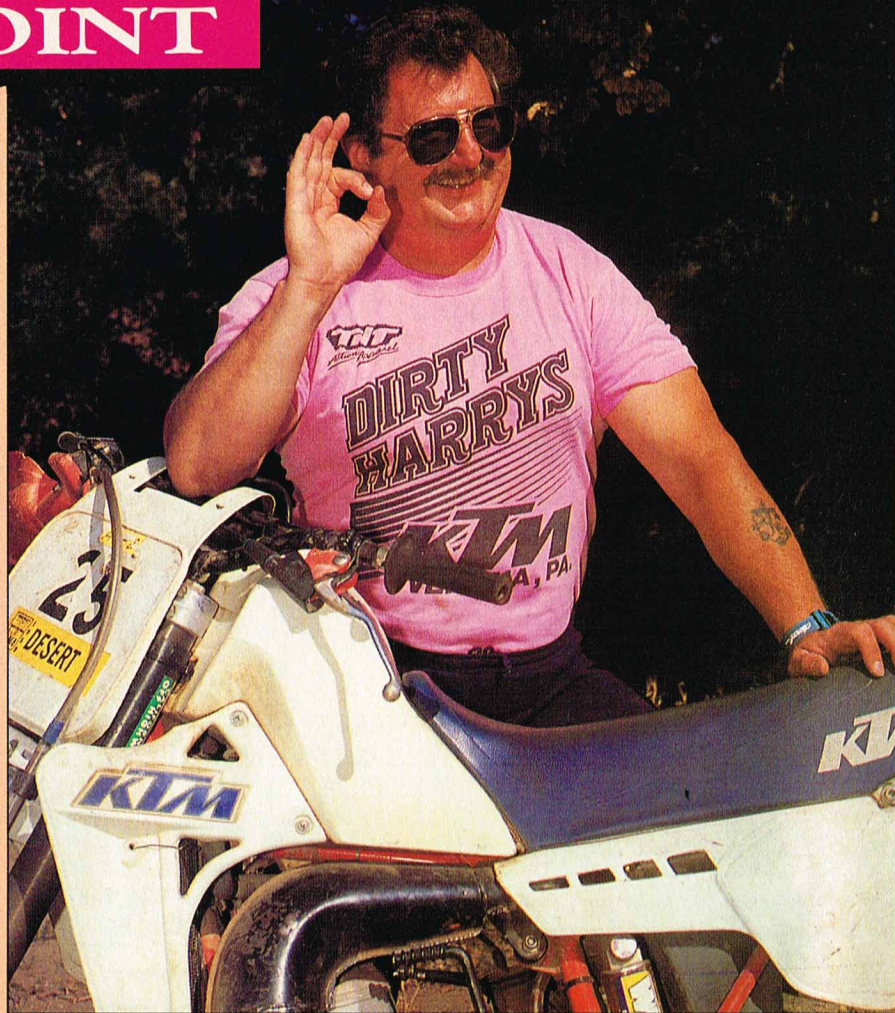
When I got up to my favorite trail area, the sand was moist enough to wad up into a sand-ball in the palm of your hand. When I unloaded the bike, you could see the knobby tracks in the sand like they were cast in plaster. Perfect.

I put on a stout enduro jacket and filled up the canteen, then headed out on the trails leading into the mountains. Traction was perfect and the bike responded like a thoroughbred. A blip on the throttle would make the bike leap forward and the front end would nudge off the ground when under power.

I made a mental note to stay on the main trails, just in case I got into any sort of trouble—but what sort of trouble could a seasoned dirt biker get into if he used his head?

About halfway through the 35-mile loop I was planning on taking, the front end washed out when it hit a slick spot, and I sailed off the edge of the fire road and tumbled down a 30-foot embankment.

The fall wasn't all that bad. The wind was knocked out of me and my visor was broken, but the bike seemed to be in one piece. Un-



fortunately, that one piece had followed me down and had me pinned firmly to the ground. The odd thing was that I couldn't move. I knew what the problem was. I had re-injured my back—a pinched nerve—and simply could not move from the waist down.

I knew it was only a matter of time before the pinched nerve got better, but in the interim I was trapped underneath a 325-pound four-stroke and couldn't get free. After a while, it started to get dark and I started to get hungry. There were plenty of tools in the fanny pack, but no food.

I had no idea how long I would be trapped there, but the will to survive runs deep and strong in any dirt biker. So, in desperation and with the will to live burning like a 55-gallon drum of pre-mix, I came up with a strategy for survival.

I would eat the motorcycle.

The next morning, after a night of broken sleep, I ate the foam from the saddle. It wasn't too bad, because I prepared it with some grass that I pulled out of the ground. Sort of a side dish.

Later that afternoon, I ate the fork boots and control cables. The next day, I wolfed down one tire and tube with the help of a pair of side-cutters. This took the edge off my hunger (tires are quite filling), and I was able to sleep well that night.

The following day, I ate the other tire and had two grips for dessert—but I had to pace

myself! There was no telling how long I would be there, and common sense told me that I should ration myself.

Over the next two days, I ate the filter, the airbox and most of the plastic parts. Another day went by, and I started getting apprehensive. Most of the edible parts were gone, and I was forced to gnaw on the spokes and control levers to quell my hunger. It helped, but it was nothing like a good piece of saddle foam.

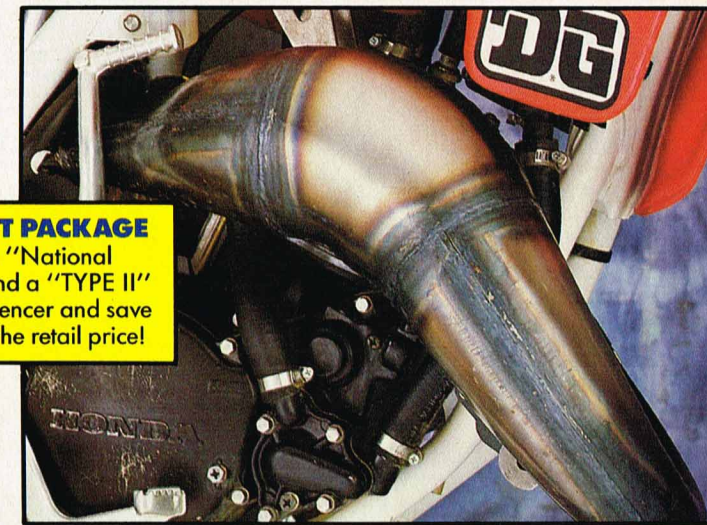
With nothing tasty or edible left, I started to weaken and was even near giving up hope, when I heard the sound of a dirt bike motoring along a nearby trail. It was Ranger Bob on his DT1, on patrol. I called for help and he quickly responded by scrambling down the slope and lifting what was left of the bike off of me. Instantly, the pressure on the nerve was released and all feeling came back to me.

Ranger Bob gave me some water and a granola bar before we headed on back. He became more than slightly irritated when I tore off a piece of his saddle cover to go with the granola bar, and threatened to leave me in the woods if I didn't behave myself.

Well, I certainly learned my lesson about going riding alone and promised that I would never do anything that dumb again. Funny thing, though. Every time I attend a new model dirt bike preview, my mouth starts to water. □

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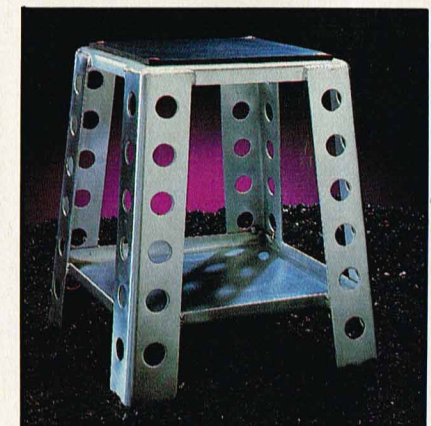
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SURE FUN FOR '91

*Works parts on
production racers*

By the DIRT BIKE Staff

Yamaha did not sell very many 1990 YZ250s, partly because the famous YZ midrange hit was toned down from '89 and partly because the suspension was overshadowed by Kawasaki and Suzuki. For '91, the tuning fork folks want to set the motocross world on fire with a much-improved YZ250 and an easier-to-ride YZ125.

They've addressed every complaint of the past and thrown in full-on works technology learned from Team Yamaha's racing efforts, and they've made styling changes to attract trendy youths. Yamaha wanted to snare the other manufacturers, so they invited *Dirt Bike* out to test pre-production 1991 YZs head-to-head against '90 models, just like regular paid Yamaha test riders. However, instead of being sworn to secrecy, we could bring our cameras along to record the suspension testing.

What a change! Instead of having to crawl for miles through cactus and evade security guards to get new-model photos, we merely drove through the front gate. Here's what we saw and experienced.

LOOKING AT THE CHANGES

Both new YZs have all-new suspension components and geometry. A different shock angle and linkage mate with revised shock valving to provide smoother action out back, and works-type 43mm KYB forks, which have both the compression and rebound stacks on top of the cartridge, replace the



The 1991 YZ125 (left) stands out from the '90 model with wilder colors and graphics on top of radically changed plastic. Snagging your boots and tearing the seat's lower front portions are a thing of the past.

◀ Jim Holley airs out the new YZ125, which has much better low- and midrange suspension, brakes, shifting and throttle response than past efforts. It's less demanding and faster than the '90.

much-criticized 41mm units. Although swing-arm length is unchanged, the tapered shape is new and looks trick. Extensive motor changes, new Nissin brakes and shorter silencers also follow works modifications to both machines.

Both bikes also received new plastic and graphics. The seat is reinforced at the lower front edge to cure tearing problems, and the all-new side panels extend all the way to the tank to prevent your boots from snagging on the seat. These side plates also incorporate the best grab handles to ever grace a dirt bike, and the rear fender is styled to flow with the panels and lower-swooping radiator shrouds. Both the front fender and number plate were standard '90 fare, but we hear tell a space-age aerodynamic front plate and tube-hugging '90 XT600-type front fender may see final production.

We polled riders on the new magenta-on-white seat and graphics and found no middle ground—either they loved the Team Yamaha replica colors or they hated them. If you don't like 'em, their stickers peel off easily enough and a seat cover will tone down the new-wave looks. These bikes are so good you'd be crazy to pass them up because you don't like magenta.

WRINGING OUT THE 125

Most of the modifications to the 125 were directed at making the bike easier to ride without losing anything on top. Besides the works-type shortened silencer, the '91 125 got an all-new power-valve shape, porting, head shape and carb settings. This, along with tightening up the overall gear ratios with a one-tooth-larger rear sprocket (from 50 to 51), gives the new YZ much better throttle response in the lower revs with a stronger midrange punch. The bike also revs a bit further than the '90, requiring fewer shifts per lap.

Ah, yes, shifting. Yamaha threw away the hated, notchy shifter plaguing past models and went to an all-new ratchet-type design with more leverage. Our brand-new '91 test unit shifted much easier than the well-broken-in '90 we had along for comparison. Up, down, with or without the clutch, even in deep sand, shifting is excellent.

Suspension action is better balanced than '90, and both ends are much more compliant over small bumps. The ride is much more predictable on whooped-out sweepers, where the '90 kicks. Turning is quicker, and the brakes are more powerful and quieter.

TESTING THE YZ250

Stroke was increased .8mm (from 68mm to 68.8mm), bumping displacement to 249.9cc. Power-valve timing, the ignition curve, the pipe dimensions and head volume were fine-tuned to provide crisper throttle response in the lower revs. Low-end and midrange response and power are much stronger, while top-end power is like the '90. Receiving the same shifting changes as the 125, the 250 shifts much smoother this year.

Like the 125, turning is quicker yet high-speed stability is better. Both brakes are stronger and quieter. Your boot no longer snags on the seat, although the right side panel does bow your leg out a bit more than the '90 plate. Despite the stronger hit, the bike is easier to ride in slick conditions.

As we stated before, we were there to test for Yamaha R&D. The first fork settings were better than the '90 forks but still transmitted a spike to the arms when slapping down from jumps. A Kayaba technician was on hand to handle complaints with the settings, and he installed a less progressive compression stack. After dialing both ends to the new damping curves (see related article on setting up your suspension properly), both Holley and Torquin' Tim were stoked with the 43mm forks. If these settings see production, the '91 YZ250 will have better forks than the '90 KX250 and a better shock than the '90 RM. We're talking tremendous improvement and a plush, predictable ride.

◀ Both 1991 YZs got works-style 43mm forks, a new frame and linkage combination, a tapered Delta box swingarm, extensive styling changes and motor mods coming directly from Team Yamaha.



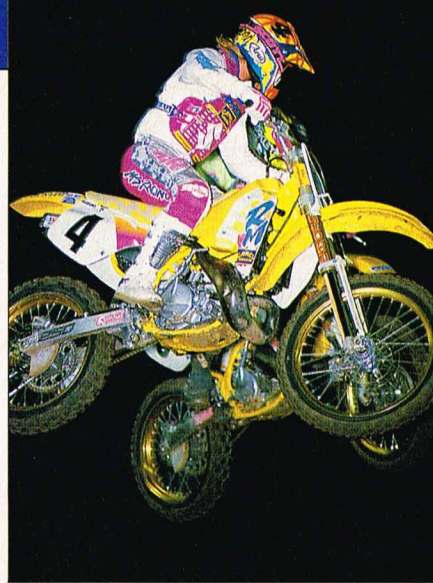
'91 SUZUKIS

• Suzuki also made radical styling changes to their motocross line, along with several technological changes to fine-tune the same basic design packages. The effort to build better machines and attract the fashion-conscious youth market with wild styling is coupled with Suzuki's huge racing budget, generous contingency program, free Tony D riding school and support trucks at events across the country again for 1991. Suzuki is definitely making a push to displace Honda as the most represented bike at starting gates across America. National championships and wins from Denny Stephenson, Buddy Antunez, Guy Cooper and Larry Ward show that the '90s have potential, and the '91s will benefit from lessons learned by Team Suzuki. Let's take a look at the changes.

ACROSS THE BOARD

All RMs get a yellow frame, white radiator shrouds and side panels with yellow/orange graphics, a textured mottled yellow/gray seat and a white front number plate. Most folks either love or hate the new look, depending on age and taste. It's clearly a Japanese effort at being hip, and one staffer dubbed the new look "McRM."

Strengthened frames, pistons, rods and welded cast/extruded swingarms are new for all RMs, and the 250 and 80 have the '90 125-type dual O-ring head gasket. The 125 and 250 get Team Suzuki-inspired Showa suspension components, with 45mm inverted cartridge forks up front and an Ohlins-type fade-control system out back. Suzuki's Showa milk-bottle shock also features 40 percent more oil capacity than the '90 KYB unit (the 80 also has this fade-fighting feature). Bob Hannah did extensive testing with Showas and KYBs and found the Showas to offer better weight transfer for cornering and quicker lap times. Guy Cooper tested



Suzuki unveiled its 1991 styling changes at the '90 supercross final, an appropriate introduction considering how the extensive motor and suspension changes came from Team Suzuki.

the '91 units against his '90 race bikes and found the action to be almost identical.

Both big RMs have new, better-flowing silencers and a parallel-type dual radiator system, where coolant circulates through them individually rather than flowing through one and into the other. New linkage bearings and dust seals grace the 125 and 250, along with thicker brake pads for durability. A stronger chainguide is standard on all RMs, as is a stronger gear shift cam stopper plate, which sometimes broke last year in crashes. All RMs now have four-petal reeds instead of eight-petal units, for quicker throttle response.

250 CHANGES

- Low- to midrange power enhanced by changes in exhaust port and power-valve timing, shortened intake tract and expansion chamber.
- Piston has seven percent more silicon (and no plasma coating) for more durability.
- Connecting rod strengthened to handle



The best 80 of '90 gets better for '91. Its modifications are intended to make it more fun and easier to ride and less a pain for dad to maintain. Additional gusseting behind the steering head increases rigidity.

increased horsepower, as are third, fourth and fifth transmission gear engagement dogs.

- Steering quickened slightly with one-quarter-degree steeper head angle, 5mm less trail and 2.5-degree more offset (27° 15', 108mm and 22.4°).

- Different lower steering head bearing for better bearing adjustment (see article on setting up your suspension in this issue).

- Better foot support is supplied by 10mm wider footpegs.

125 CHANGES

- Top-end power is enhanced by booster exhaust ports and different exhaust valve guides.

- Piston is no longer plasma-coated and has seven percent more silicon for more durability.

- Third through sixth gears are strengthened.

- Steering geometry is quicker (from 28° to 27° 45' rake, 116mm to 111mm trail, 27° to 24.5° offset).

80 CHANGES

- New steering head dust seal extends bearing life.

- Rear compression and rebound damping revised for more progressive action (smoother on small bumps).

- Ring 0.25mm thicker for better durability.



More frame rigidity, quicker turning, completely new Showa suspension, more powerful brakes and across-the-board power increases were the goals for the 1991 RM250. We hope it's as fast as it is ugly!



For the last two years, the RM125 has been a slug on top-end. Suzuki set out to change that with a less-restrictive silencer, exhaust boost ports, new exhaust valve guides and new piston.

'91 HONDAS



◀ New linkage ratios and damping curves, graphics and 250-styled gas tank, seat, side panels, rear fender, airbox and subframe highlight the 1991 CR125. Honda's press release says the "striking new graphics emphasize the aggressive performance of the hot new CRs."



◀ All big Honda motocrossers get redesigned Showa forks with larger damper cartridges, the springs placed high on the cartridge to fight friction and contamination, a new bottoming system and internally anodized legs.



◀ Like the 125 and 250, the CR500 gets a new KYB shock with a newly developed swivel bearing. The 500 also gets 250-styled subframe, airbox and plastic. Numerous refinements grace all three red rockets.

'91 KAWASAKIS

Kawasaki went all out on the KX80. Changes include a tubular perimeter frame, stiffer box-section swingarm, suspension refinements, new linkage ratio and extensive motor mods to increase rideability and longevity. The bike looks every bit as trick as its big brothers. ▶



Refinements for better power and terrain control were priorities for the KX125. New works-style forks and a forged link with revised ratio, lighter wheels, aluminum sub-frame, a dual-piston front brake, a stiffer swingarm and frame and a new micro-processor ignition for a wider powerband top the changes. ▼



▲ Sales of Open-class machines aren't great enough to warrant a perimeter frame, but the KX500 got all of the chassis, brakes, suspension and ignition changes that the 125 and 250 did. On top of that, the 500 has KIPS-D, which features a decompression system built into the power-valves for easier starting.

◀ The KX250 gets all of the '91 KX125 mods plus a new pipe for more top-end over the '90 KX250. We're glad to see that Kawasaki resisted the trend towards bizarre graphics/color combos and concentrated on refining the Green Machines. □

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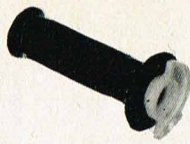
CRANK REBUILD KIT



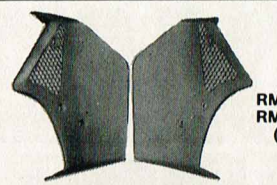
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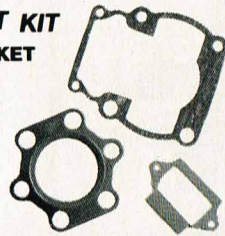


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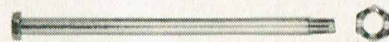
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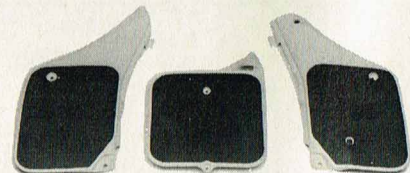
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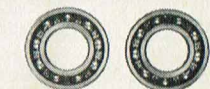
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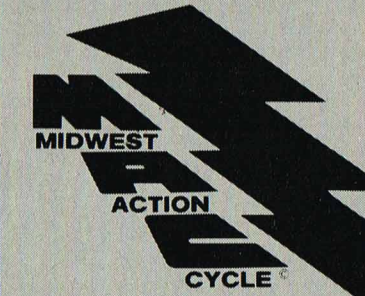
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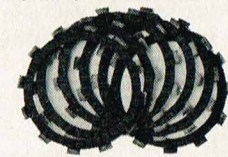
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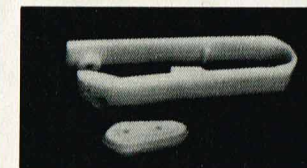


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SWING ARM BEARING AND SPACER KIT



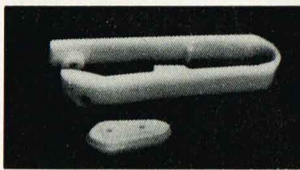
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GENUINE KAWASAKI

KX 80 (1980-90)	139.99
KX 125 (1982-85)	173.10
KX 125 (1986-88)	195.25
KX 125 (1989-90)	169.95
KX 250 (1980-85)	225.10
KX 250 (1986-87)	201.99
KX 250/500 (1988)	239.75
KX 250/500 (1989-90)	281.95

FENDERS

ORIGINAL . . . TEAM KAWASAKI. Fit perfectly for each yr. & model. NO DRILLING HOLES - BOLTS RIGHT ON.

FRONT

KX 80 (1981-90)	\$18.60
KX 125/250/500 (1980-83)	19.30
KX 125 (1984-85)	43.70
KX 125 (1986-90)	19.30
KX 250/500 (1984-86)	43.70
KX 250/500 (1987-90)	19.30

REAR

KX 80 (1983-90)	17.95
KX 125/250/500 (1985-87)	21.50
KX 125/250/500 (1988-90)	19.95

KAWASAKI Clutch Plates

FIBER DRIVE

KX 80 (1981-87)	\$6.65 ea.
KX 80 (1988-90)	6.99 ea.
KX 125 (1980-87)	8.25 ea.
KX 125 (1988)	5.99 ea.
KX 125 (1989-90)	4.99 ea.
KX 250/420/500 (1980-83)	6.60 ea.
KX 250/500 (1984-90)	8.25 ea.

WRIST PIN - WRIST PIN BEARING

WRIST PIN

KX 80 (1979-90)	4.95
KX 125/250/500 (1974-90)	6.50

WRIST PIN BEARING

KX 80 (1979-90)	6.70
KX 125/250/500 (1974-90)	6.50

BRAKE SHOES/PADS
GENUINE KAWASAKI

FRONT

KX 80 (1981-83)	\$10.95 pr.
KX 80 (1984-87)	38.95 set
KX 80 (1988-90)	25.95 set
KX 125/250/420 (1980-81)	16.95 pr.
KX 125/250/500 (1982-86)	40.95 set
KX 125/250/500 (1987-88)	19.95 set
KX 125/250/500 (1989-90)	29.95 set

REAR

KX 80 (1981-87)	10.95 pr.
KX 80 (1988-90)	25.95 set
KX 125/250/500 (1980-85)	13.25 pr.
KX 125/250/500 (1986)	29.95 set
KX 125/250/500 (1987-88)	25.95 set
KX 125/250/500 (1989-90)	30.75 set

CRANK MAIN BEARING AND SEAL KIT

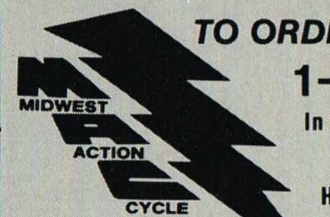


GENUINE KAWASAKI FACTORY PARTS. Consists of two main bearings and two crank seals.

KX 80 (1980-90)	\$20.95
KX 125 (1980-90)	28.95
KX 250/420/500 (1980-90)	35.95

EBC BRAKE PADS

KX 80/125/250/500 . . . \$21.95 set
indicate front or rear



SPROCKETS



BLACK LIGHTNING RACING SPROCKETS for serious off road competition.

FRONT SPROCKET. Made from top grade steel, case hardened, over 60 Rockwell.

KX 80/125/250 (1979-90)	\$10.95
KX 420/500 (1980-90)	11.95

REAR SPROCKET
MAC. Hardened alloy, light wt. bullet proof, wears twice as long as any sprocket on the market today.

KX 80 (1980-90)	\$34.95
KX 125/250/500 (1980-90)	36.95

"NEW GROOVE"
WORLD'S BEST GROOVED "SELF CLEANING" REAR SPROCKET.

KX 80/125/250/500 (1980-90)	38.95
-----------------------------	-------



Pre-stressed, Pre-stretched, special heat treated for hardness.

KX 80 (all yrs.)	24.95
KX 125/250/500 (all yrs)	39.95



Complete piston set. Piston, Rings & Circlips

KX 80 (all yrs)	\$43.95
KX 125 (all yrs)	56.95
KX 250 (all yrs)	59.95
KX 500 (all yrs)	69.95

MAC TOP END GASKET KIT

HEAD, BASE & REED GASKET

KX 80/125 (1981-90)	\$ 8.95
KX 250/420 (1980-86)	12.50
KX 250 (1987-90)	10.95
KX 500 (1983-85)	14.80
KX 500 (1986)	19.95
KX 500 (1987-90)	12.25

CRANK REBUILD KIT

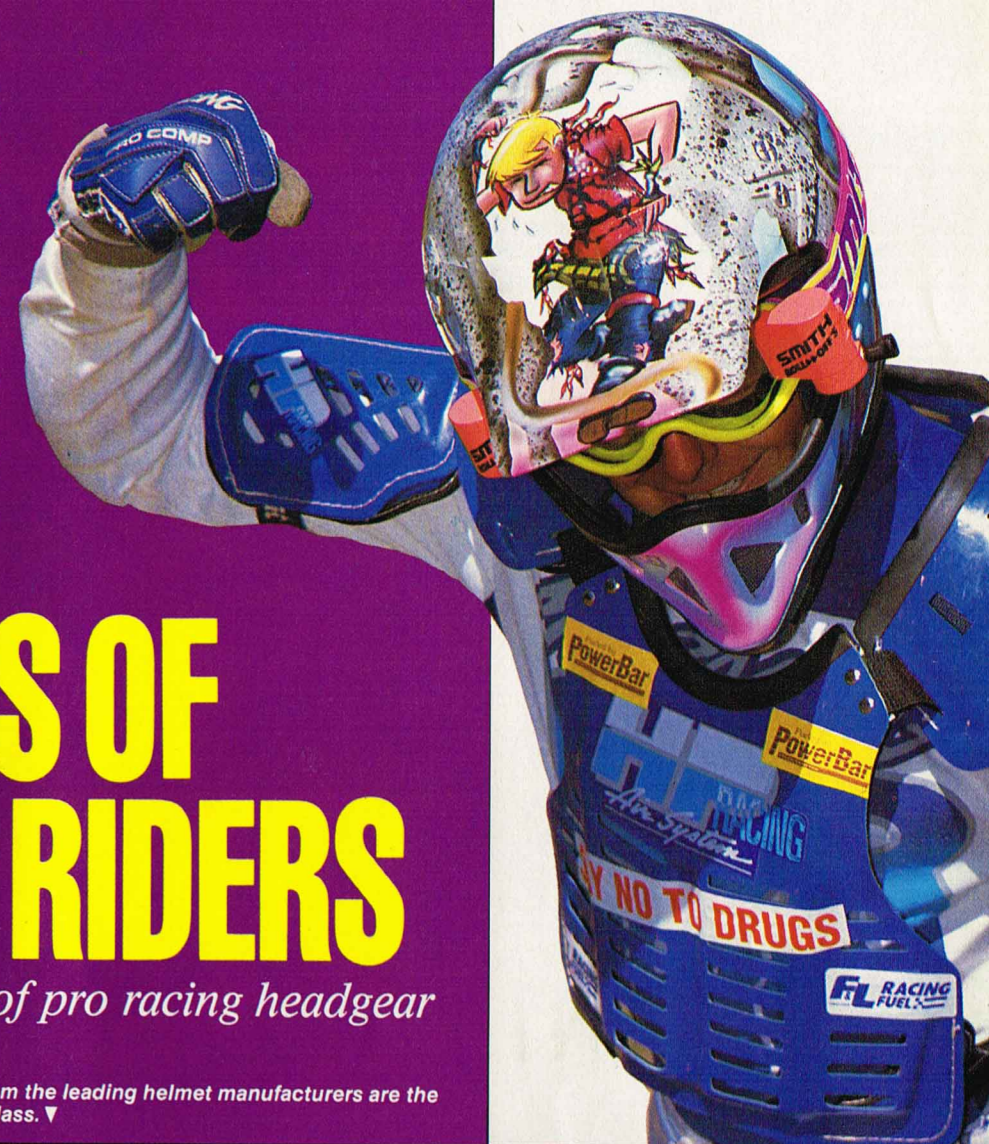


Consists of GENUINE KAWASAKI factory parts. ROD, LOWER ROD BEARING, CRANK PIN, and TWO THRUST WASHERS.

KX 80 (1981-90)	\$43.95
KX 125 (1980-87)	58.50
KX 125/500 (1988-90)	50.40
KX 250/420 (1980-84)	56.95
KX 250 (1985-90)	52.95
KX 500 (1983-87)	61.95

DIRT BIKE'S HOW-TO SPECIAL

Throughout the history of civilization, hats have been used to indicate one's status, fashion sense or occupation, or purely for some function of head protection. The hat of the professional dirt bike racer, the helmet, serves all these purposes. Are we suggesting that dirt biking represents the zenith of man's endeavors, the very height of civilization? Well, yes, but helmets are the issue here and whether you're a pro or just want to look like one, you're going to want to know about the helmet manufacturers and painters in this article. There are many more fine helmet manufacturers and painters than we've listed in this article, but we're spotlighting only the top guns in paint and head protection in the pro racing scene here, so feast your eyes—this show is in color!



TOP HATS OF THE TOP RIDERS

Painters & purveyors of pro racing headgear

By the DIRT BIKE Staff

Custom-painted, top-of-the-line helmets from the leading helmet manufacturers are the headgear of choice at the front of any Pro class. ▼



TOP HATS

This Bell-manufactured helmet has excellent venting and a removable, washable liner. The graphics on this helmet are decals which are not clearcoated, so they're simple to remove—a bonus for riders who want to have the helmet painted.

Shoei: Shoei's VX-5 \$274.95 plain white (models with graphics to \$318.95) is typical of the high-end helmets in this group in that it's loaded with features like venting passages that enter at the top and bottom of the helmet and carry cooling air through the interior to exhaust vents at the back of the shell; a truly comfortable and absorbent liner material and excellent detailing. Great care in design, detailing and quality control make this helmet look and feel like an article of fine clothing rather than just a piece of good riding gear.

THE ART CLASS OF 1990

Whether we realize it or not, we all have artistic preferences, helmet painters included. All the painters in this guide will do outstanding work, but before you pick one at random to do your helmet, study the painting they've done for others. Some lean toward angular shapes, lifelike figures or chaotic designs because they enjoy them and do them extremely well. See whose style matches your taste to get the helmet that fits your style as well as your head.

There's a fairly standardized "menu" of services in the world of helmet painting, so we've arranged this guide to follow it. The least expensive custom painting service most helmet painters offer is lettering or numbers. The next step up in price is a basic graphic treatment. This is a fairly simple multi-color design or striping. Since this type of paint job involves painting the entire shell, you will have to pay the painter to strip the helmet shell of old paint and graphics so he can begin with the custom design, unless he begins with a new, solid-colored helmet. The final step up is a complex design or cartoon with fades from one color to another. For a small additional charge the painters will do a spare visor or two painted to match the one that's custom painted with your helmet. You should also consider the time it will take to have your helmet painted, so we've listed the painters' typical turnaround times. Some helmet painters sell much more than painting services and many are helmet dealers (which means you can call them, request a helmet and a design and wear your old lid while you wait for your stylish new one) so we've listed the additional products and services they offer, too.

Artco Designs, 45 Denver St., Pawtucket, RI 02860; (401) 722-6989. Lettering or numbers, \$15-\$20. Stripping, \$25. Basic graphic treatment, \$100 (Moto-5, \$125). Extra visor, \$15 (paint only), \$25 (includes visor cost). Cartoon, \$50 and up. Turnaround, two to three weeks. *Additional products and services:* Dealer for Arai, Bell, JT, Shoei helmets and Troy Lee Designs visors.

Designs in Motion, 1914 Woodrow, Fres-



Shane Trittler's Bell Moto-5.
Paint by Bob's Krazy Brush.



Jeff Emig's Shoei VX-5.
Paint by Troy Lee Designs.



Jeff Ward's Shoei VX-5.
Paint by Troy Lee Designs.



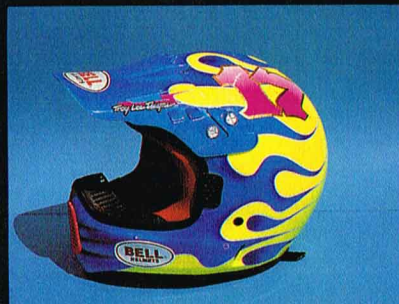
Guy Cooper's Arai MX-Pro.
Paint by Arai.



Mike LaRocco's Bell Moto-5.
Paint by Mototime.



Jimmy Gaddis' Bell Moto-5.
Paint by Serrano Designs.



Larry Ward's Bell Moto-5.
Paint by Troy Lee Designs.



Jean-Michel Bayle's JT ALS-II
with JT graphics.



Mike Kiedrowski's Arai MX-Pro.
Paint by Troy Lee Designs.



Damon Bradshaw's Bell Moto-5.
Paint by Troy Lee Designs.



Buddy Antunez's Shoei VX-5.
Paint by Designs in Motion.



Jeff Stanton's Arai MX-Pro.
Paint by Arai.



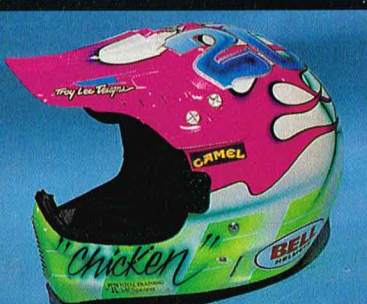
Tallon Vohland's Bieffe BX-6.
Paint by Koller's Kolors.



Shawn Wynn's Shoei Jet-X.
Paint by Designs in Motion.



Jimmy Button's Shoei VX-5.
Paint by Troy Lee Designs.



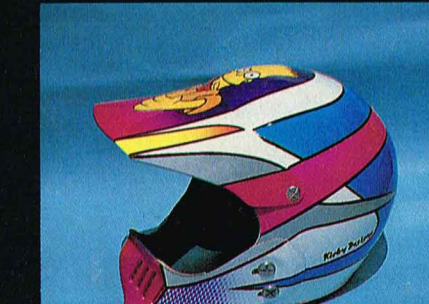
Jeff Matiasevich's Bell Moto-5.
Paint by Troy Lee Designs.



Steve Lamson's Arai MX-Pro.
Paint by Gerard Designs.



Billy Whitley's Bell Moto-5.
Paint by Factory Art Designs.



Arai's MX-Pro.
Paint by Kirby Concepts.



Jeff Dement's JT ALS-II.
Paint by Kirby Concepts.

SPHERICAL CANVAS

Trend-setting helmet designs from Arai, Bell, Bieffe, JT and Shoei get to wear most of the work of the masters of helmet art. Then the helmets and artwork are further glorified by being worn by many of the best riders. The riders then show their appreciation for this art and technology by throwing rocks and dirt at the masterpieces. This strange, sophisticated ritual begins with the helmets and so will we. All of the helmets in this guide have fiberglass shells except for the Bieffe, which uses fiberglass/Kevlar composite. These materials offer excellent protection and hold paints better than most

plastic helmet shells. Most helmet makers, including the ones we're featuring, offer their helmets in color and graphic combinations that would shame the wildest custom paint jobs of a few years ago. Some even have designs by big-name helmet painters right from the factory! Answer Products' Tek 4 by Bell has a Troy Lee Designs visor and graphics, TX-10/Hondaline has a Bell Moto-5 with Troy Lee Designs graphics, HJC offers its top-of-the-line helmets with Gerard Designs graphics. Suzuki sells a special Arai MX-Pro, and Bell makes special Moto-5s for AXO, Kawasaki and Yamaha in addition to their own Rick Johnson

replica Moto-5.

If stock graphics don't suit your style you are probably interested in a plain white helmet because you'll have it painted anyway. These are usually the cheapest to buy and paint. This is because helmet dealers usually charge more for helmets with graphics and most helmet painters charge a fee for removing any graphics so they can begin with a bare helmet.

Arai: Arai's \$222.99 plain white (models with graphics to \$274.95), MX-Pro has a removable chin piece so it can be worn as an open-face helmet. Japanese attention to detail gives this helmet an excellent fit and ap-

pearance. It's got the only visor among the helmets in this group that will hold paint. You must buy a Troy Lee visor for the other helmets in order to have the helmet and visor custom painted.

Bell: Bell's Moto-5, white only must be purchased from Troy Lee Designs as part of a helmet/custom paint package; otherwise you'll have to buy a \$266.99 factory tri-color model, or the \$299.99 Rick Johnson replica. The Moto-5 is a major step forward from its predecessor, the immensely popular Moto-4, in styling and function due to its clean, aggressive looks and very effective high-volume venting system. It's also got a re-

movable, washable liner.

Bieffe: Bieffe's \$119.95 BX-6 plain white (models with graphics to \$149.95) has been a popular helmet in Europe for some time and is catching on with American pros. At three pounds, five ounces, it's about two ounces lighter than most fiberglass shell helmets. Its exotic Kelvar/fiberglass shell material is the reason. Bieffe has an even lighter carbon fiber/Kevlar model, the MX-Hi Tech, in the works!

JT: JT's \$267.95 (plain white or with graphics) ALS II is the helmet that set the trend for integrated visor off-road helmet design years ago and it still looks modern.

TOP HATS

no, CA 93703; (209) 251-8713. Lettering or numbers, \$15-\$20. Stripping, \$25, free with helmet jobs costing \$175 or more. Basic graphic treatment, \$100. Extra visor, \$15 (paint only), \$25 (includes visor cost). Cartoon, \$50 and up. Turnaround, one to two weeks. *Additional products and services:* Dealer for Troy Lee Designs visors.

Troy Lee Designs, 1985 Aviation Dr., Corona, CA 91720; ([714] 371-5219). Lettering or numbers, \$15-\$30. Stripping, \$25. Basic graphic treatment, \$160 (free Cross-Top billet aluminum helmet screws with paint job). Extra visor, \$15 (paint only), \$25 (includes visor cost). Cartoon, \$100-\$160. Turnaround, 14-16 weeks. *Additional products and services:* Dealer for Arai, Bell (plain white Moto-5s are available from Troy Lee Designs), Shoei and Simpson helmets, Troy Lee Designs visors (free visor with helmet purchase), Knowear shirts, hats sportswear and cycling clothes, CrossTop billet aluminum screw kits, Sticky Colors helmet graphic kits, Stickit sticker kits, Spy visors. Lycra helmet bags, Jet-Ski custom paint jobs.

Bob's Crazy Brush, 1948 Del Amo Blvd. #D, Torrance, CA 90501; (213) 327-2553. Lettering or numbers, \$25-\$35. Stripping, \$25-\$35. Basic graphic treatment, \$150. Extra visor, \$15 (paint only), \$25 (includes visor cost). Cartoon, \$40 and up. Turnaround, two to three weeks. *Additional products and*



Ty Davis' Arai MX-Pro. Paint by Gerard Designs.

services: Dealer for Arai, Bell, JT, Shoei helmets and Troy Lee Designs visors.

Gerard Designs, 7103 Owensmouth Ave., Canoga Park, CA 91303; (818) 703-6589. Lettering or numbers, \$25-\$35. Stripping, \$25. Basic graphic treatment, \$120. Extra visor, \$15 (paint only), \$25 (includes visor cost). Cartoon, \$40 and up. Turnaround, three to four weeks. *Additional products and services:* Dealer for Arai, Bell, JT, HJC, Shoei helmets and Troy Lee Designs visors. Auto, boat and mountain bike painting.

Kirby Concepts, 7902 Shelbourne Circle, Spring, TX 77379; (713) 320-9639. Lettering or numbers, \$5-\$15. Stripping, \$20. Basic graphic treatment, \$100. Extra visor, \$15

(paint only), \$20 (includes visor cost). Cartoon, \$35 and up. Turnaround, two to three weeks. *Additional products and services:* Dealer for Troy Lee Designs visors.

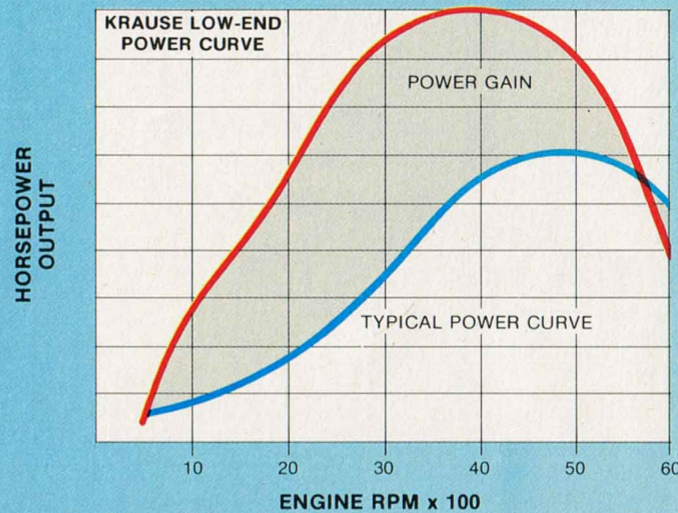
Koller's Kolors, 10734 Kenney St. #F, Santee, CA 92071; (619) 449-4787. Lettering or numbers, \$15-\$20. Stripping, \$25. Basic graphic treatment, \$100 (Moto-5 \$125). Extra visor, \$15 (paint only), \$25 (includes visor cost). Cartoon, \$50 and up. Turnaround, four weeks. *Additional products and services:* Dealer for Arai, Bell, JT, Shoei helmets and Troy Lee Design visors. Jet ski hull repair and paint.

Serrano Custom Designs, 35603 Morley Pl., Fremont, CA 94536; (415) 793-1848. Lettering or numbers, free with basic or full graphic treatment, not available separately. Stripping, \$30. Basic graphic treatment, \$180. Full graphic treatment with cartoon, name, numbers, \$240. Extra visor, \$25 (paint only), \$30 (includes visor cost). Turnaround, two weeks (appointment required). *Additional products and services:* Dealer for Arai, Bell, JT, Shoei helmets and Troy Lee Designs visors.

SND Custom Paint Designs, 9101 Boyds Turn Rd., Owings, MD 20736; (301) 257-7865. Lettering or numbers, \$3 per digit. Name, \$5. Stripping, \$25. Basic graphic treatment, \$100. Extra visor, \$15 (paint only), \$35 (includes visor cost). Cartoon, \$15-\$50. Turnaround, three to four weeks. *Additional products and services:* Dealer for Troy Lee Designs visors. HRP lexan shoulder pad painting, \$50. □

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Since 1968 Krause has hand-made tens of thousands of racing pipes for customers all over the world. We are the only supplier capable of offering our customers a specific choice of powerband for any application. The technical graphs below are provided to help you choose the level of power that fits your riding style.

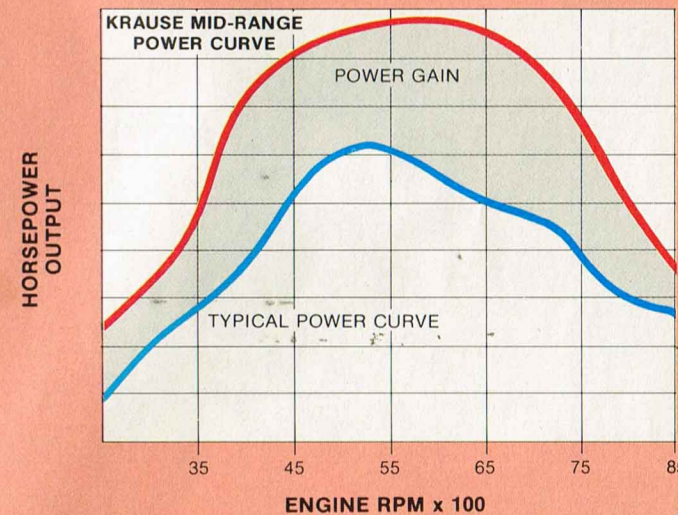


LOW-END PIPE

Comparison of an average pipe with our low-end version demonstrates a power shift heavily favoring the bottom end of the curve. The grey area identifies a substantial low-end gain provided by our pipe. Typical increases range 15% to 25% under 6000 RPM. This creates a "John Deere" type of power delivery. Monster torque is produced in a deep surge of low-end beyond compare. This version is particularly well suited for sand drags, hill climbing, bog runs, sled pulls and similar applications where top-end power is not a consideration.

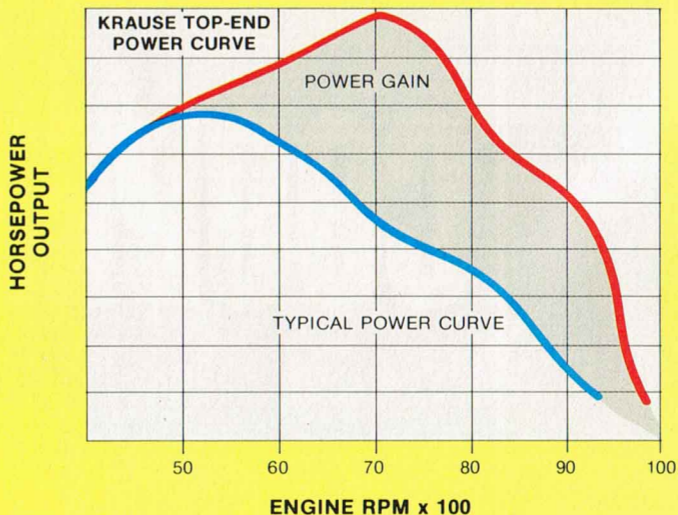
MID-RANGE PIPE

The graph on the right says it all. A big chunk of power is generously packed into the mid-range between 3500 rpm to 6500 rpm. Expect overall power gains of 15% or more. The immediate acceleration and response will take your breath away. Besides this stunning rush of power in the middle band, the bottom comes on 1500 rpm sooner and revs out 1000 rpm higher on top. This design makes your engine think its turbo-charged. Not a peaky west coast pipe, but a solid fist-full of power any time you want it. Our best selling model and a real winner.



TOP-END PIPE

The top-end pipe, as the graph shows, produces awesome peak horsepower. This version is geared for balls-out, full-tilt, national level motocross or wide-open desert racing. This baby is only for the serious holeshot artist that needs explosive, almost uncontrollable top end power delivery. You will feel like you have been shot out of a kannon. Keep the throttle pegged and this pipe will rip the pro-circuit apart.



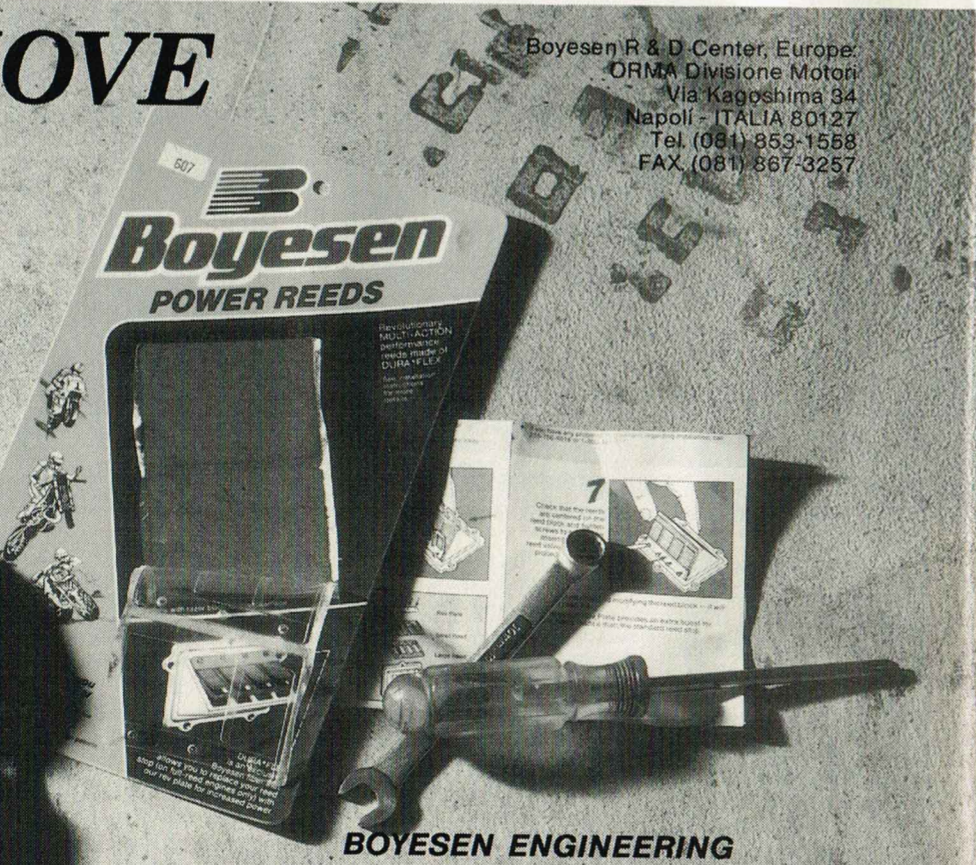
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Guy Cooper worked his way up the privateer ranks into full-on factory Honda and Suzuki rides helped greatly by his outstanding jumping prowess. As a Honda privateer, "Airtime" Cooper collected extra bucks at supercross heat races, airing it out farther than anyone over the Coke Catapult. Cooper's aerial antics made him a crowd favorite and carried him to a spot on Honda's factory team and a third in the '89 supercross season. For '90, Guy switched to Suzuki at the ripe old age of 29!

How could a guy known for his incredible leaps stay together and on top of the sport over younger riders? By knowing how and when to stay low or launch for the stratosphere. Cooper is the master of leaps, but part of his secret is his ability to stay low and set up for really big air. Here's how he does it.

THINKING AHEAD

"There are all kinds of ways to approach a jump, but the first thing you have to do

is determine what follows the jump. If it's a corner or tabletop or whatever, your approach to the jump immediately in front of you is critical. A low-profile jump lets you get back on the ground sooner to get the drive to clear the next obstacle, or to get on the brakes to make the next corner. It's not like the old days of motocross or supercross, where the farther you fly, the more rough stuff you fly over. The tracks now are smooth, so you're either going for max air to clear the doubles or jumping low to set up for the next obstacle.

"There are several ways to stay low over a jump. One is to get the front end light over the jump, like Jeff Ward has done for many years. You get the front end light before you hit the jump so, when you hit the face, the front end doesn't compress and then spring up like it would normally. The lightened front wheel hits the top and compresses, but the bike stays level instead of springing into the air. The front compresses as it hits the



lip, causing the rear end to lighten, shooting you forward instead of upward. This takes a lot of practice and works even on big jumps, so try it first on small kickers and work up.

"If you watch a BMX race, they wheelie over a jump and set the front wheel down on the backside—this is sort of the same principle. You can't place the front wheel on the backside like a bicyclist, because the speeds are greater, but the principle carries over. Instead of bouncing up and catching ten or 20 feet of air, you shoot out low and get back on the ground quicker.

"Another good way to stay low is to ap-

proach the jump as fast as possible, then brake before you hit the jump. Just be sure to not let the bike kick over the jump—gas it again as you leave the lip. The most obvious way to stay low is to look at the jump and find the low line—a groove in the face or a bump that'll let you leave the ground earlier and preload over the lip. This will keep you lower than just hitting the lip and launching. Always look for that line that'll send you the farthest out instead of the farthest up."

TURNING STRAIGHTS INTO TURNS

"Another way to stay low, in a place where everyone slows down anyway, is to angle the

Guy Cooper can air-out a bike so far that the landing sounds like the bike is going to break in two. A big part of Cooper's aerial prowess comes from keeping the bike low beforehand to get a good drive on the big jumps.

◀ Cooper slices a jump to get back on the ground quicker so he could pin it and clear a section of stadium whoops. Treating a jump like a turn uses gyroscopic affect to lower the trajectory—and lap times.



We had a chance to watch Cooper at his Stillwater, Oklahoma, practice track and were utterly amazed at Airtime Cooper's sheer nerve and ability to push a bike past the laws of gravity.



COOPER'S AIRTIME TIPS

The long & short of catching air

By the DIRT BIKE Staff



AIRTIME TIPS

bars over the jump, pivoting the bike over as if it were a turn instead of a jump. Since the bike's center of gravity is around two feet off the ground, if you were to hit the jump straight on, it continues to carry that weight, two feet up, at the speed at which you left the ground. Say it's a big, round jump. You're going to carry that inertia at that 'two feet up' center of gravity.

"If you lay the bike over as you hit the bump, you're slicing [lowering] the center of gravity and using the gyroscopic effect of the spinning wheels to cut the inertia that would normally carry you into the air. You keep the bike from springing up and floating through the air. It also allows you to hook up on the backside of the jump and get that much extra drive to the next obstacle. This works great on three jumps where you can't triple. You 'knife it' over the first one, straighten the bars and twist the throttle, drive hard and clear the next two. All of these techniques have to be practiced extensively, on terrain you know well."

LOOKING AHEAD

"With the tracks today, it's never just one jump. You're always setting up for the next jump. Everyone on the competitive edge today can do the triples and doubles. The secret is to do the jump well enough to set up for the next one. Timing becomes very critical. You want to carry as much speed as possible at all times yet stay low to set up for the big jumps. Some jumps have such a steep backside that you have to land perfectly, with the bike level with the downslope, to get the drive to clear the next obstacle."

GOING FOR BIG AIR

"Attacking the big jumps is different with each rider. I can't jump like my teammate, Mike LaRocco. He always rides one to two gears above me. Mike may attack a jump in third or fourth, and I'm going, 'No way.' I'm in second. I approach a jump at mid-throttle, then I wick it wide open as I hit the beginning of the jump. You have to be jetted right for this because, if you hit it wide open and you're jetted wrong, you're going to get the dreaded bogs."

"Body positioning also varies from rider to rider. I've jumped so many times that it comes automatically, as far as body positioning over each jump, because each is different. One thing is the same, though; I always jump with my arch on the footpeg. I only ride on the ball of my foot in technical whoop sections. You should be centered on the bike enough that you can either go forward to bring the front down or you can go back on the bike. Your bike is in the mid-

◀ This is taking the concept of landing level with the downslope to the extreme limit of sanity. Cooper hit the landing perfectly, time after astounding time. His secret? Lots of practice.

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Arai MX Pro	\$ 199.99
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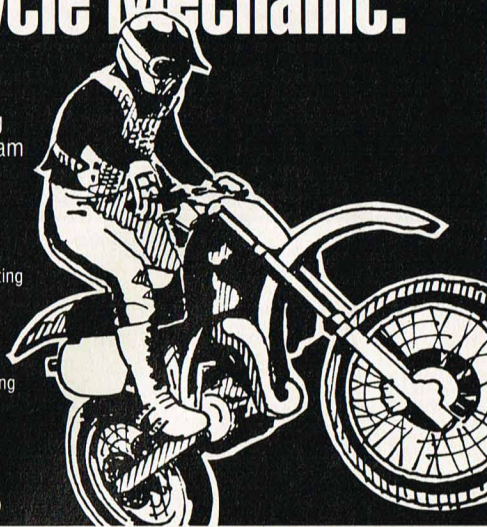
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AIRTIME TIPS

range after unloading off of the face of the jump. In the air you are centered over the bike."

BRACING FOR THE LANDING

"I look down, beside the forks, and make a judgment. Am I coming down a bit short, perfectly, or a bit long? Say you're a bit short on a rounded jump. You can force the front down and lock your arms. The front end should ride over the crest, letting the back end soak up the jolt. It lands hard, but you ride it out. You're forcing your weight forward, which is exactly the opposite of what you'd think you'd do to save it. If you get your weight back, you'll endo for sure. This is the only scenario where you lock your arms.

"If you're coming up way too short, you want to lighten the front end with the throttle and body weight shift. Always let the bike take the abuse. You can always replace a bike, but you can't replace an ankle. Remember—let the bike take the torture. In this situation, I do the panic rev, or the Cooper rev, as it's sometimes called. Get the front end high and let the bike take the punishment. Try to land softly on top of it.

"Say you've gone a foot or two too far. The rear wheel is going to catch the downside of the double or whatever. Get the front end light and let the rear absorb the jolt, but don't wick the throttle wide open or you'll ground-loop it. Let the bike pull the front end up but don't panic-rev it. The bike will shoot out a foot or two in front of you, but anticipate it and hang on. A slight overjump can be as severe as coming up short, but you definitely don't want to tense up.

"Jumping way too far is like landing on flat ground, or worse. Here, get the front end high with the throttle, let the rear wheel take the jolt; the front wheel will slap down hard, then let your elbows drop to absorb the jolt. Never stiff-arm any of these jumps, except where you're coming up just a tad short. Your legs should be bent, too. Not even Rick Johnson or Jeff Stanton can control these types of landings. You have to flow with the bike.

"When you hit a double perfectly—nothing can beat that feeling. It's so smooth, and you can accelerate hard to the next obstacle."

PRACTICE MAKES PERFECT

"If you have a practice track and you conquer a double, don't feel you have to accomplish all of the jumps in a given day. Have fun with what you've done. Have a good time and do what you feel comfortable with. A lot of the top riders can't do that. When they have a good day and do a new double, they look immediately at the triple they haven't done. They want to keep driving. To be #1 takes a lot of steps. Work up to it. Build your practice track with rounded jumps, then build the last ones up as you gain confidence. With practice comes experience and confidence." □

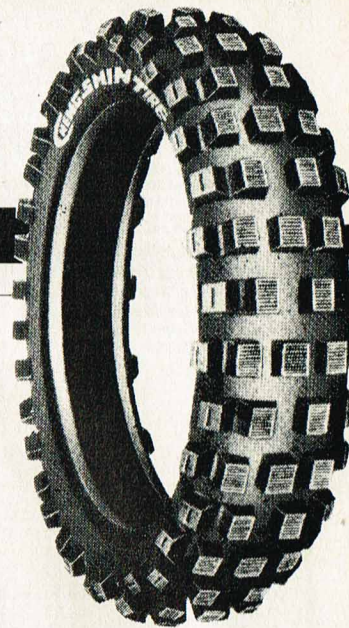


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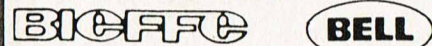


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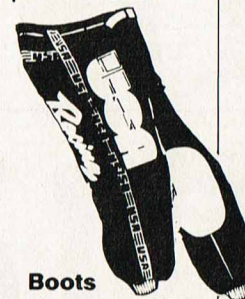
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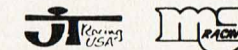
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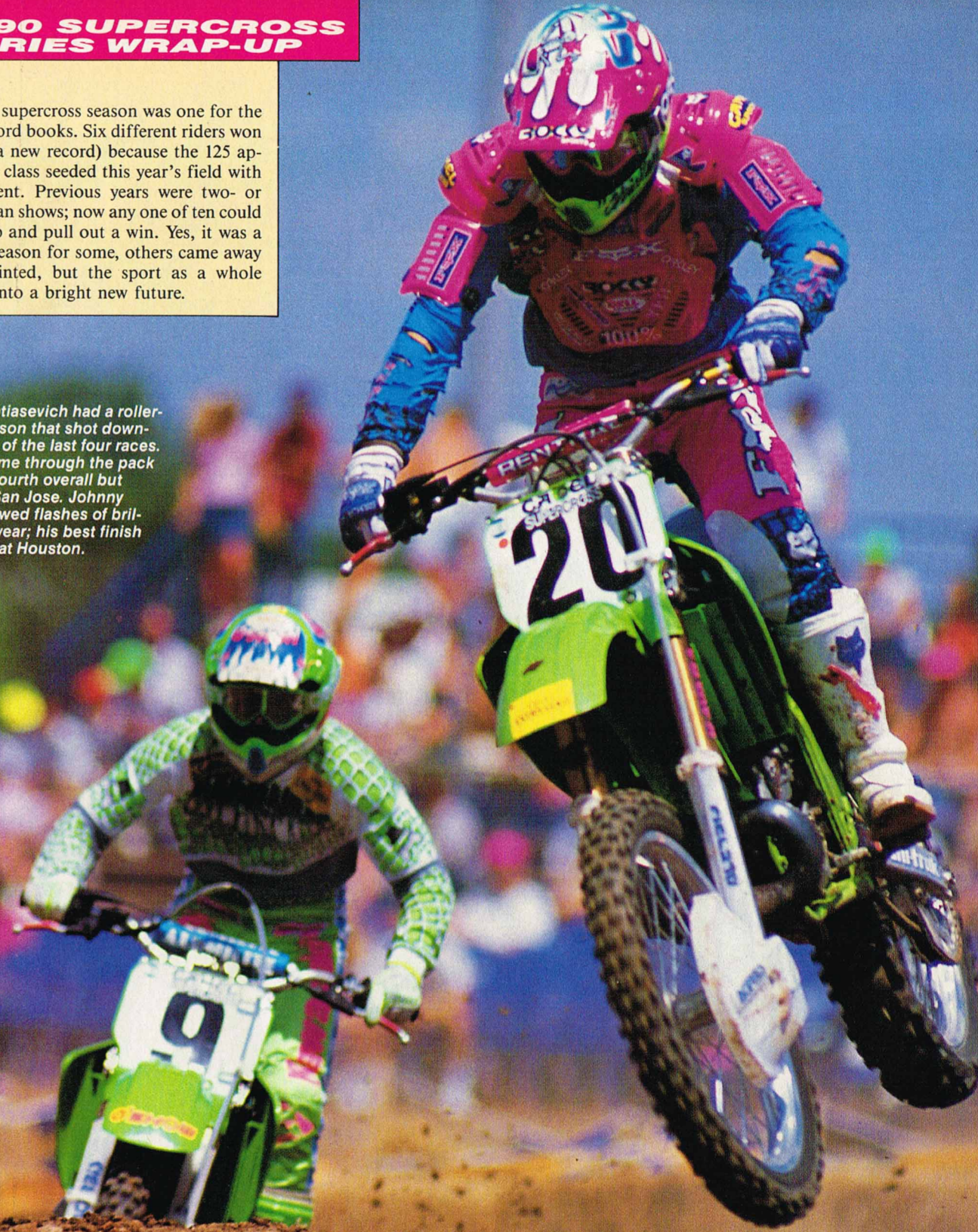
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1990 SUPERCROSS SERIES WRAP-UP

This supercross season was one for the record books. Six different riders won mains (a new record) because the 125 apprentice class seeded this year's field with new talent. Previous years were two- or three-man shows; now any one of ten could dig deep and pull out a win. Yes, it was a dream season for some, others came away disappointed, but the sport as a whole leaped into a bright new future.

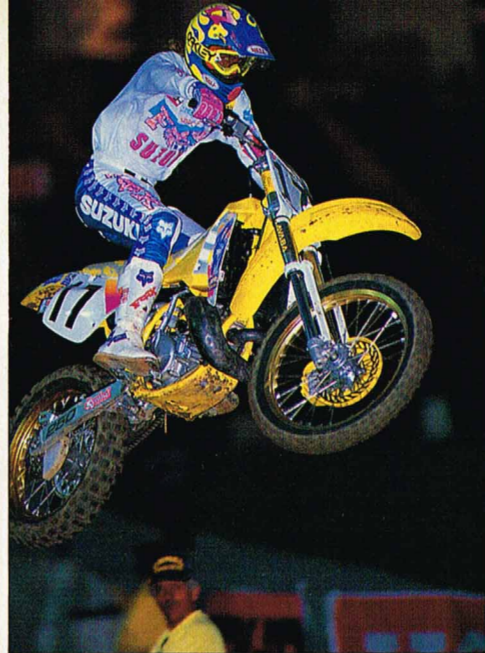
Chicken Matlasevich had a roller-coaster season that shot downhill in three of the last four races. Chicken came through the pack at OKC for fourth overall but choked in San Jose. Johnny O'Mara showed flashes of brilliance this year; his best finish was a third at Houston.



STANTON CATCHES FIRE

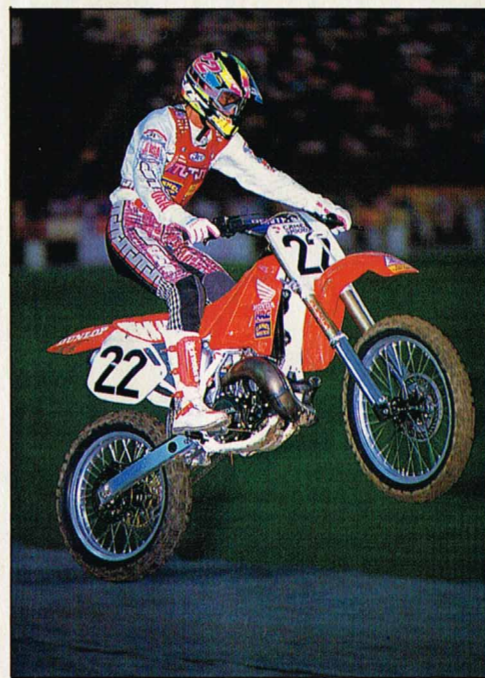
Team Honda comes on strong in the homestretch

By Tim Tolleson



Larry Ward, at the Camel Awards banquet, thanked Chicken Matiasevich for making "the most memorable night of my life [Ward's Seattle win] more interesting." Seattle was a study in brake-checking and block-passing, and both riders claim the other started it.

◀ Mike Kiedrowski had a lot of bad luck, usually in the first turn, during the first part of the season but vaulted from sixth to fourth in series points after visiting the winner's circle in the last three rounds.



LICENSE TO STEAL

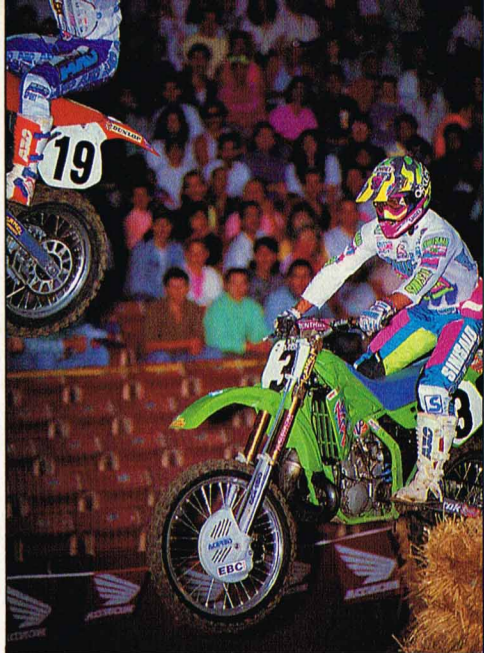
Pre-season hype had the young gun 125 graduates pitted against the seasoned veterans of 250cc supercross. At the season opener at Anaheim, the two '89 125 champs stole the show. Damon Bradshaw and Jeff "Chicken" Matiasevich traded stuffs for most of the main, until Chicken faded. French upstart Jean-Michel Bayle, the 20-year-old dual World Champion, stuffed Chicken for second spot on the victory podium, a podium with three unfamiliar faces. The veterans weren't ready for the Rollerball style of supercross, and they claimed the new sensations would crash themselves out of contention.

Sure enough, Bayle biffed out in Houston, and he would sit out the third round as well. Bradshaw backed up his Anaheim victory after a tense battle with Larry Ward at Houston, but then crashed out while leading the San Diego Supercross. Damon sat out Seattle, scored a painful ninth in Atlanta, then sat out Las Vegas. Two of the new lions were out, but the trouble was—there were more than two.

Defending champ Stanton survived the carnage at San Diego, whereas Ross Pederson, Bradshaw and Jeff Ward crashed out, to take the win and points lead. Seattle was a young gun benefit, with Matiasevich and Larry Ward pinning each other to the bales, World Wrestling Federation style. Larry won but Matiasevich took the points lead with a second. Stanton dropped to third in points with a sixth. Wardy and Stanton won Atlanta and Daytona, respectively, then Matiasevich came back to take Las Vegas, extending his points lead to 14 over Stanton, who displaced Larry Ward with a third in Vegas, despite his transmission going south.

Wardy took the win in Pasadena but still was seventh in points, then the young guns ruled the rest of the series. Mike LaRocco and Bayle caught fire, and Bradshaw was healthy again. Bayle won at Dallas, Tampa, Pontiac, New Jersey and Foxboro, becoming the winningest 250 rider of the season. Bradshaw took Charlotte and Pontiac, upping his win total to four. Meanwhile, Matiasevich and Stanton scrapped for points,

◀ Frenchman Jean-Michel Bayle was a threat for the title despite missing Houston and San Diego due to an elbow injury and crashing out at Charlotte. Had Bayle won the title, would we have seen a new Pierre Karsmakers-type residency rule for the '91 season?



Jeff Ward dug deep for wins at Atlanta and Pasadena but crashed out of the top ten at Houston, San Diego, Las Vegas and Dallas. Wardy edged out Larry Ward by one point for fifth in the series.

with the champ gaining a point here, a point there.

THE HOMESTRETCH

Stanton had failed to get a top-seven finish just once, having crashed back to 16th at Atlanta. Chicken Matiasevich had been 14 points ahead but, after tangling with Doug Dubach at Dallas and Bayle at Pontiac, Chicken choked at Foxboro, finishing ninth to Stanton's fourth. This let Stanton close to within one point of Chicken, with three rounds to go. The first 15 rounds were now moot; this would be a three-race series to the title. Bayle's win streak had once again made him a contender.

Oklahoma City was hot, humid and without floods for the first time this year. Cooper wanted it hot, scorching hot. He was used to it and predicted he'd win—or crash. Stanton, Cooper and Bayle went at it in the summer heat, trading the lead several times. Chicken was midpack. Cooper had led but crashed out trying to reel in Stanton. Riders started dropping like flies and, while Bayle and Stanton duelled, Chicken Matiasevich quietly slipped into fourth. Stanton held off Bayle for the win and took the points lead from Matiasevich, by six points.

San Jose was another story of upstarts threatening to overshadow the points leaders. Wardy holedshot, but Stanton zapped him. LaRocco came from nowhere to chal-

RACE-BY-RACE RESULTS*

Anaheim	Houston	S. Diego	Seattle	Atlanta	Daytona	L. Vegas	Pasadena	Dallas	Pontiac	1Pontiac	2Tampa	Charlotte	Mdwinds.	Foxboro	OK. City	S. Jose	L.A.
Bradshw	Bradshw	Stanton	L. Ward	J. Ward	Stanton	Matiasev	J. Ward	Bayle	Bradshaw	Bayle	Bayle	Bradshw	Bayle	Bayle	Stanton	Stanton	Bradshaw
Bayle	L. Ward	Matiasev	Matiasev	Cooper	Bayle	Bayle	Matiasev	LaRocco	LaRocco	Matiasev	LaRocco	J. Ward	J. Ward	J. Ward	Stanton	Bayle	Bayle
Matiasev	O'Mara	Kiedrow	R. Tchnr	R. Jhnsn	Kiedrow	Stanton	Bayle	L. Ward	LaRocco	J. Ward	Stanton	Stanton	Bradshw	LaRocco	Kiedrow	Kiedrow	Kiedrow
J. Ward	LaRocco	L. Ward	R. Jhnsn	Bayle	Matiasev	Dubach	Kiedrow	Stanton	Kiedrow	Kiedrow	Kiedrow	Matiasev	LaRocco	Stanton	Matiasev	J. Ward	O'Mara
Dubach	Stanton	LaRocco	Cooper	L. Ward	J. Ward	L. Ward	L. Ward	Cooper	J. Ward	Matiasev	L. Ward	L. Ward	Stanton	L. Ward	LaRocco	LaRocco	J. Ward
R. Jhnsn	Tichenor	O'Mara	Stanton	Matiasev	Tichenor	Kiedrow	Stanton	LaRocco	Tichenor	Stanton	LaRocco	Tichenor	Matiasev	Kiedrow	O'Mara	Bradshw	Stanton
Stanton	Kiedrow	G. Cooper	Bayle	O'Mara	Dubach	O'Mara	Tichenor	Kiedrow	L. Ward	L. Ward	J. Ward	J. Ward	L. Ward	Tichenor	Cooper	O'Mara	Matiasev
LaRocco	Dubach	R. Jhnsn	Kiedrow	Fisher	L. Ward	Fisher	LaRocco	Matiasev	Matiasev	Johnson	Tichenor	Cooper	Kiedrow	Bradshaw	J. Ward	L. Ward	Cooper
Tichenor	Matiasev	M. Fisher	LaRocco	Bradshw	O'Mara	Tichenor	O'Mara	Tichenor	Bayle	Dubach	Bradshw	Kiedrow	Fisher	Matiasev	Tichenor	Cooper	L. Ward
O'Mara	M. Fisher	R. Tchnr	J. Ward	Kiedrow	Cooper	Cooper	Fisher	Fisher	Dubach	Tichenor	Fisher	O'Mara	O'Mara	Cooper	Bradshaw	Matiasev	Fisher

*Bold entries indicate points leader after that round.

**JEFF STANTON
INTERVIEW
TALKING WITH
THE CHAMP**

• Jeff Stanton is the quiet champion. He doesn't run his mouth about how he's going to go out, kick butt and take names. The Michigan farmboy turned three-time AMA National Champion doesn't snivel or bad-mouth. If doesn't have something good to say, he says little or nothing. After a win, he says little, thanking the sponsors, promoters and fans. Not much more. It's clear he's already thinking about the next race, the next championship. Stanton is a workman's hero, a businessman who's more at home on the track than in the spotlight, making him the opposite of a Bob Hannah or a Rick Johnson, as far as playing to the fans is concerned. Jeff is so determined to beat those guys' accomplishments that it consumes his public persona.

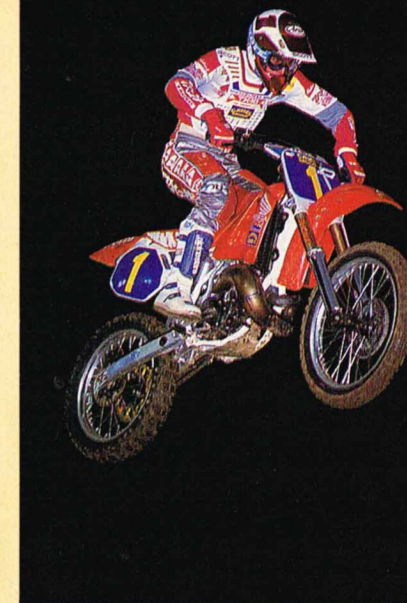
After Jeff defended his supercross title, we got him to open up a bit.

Dirt Bike: When the season began, there was all this hype about the Young Guns, the New Lions, yet you were only 21 years old as the season began. Did this bother you?

Jeff Stanton: Everyone was calling me a veteran, because I was the defending champion. I'm just a young gun, too. They started off fast, and I started off slow, is what it amounts to, basically. I had to work my way into it and knew I would come on strong later in the season.

DB: You said at the beginning that the new guys would crash themselves out, and you'd hold back until things sorted themselves out. Then you announced that you were going to go for it.

JS: Yeah, I started out calm and collected, which wasn't the right thing to do. Some guys got hurt, but not all of them. It all worked out in the end. At San Diego, I felt they were riding over their heads and it was only a matter of time before they were getting off. I just stayed in there and started plucking away. It's what the whole season



Jeff Stanton has become the first rider since Bob Hannah to win back-to-back supercross titles. Along the way he had to learn to handle pressure in the most intense supercross season ever. Here's how he did it.

amounted to—letting them make the mistakes, then going around them. Near the end of the season I knew what I had to do, so I went out and did it.

DB: Last year you had the points lead by Daytona, but this year you were trailing in points at Daytona. Did this put more pressure on you, compared to last year, or was more pressure on Matiasevich?

JS: There was more pressure on me all year because I had to defend the title, and I'm not comfortable being behind. I'm comfortable being out front, leading. Being out front, riding solo, was a piece of cake last year compared to this year. It's one thing to get the #1 plate, it's a whole different story keeping it. It was hard all the way through. I had someone pushing me all the way, and I was behind for most of the series.

DB: Things were getting sorted out in the first third of the 18-race series. What was

your game plan as the season got to the half-way point?

JS: I knew I had to do something, so I started whittling away, race by race. After Las Vegas, Chicken had a few bad races, and I had a few good ones. Things were turning around. I knew it was time to get serious, to turn things to my favor. I had to start winning races, being more aggressive.

DB: Coming out of Foxboro and into Oklahoma, you were one point behind Chicken. Were you confident?

JS: Yeah, the course was really tough and the weather was to my advantage. I went out, felt good and won. The same way with San Jose—the track was to my liking. I knew I had to go out and win to put some points on those guys.

DB: Is your Oklahoma showing a preview of what's in store for the competition in the remainder of the outdoor Nationals?

JS: Yeah, its going to be hot and tough, and I'm going to go out there and do it. Wardy is going to be tough. I'm kind of mad at how I rode at the L.A. Coliseum, so I'm going to come on strong and win the outdoor championships.

DB: What about the Coliseum? You did what you had to do.

JS: I felt good there all the way through—I went out and won my heat and I got a good start in the main but, around the fifth lap, I started making a few mistakes. O'Mara was riding well but started making a few mistakes—riding over his head a little bit. I felt that there was no reason to get taken out and lose the championship, so I just cooled my jets a little. I rode my race instead of going for the win. The championship was more important.

DB: What would you like to change about this year, or what will you do differently next year?

JS: I learned a lot about pressure this year. You have to deal with it and make it work to your advantage instead of your disadvantage. This year the pressure got to me. It won't get to me next year. •



◀ **Damon Bradshaw only scored two points at San Diego and sat out four rounds with a foot injury. He came back to tie Bayle for the most main-event wins (five) and take eighth in series points. Bayle tried to protest Damon's last win, claiming rough riding.**

lenge Stanton for the lead, only to crash. LaRocco, the fastest man on the track, would later mount another charge, only to crash again. Bayle moved up to take second, behind Stanton. Matiasevich was in another time zone—he'd choked and taken tenth. Bayle dropped Chicken to third in points. Stanton now only had to get ninth at Los Angeles, if Bayle won, to clinch the title.

The pressure on Stanton was tremendous. He'd locked up the '89 title at Oklahoma and was free to let it all hang out at the L.A. Coliseum, which he did for the win. Team

Honda was deathly afraid he'd try to race and throw away the Championship this year. Bradshaw wanted the win bad, to tie the Frenchman for total season wins. Bayle had to win for any kind of chance at the title. Johnny O'Mara, facing the end of his supercross career, wanted the win to keep his factory ride.

Stanton led early but was passed by Bradshaw, Tichenor (who then crashed), then Bayle, who had gated very poorly but moved up quickly. O'Show and Bradshaw battled, until Bayle zapped past the Kawasaki rider. Stanton was fourth. Bayle and Bradshaw went at it for ten laps, with Damon riding over the edge to stay ahead. Mike Kiedrowski was on the move and passed Stanton, then O'Mara. Bayle passed Damon up the peristyle on the last lap, but Bradshaw rammed him twice (yes, twice) in the next

SERIES FINAL POINTS

1. Jeff Stanton (Hon)	329
2. Jean-Michel Bayle (Hon)	322
3. Jeff Matiasevich (Kaw)	308
4. Mike Kiedrowski (Hon)	285
5. Jeff Ward (Kaw)	275
6. Larry Ward (Suz)	274
7. Mike LaRocco (Suz)	252
8. Damon Bradshaw (Yam)	250
9. Ron Tichenor (Suz)	227
10. Guy Cooper (Suz)	213
11. Johnny O'Mara (Kaw)	195
12. Mike Fisher (Kaw)	184
13. Doug Dubach (Yam)	163
14. Fred Andrews (Suz)	103
15. Rick Johnson (Hon)	95
16. Keith Bowen (Suz)	76
17. Dean Matson (Suz)	67
18. Erik Kehoe (Hon)	57
19. Ray Sommo (Suz)	36
20. Gene Naumec (Kaw)	34

turn. Damon gained the lead and almost threw it away 50 yards from the finish, where he lost control but kept the throttle pinned. Hanging off of the bike like the Hannah of old, Bradshaw held on to the bike to take the win over Bayle. Stanton was sixth and had defended his championship by a mere seven points!

**125 EAST/WEST WRAP
NEXT YEAR'S HEROES?**

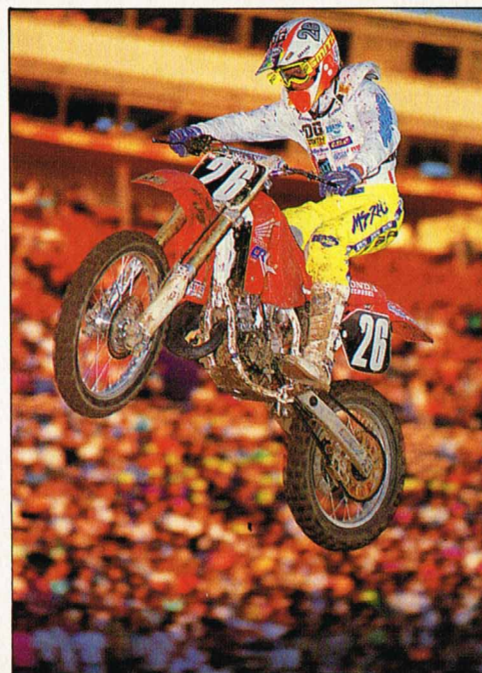
It took a while for Missouri's Denny Stephenson to get going, but once he built momentum, Stephenson blew away the Eastern Region riders and took eight of 11 main events. Jeff Emig and Mike Jones took the first two Eastern rounds, then Suzuki's Stephenson was untouchable for eight straight. He locked up the Eastern Regional Championship at Foxboro, where he only needed an 11th. Denny led early but threw it away and had to work up through the pack into second with two laps to go. He worked lapped traffic to catch Jones then jumped/stuffed his way past the Honda rider to clinch the title with a win.

At the last round, which was a combined East/West event like Houston, Stephenson wanted to humiliate the Western riders in preparation for the \$25,000 Camel 125 Shootout. Stephenson gated behind Emig at Oklahoma but crashed heavily on the second lap while trying to set up Emig over a set of doubles. Denny downshifted in the air and saw that he was coming up short, so he wicked it. Somehow, he had found neutral. The bike cased hard and pitched him forward onto the next bump, where the RM squashed him like a bug. Amazingly, Stephenson got up and was unhurt, except for a tweaked wrist. The East Coast Champion

tried to ride at L.A., but he reinjured his wrist in practice and sat out the 125 shootout.

WINDING IT OUT WEST

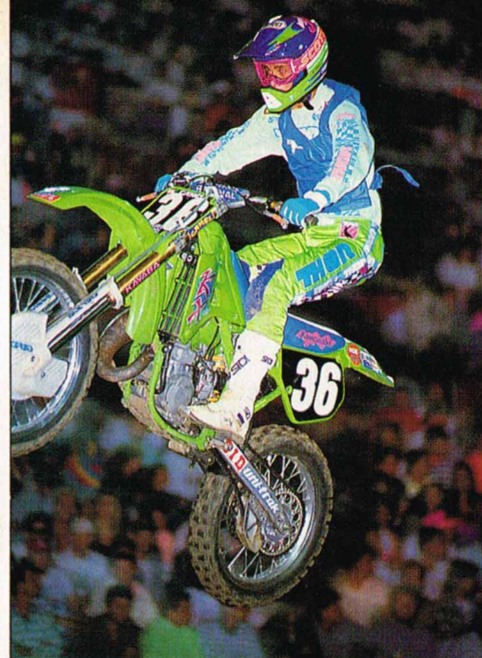
Michael Ray Craig came out swinging at Anaheim, but he and teammate Jeremy Mc-



Ty Davis was one of several who lost their factory Suzuki rides at the end of 1989. Davis contested the Western Regional series aboard a privateer Pro Circuit-built CR125R, won two rounds and clinched the title.

The hotly contested Pee Wee main gets underway at Oklahoma City. Johnny Marley (90) overcame a midpack start and late second-moto pressure from Randall Williams (114) for the championship.

Robbie Reynard (67) won the 85cc 12-13 qualifier but suffered another poor start in the main and had to work his way through the pack. Reynard came up short and Louisiana's Kevin Windham (not shown) took the title.



Grath collided in midair at Houston. Suzuki's Buddy Antunez left Houston with the Western points lead over Ty Davis, but the Honda privateer came back strong at the rough San Diego round, winning and building a points lead he would never relinquish. Disaster struck Davis at Pasadena, where he came up short on the doubles and crashed heavily, but he remounted for ninth. Both Craig and McGrath beat Davis at the next round at Dallas, so they closed on points, but the series belonged to the Pro Circuit-backed Honda rider.

Davis had a heart-stopping moment when his bike started smoking early in the main at San Jose, but his CR held together for a fourth-place finish, two better than McGrath. Antunez's win vaulted the Suzuki rider past Emig into third-place points. Go-

East met West three times throughout the 18-race series, and Jeff Emig won two of the three outings. He then won \$10,000 for winning the East/West 125 Camel shootout.

ing into the final round, Davis enjoyed a 16-point lead over McGrath. At Los Angeles, Davis and Gaddis crashed in their heat and had to ride the last-chance qualifier.

Craig holeshot the 125 main but crashed in front of the pack and took Gaddis, Davis and Jimmy Button with him. Emig took over and pulled out a sizable lead, but Antunez had a fast line through a turning triple/double section and closed on Emig. The Suzuki star set up for the lead down the peristyle and made the pass down the back straight. Antunez won over Emig and McGrath, but Davis moved up to tenth, which gave him the West Coast Championship over McGrath, by a scant seven points.

EAST MEETS WEST

Emig was hot, Stephenson was out, Davis was having a horrible night, and Antunez was pumped from his main-event win. If there was any hope for the East, it was in Michael Jones. Emig ripped into a big lead over Lamson, Tallon Vohland, Jones, McGrath, Antunez and Button. Vohland put on a charge past Lamson only to be stuffed by Antunez in the triple/double turn. Antunez started closing on Emig, picking up a second a lap, but just as he got within striking range, he clipped the last jump in the triple/double turn and crashed hard. Lamson, Jeremy Buehl, Craig and Davis also crashed their way backwards, while Emig took the \$10,000 win over fellow Westerners McGrath and Button. •

125 EAST/WEST STATISTICS

125 SUPERCROSS WINNERS

- Anaheim (W) Mike Craig (Kaw)
- Houston (E/W) Jeff Emig (Kaw)
- San Diego (W) Ty Davis (Hon)
- Seattle (W) Ty Davis (Hon)
- Atlanta (E) Denny Stephenson (Suz)
- Daytona (E) Denny Stephenson (Suz)
- Las Vegas (W) Jeremy McGrath (Kaw)
- Pasadena (W) Buddy Antunez (Suz)
- Dallas (E/W) Denny Stephenson (Suz)
- Pontiac (E) Denny Stephenson (Suz)
- Pontiac (E) Denny Stephenson (Suz)
- Tampa (E) Tallon Vohland (Kaw)
- Charlotte (E) Denny Stephenson (Suz)
- Meadowlands (E) D. Stephenson (Suz)
- Foxboro (E) Denny Stephenson (Suz)
- Oklahoma City (E/W) Jeff Emig (Kaw)
- San Jose (W) Buddy Antunez (Suz)
- Los Angeles (W) Buddy Antunez (Suz)

125 EAST FINAL POINTS

- 1. Denny Stephenson (Suz) 223
- 2. Mike Jones (Hon) 181
- 3. Jeremy Buehl (Suz) 175
- 4. Barry Carsten (Suz) 148
- 5. Tallon Vohland (Kaw) 135
- 6. Doug Henry (Yam) 135
- 7. Cliff Palmer (Suz) 112
- 8. Billy Whitley (Suz) 111
- 9. Grayson Goodman (Suz) 101
- 10. Steve Childress (Suz) 97

125 WEST FINAL POINTS

- 1. Ty Davis (Hon) 187
- 2. Jeremy McGrath (Kaw) 180
- 3. Buddy Antunez (Suz) 176
- 4. Jeff Emig (Kaw) 160
- 5. Michael Craig (Kaw) 145
- 6. Steve Lamson (Suz) 125
- 7. Jimmy Button (Hon) 110
- 8. Phil Lawrence (Yam) 108
- 9. Kyle Lewis (Kaw) 72
- 10. Chris Young (Suz) 65

L.A. COLISEUM

EAST/WEST 125 SHOOTOUT

- 1. Jeff Emig (Kaw) West
- 2. Jeremy McGrath (Kaw) West
- 3. Jimmy Button (Hon) West
- 4. Mike Jones (Hon) East
- 5. Phil Lawrence (Yam) West
- 6. Billy Whitley (Suz) East
- 7. Cliff Palmer (Suz) East
- 8. Barry Carsten (Suz) East
- 9. Buddy Antunez (Suz) West
- 10. Jeremy Buehl (Suz) East

ating to secure the Oklahoma State Fair-ground the week preceding Ponca City, so riders can sweep through OKC, Ponca and Loretta Lynn's in one fell swoop. □

AMATEUR SX CLASS CHAMPIONS

Class	Rider/Bike	State
PeeWee (4-8)	Johnny Marley (Yam)	OK
65cc (7-11)	Earl Kephart (Kaw)	OK
85cc (7-11)	Jacob Martin (Yam)	OK
85cc (12-13)	Kevin Windham (Kaw)	LA
85cc (14-15)	Jeff Dement (Suz)	TX
125cc C	Ty Harris (Hon)	OK
125cc B	Shawn Morga (Yam)	NM
125cc A	Steve Bayles (Suz)	OK
125cc (12-15)	Joshua Steel (Hon)	OH
Vet 25+	Steve Bayles (Suz)	OK
250cc C	Marc Baker (Kaw)	OK
250cc B	Shawn Morga (Yam)	NM
250cc A	Steve Bayles (Suz)	OK
Vet 30+	Truitt Rogers (Yam)	OK
Sr. 40+	Henry Gref (Yam)	OH



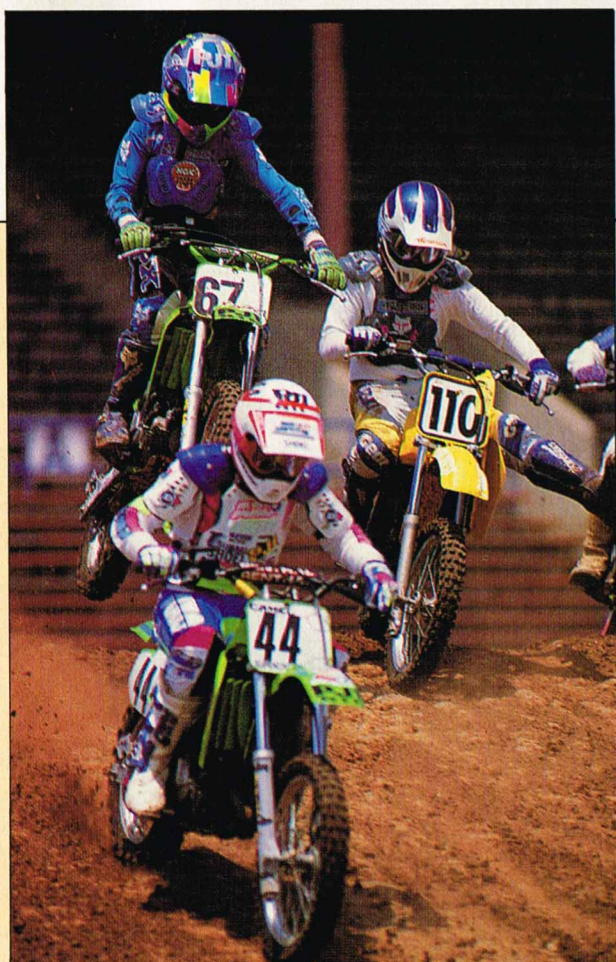
Instead of four days, the inaugural Amateur Supercross Nationals took one day to complete, on the same track the pros would later ride. Although the turnout was small, the racing was intense as the summer weath-

er, and all 15 Amateur Champions had to fight for their titles and trophies. Next year, the Oklahoma Supercross Finals will be scheduled a little later to make sure everyone is out of school. Worldsports is negoti-

**AMATEUR NATIONAL
SX CHAMPIONS
FUTURE STARS?**

Area qualifiers for the Oklahoma City Amateur Supercross Championships had drawn big rider turnouts, so Worldsports Promotions had expected a huge turnout. Bill and Jerry West had anticipated thousands of riders and scheduled the Nationals to take a full four days of practice, qualifiers, semis, last-chance qualifiers and mains for the 15 classes of supercrossers. Oklahoma City was chosen because of its location in the center of the country and because OKC's Mayor Norick supports motorcycle racing. John Savitski built the track for pros, because they fully expected the amateur program to last right up to the moment pro practice was scheduled to begin.

However, schools in the East hadn't let out yet, due to a hard winter, and the schools out West were also in the finals and graduation mode. Few riders who had qualified could take off from school to make the trek to OKC, so the turnout was much smaller than expected.





**Most ads are for
things you can buy.
This one isn't.**

Even a Rockefeller, Dupont or the Sultan of Brunei can't buy Jeff Stanton's Supercross Championship. His second in a row.

A platinum card won't help them acquire Jean-Michael Bayle's second place either.

But what you can do is get a Honda CR.[™] (On payments if you like.)

Our CRs have won 22 out of a possible 32 National Motocross Championships over the past eight years.

In the highly competitive world of motocross, it's one thing you can bank on.



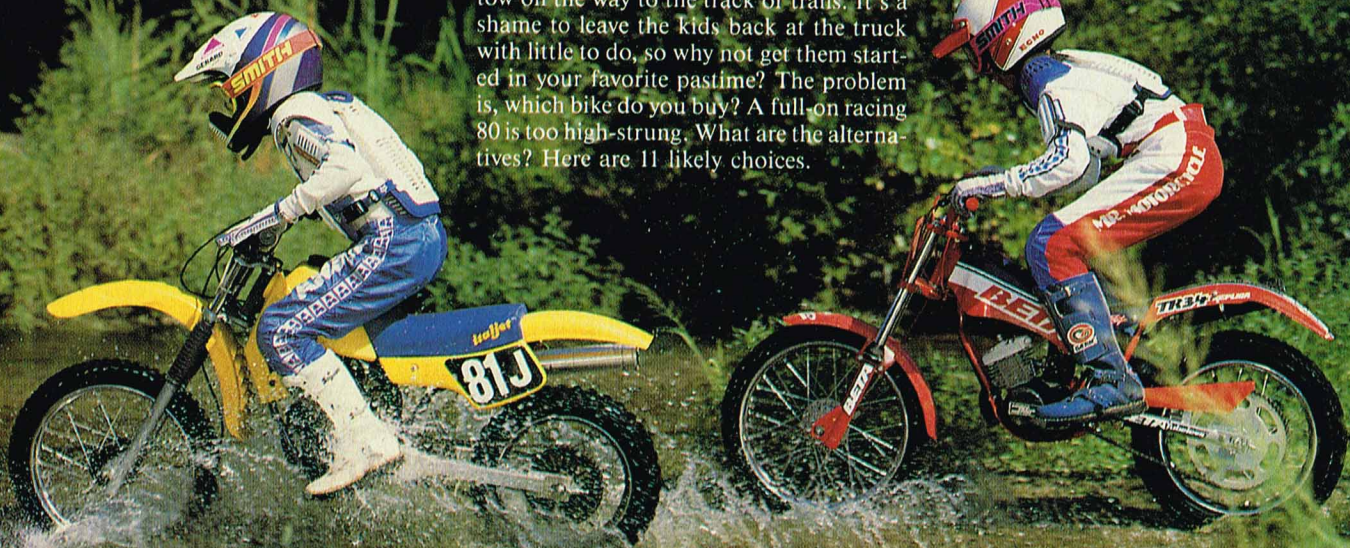
ALWAYS WEAR A HELMET, EYE PROTECTION AND PROTECTIVE CLOTHING, AND PLEASE RESPECT THE ENVIRONMENT. Obey the law, and read your owner's manual thoroughly. CR is a Honda trademark. © 1990 American Honda Motor Co., Inc. (7/90)

FUN FOR THE KIDS

What to look for when buying a minibike

By the DIRT BIKE Staff

Baby-boomers out there are now in the vet class, and many have youngsters in tow on the way to the track or trails. It's a shame to leave the kids back at the truck with little to do, so why not get them started in your favorite pastime? The problem is, which bike do you buy? A full-on racing 80 is too high-strung. What are the alternatives? Here are 11 likely choices.



BETA MINI TRIAL

Engine type Air-cooled, piston-port 2-stroke
Displacement 49cc
Bore and stroke 40mm x 38mm
Carburetion 14mm Dellorto
Fuel tank capacity 0.5 gal.
Transmission 1-speed
Clutch Automatic
Gearing, front/rear 14/37
Front travel 4 in.
Rear travel 3.5 in.
Seat height 23 in.
Ground clearance 9.75 in.
Wheelbase 39 in.
Weight 62 lbs.
Spark arrester Yes
Suggested retail price \$945

Comments: This Tarres Replica TR34 is directed towards kids in the seven- to 11-year-old group who want to develop trials skills. Its wetsuit-thickness foam seat, stump-puller gearing and steep steering head angle make it unsuitable for casual trail riding. Ample torque and excellent trials tires, along with springy suspension, are great for helping bigger kids develop balancing skills, but the Beta is too specialized for use as anything else.

ITALJET BUSTER

Engine type Air-cooled, piston-port 2-stroke
Displacement 49.9cc
Bore and stroke 40mm x 39mm
Carburetion 14mm Dellorto
Fuel tank capacity 0.5 gal.
Transmission 1-speed
Clutch Automatic
Gearing, front/rear 11/49
Front travel 2.9 in.
Rear travel 3.6 in.
Seat height 22.5 in.
Ground clearance 5.9 in.
Wheelbase 32.8 in.
Weight 66 lbs.
Spark arrester No
Suggested retail price \$899

Comments: One of two beginner Italjets, the Buster is the shorter version for smaller youths, aged four to eight. The lower seat height and smaller, wider tires (2.50x12 and 2.50x10) make it a better choice than the Victory for smaller, less skilled riders. Its downsized proportions are still larger than the Y-Zinger and Suzuki JR, though. Both drum brakes are hand-operated, and the Buster has maintenance-free mag-styled wheels. The Buster is AMA-legal for the PeeWee class but needs a spark arrester for off-road use.

ITALJET VICTORY

Engine type Air-cooled, piston-port 2-stroke
Displacement 49.9cc
Bore and stroke 40mm x 39mm
Carburetion 14mm Dellorto
Fuel tank capacity 0.5 gal.
Transmission 1-speed
Clutch Automatic
Gearing, front/rear 11/49
Front travel 2.9 in.
Rear travel 4.5 in.
Seat height 26 in.
Ground clearance 8.4 in.
Wheelbase 40.5 in.
Weight 79 lbs.
Spark arrester No
Suggested retail price \$999

Comments: Though it shares the Franco Morini motor of the Buster, the Italjet Victory is aimed at larger riders and has larger wheels (15-inch and 12-inch) that make it illegal for the PeeWee class and stretch seat height to 26 inches. It would have to be raced in the 65cc class, for which the AMA has set an age range of seven to 11. The Victory has a full-on cradle frame and good suspension but falls short of the six-speed KX60 on the track.

◀ Italjet Victory (left) Beta TR34 Min Trial

HONDA EZ90 CUB

Engine type Air-cooled, reed-valved 2-stroke
Displacement 89.8cc
Bore and stroke 48mm x 49.6mm
Carburetion 15mm Keihin
Fuel tank capacity 1.1 gal.
Transmission 1-speed automatic
Clutch Automatic
Gearing, front/rear 14/35
Front travel 3.9 in.
Rear travel 4.3 in.
Seat height 29.5 in.
Ground clearance 8.3 in.
Wheelbase 47.2 in.
Weight 176 lbs.
Spark arrester Yes
Suggested retail price \$1498

Comments: The 1991 Cub EZ90 offers space-age styling and twist-it-and-go ease of riding but it's a bear to work on, other than chain adjustment. Luckily, we tried to break it and couldn't, so maintenance is minimal. The EZ has electric starting and a manual kickstarter tucked away in case the battery goes dead. The bike is the easiest to ride of all the 50cc-90cc bikes, but it has the tallest seat height, making it more of a big kid/small adult learner machine. As a safety feature, the Cub won't start unless the kickstand is up and rear brake fully engaged.



▲ Honda EZ90 Cub

▼ Yamaha PW50

YAMAHA PW50

Engine type Air-cooled, piston-port 2-stroke
Displacement 49cc
Bore and stroke 40mm x 39.2mm
Carburetion 12mm Mikuni
Fuel tank capacity 0.5 gal.
Transmission 1-speed
Clutch Automatic
Gearing, front/rear Shaft
Front travel 2.4 in.
Rear travel 2 in.
Seat height 19.1 in.
Ground clearance 4.1 in.
Wheelbase 33.7 in.
Weight 82 lbs.
Spark arrester Yes
Suggested retail price \$799

Comments: The least expensive Pee-Wee, the PW50 is a highly-sought-after machine and is more competitive than the JR50. It is faster, stock, than the JR and has more hop-up potential. The PW also has oil injection and a restrictor in the exhaust, but the shaft means you can't alter gearing cheaply. Oddly enough, the motor pivots in the frame. The pipe is quiet and tucked in very well. Like the Buster, the PW50 has mag-styled wheels; only the Yamaha's are steel. It's meant for kids aged four to eight.





Honda XR80R

Suzuki JR50



Yamaha DTL/C 50



Yamaha BW80

Suzuki DS80



Kawasaki KX60

HONDA XR80R

Engine type Air-cooled, SOHC, two-valve 4-stroke
 Displacement 80cc
 Bore and stroke 47.5mm x 45mm
 Carburetion 20mm Keihin
 Fuel tank capacity 1.7 gal.
 Transmission 5-speed manual
 Clutch Manual
 Gearing, front/rear 14/46
 Front travel 5.5 in.
 Rear travel 4.3 in.
 Seat height 28.5 in.
 Ground clearance 8.3 in.
 Wheelbase 47 in.
 Weight 141 lbs.
 Spark arrester Yes
 Suggested retail price \$1398

Comments: Aimed at beginners aged eight and above, the XR is the only sub-100cc four-stroke available. Its relatively tall seat height and manual clutch and tranny make it a bit harder to learn on than the BW80 or Cub, but it offers better performance once the fundamentals are mastered. It also makes a great pit bike. We put 180-pound Jim Holley (the XR is rated at a 220-pound maximum) on ours to see if he could break it, and he couldn't, so you know the bike will last forever under normal conditions.

YAMAHA BW80

Engine type Air-cooled, piston-port 2-stroke
 Displacement 79cc
 Bore and stroke 47mm x 45.6mm
 Carburetion 15mm Mikuni
 Fuel tank capacity 1.1 gal.
 Transmission 3-speed manual
 Clutch Automatic
 Gearing, front/rear 15/32
 Front travel 4.4 in.
 Rear travel 4.4 in.
 Seat height 24.8 in.
 Ground clearance 7.1 in.
 Wheelbase 42.9 in.
 Weight 146 lbs.
 Spark arrester Yes
 Suggested retail price \$1099

Comments: Yamaha's BW80 offers an exhaust restrictor plate for beginning riders, plus its fat tires offer excellent stability in sand. If your most-frequented ride spot is sand, it's a good choice for beginners; however, the ATV-type tires don't offer precise turning like normal motorcycle tires on harder terrain. Its three-speed tranny gives the learner experience in shifting, and the auto clutch doesn't intimidate neophytes. It's a great pit bike, too.

SUZUKI DS80

Engine type Air-cooled, reed-valved 2-stroke
 Displacement 79cc
 Bore and stroke 49mm x 42mm
 Carburetion 20mm Mikuni
 Fuel tank capacity 1.2 gal.
 Transmission 5-speed manual
 Clutch Manual
 Gearing, front/rear 12/34
 Front travel 3.9 in.
 Rear travel 4.3 in.
 Seat height 25.6 in.
 Ground clearance 7.7 in.
 Wheelbase 41.7 in.
 Weight 128 lbs.
 Spark arrester Yes
 Suggested retail price \$1299

Comments: Suzuki's entry-level trail machine, the DS80, is recommended for riders under 110 pounds, and its seat height makes it a handful for children under nine or ten. Like the XR80, its fully manual transmission and clutch is harder to master for beginners than the automatic machines, but it will be outgrown later than the autos. The DS offers full lighting and oil-injection and is 13 pounds lighter than the XR80.

SUZUKI JR50

Engine type Air-cooled, piston-port 2-stroke
 Displacement 49cc
 Bore and stroke 41mm x 37.8mm
 Carburetion 12mm Mikuni
 Fuel tank capacity 0.5 gal.
 Transmission 1-speed w/neutral
 Clutch Automatic
 Gearing, front/rear 13/28
 Front travel 2-way adjustable
 Rear travel 2-way adjustable
 Seat height 18.9 in.-20.7 in.
 Ground clearance 4.5 in.-6.3 in.
 Wheelbase 33.9 in.
 Weight 82 lbs.
 Spark arrester Yes
 Suggested retail price \$829

Comments: Smallest of the Pee-Wee-class bikes, the JR50 has height adjustment features the others don't. Extra shock mounts on the swingarm allow rear height increases, and removable spacers in the forks do the same up front. Also, seat height can be raised with different mounting holes. The JR has neutral, a restrictor plate in the exhaust, ten-inch wheels and oil injection. Depending on the size and agility of your youngster, he or she may be able to handle the JR as early as aged three, but the JR is the first outgrown.

YAMAHA DTL/C 50

Engine type Liquid-cooled, reed-valved 2-stroke
 Displacement 49.3cc
 Bore and stroke 40mm x 39.2mm
 Carburetion 16mm Mikuni
 Fuel tank capacity 2.25 gal.
 Transmission 6-speed manual
 Clutch Manual
 Gearing, front/rear 13/48
 Front travel 6.7 in.
 Rear travel 5.9 in.
 Seat height 30.9 in.
 Ground clearance 10.4 in.
 Wheelbase 48.6 in.
 Weight 165 lbs.
 Spark arrester Yes
 Suggested retail price \$1449

Comments: This is a full-on street trail bike designed to give 15-year-olds (and above) a moped-class mount with real off-road capabilities. If your child is five feet tall or more, he'll be able to handle the DTL/C with little problem. Should this be the case, it can be stripped down for off-road-only use. It has oil-injection and a boost bottle, plus it has folding shifter and brake pedals to make get-offs less expensive.

KAWASAKI KX60

Engine type Liquid-cooled, reed-valved 2-stroke
 Displacement 60cc
 Bore and stroke 43mm x 41.6mm
 Carburetion 24mm Mikuni
 Fuel tank capacity 0.9 gal.
 Transmission 6-speed manual
 Clutch Manual
 Gearing, front/rear 13/44
 Front travel 7.9 in.
 Rear travel 7.9 in.
 Seat height 27.9 in.
 Ground clearance 9.8 in.
 Wheelbase 42.5 in.
 Weight 111.4 lbs.
 Spark arrester No
 Suggested retail price \$1599

Comments: This is a full-on mini racer scaled down for bigger kids, aged seven to 11. It has almost every feature of the bigger KXs, except for KIPS valves and fully adjustable suspension. The KX60 is more of a beginning racer's bike than a beginning rider's mount, as the pipey power and manual tranny and clutch can intimidate those just starting riding. If your youngster is a quick learner and has good coordination, this would be a good choice for a first bike, as it is the last outgrown and the rage of the 65cc class. □



LOW-COST WEIGHT LOSS

Make your bike so light it's illegal!

How much would it cost to make your Honda CR500 lighter than the one Team Honda builds for Rick Johnson? You're probably thinking in the tens of thousands of dollars. How about less than a thousand? Interested? The greatest thing about our weight loss program is that you can use it on nearly any bike without sacrificing strength or performance. This isn't a

story about having a drilling and grinding marathon in your garage—that won't work with today's bikes because nearly every part is engineered to weigh as little as possible. We found the ones that weren't and replaced them. We started with the 233-pound CR500 because it's one of the lighter and more popular big-bore motocross bikes. We figured that if we could significantly reduce the

weight of a bike as carefully designed for light weight as the CR, anyone should be able to trim as much or more fat from any machine he has. We set out to make the machine so light that it would be illegal to race, according to the AMA's minimum weight limits for motocross machines. According to AMA rules, a 500 motocross bike—including Rick Johnson's—can weigh no less than 224 pounds, 250s must weigh at least 216 pounds and 125s can be no lighter than 194 pounds. The bikes are weighed without fuel but must be in running condition with all the necessary fluids and lubricants in place.

We dropped more than nine pounds from our CR500 with simple, reasonably affordable bolt-on items and succeeded in making our CR500 illegal! Here's how we did it.

The first items to go were the stock Dunlop tires. They're excellent intermediate meats but the CR was on a diet and only the lightest tires would do. Pirelli's Sandcross soft-terrain knobbies reduced the weight nearly a half-pound at the front and more than four pounds at the rear! Five pounds of unsprung blubber, gone—right off the bat!

Weight loss at the wheels is a real bonus because the suspension can control the wheel better when it has less weight to cope with, just like it's easier to catch a tennis ball than a bowling ball. We used stock, standard-thickness tubes in the tires because we could

◀ We dropped more than nine pounds from our CR500 by carefully selecting lighter-than-stock aftermarket components. Now the CR is illegal for AMA Pro class motocross because it's too light!

Every one of our weight-reducing replacements to the CR added performance or strength or both, unlike the frenzied drilling marathons of years ago. ▶

not find a significantly lighter tube. It's possible to find some tires of the same brand, model and size with as much as a two- or three-ounce weight difference, so it pays to look for the lightest individual tires you can find, not just a certain brand or model that you've discovered to be lighter than most. Remember to choose the correct tire for the terrain you'll be riding. Our CR corners like it's on Velcro in soft terrain with the Pirelli Sandcrosses on it, but these tires, like any soft-terrain tire, wouldn't hook up or hold up well in hard, rocky terrain.

After such good luck with the tires, we hit the bars—the handlebars, that is. O'Neal sells Arrow alloy bars, which we discovered were 12 ounces lighter than the stock Honda steel bar. Arrow alloy bars are premium-quality bars and are used by 125 world motocross champ Trampas Parker, former 500 world motocross champ Georges Jobe and Paris-to-Dakar rallye winner Edi Orioli, so we were sure they'd hold up under our riding and frequent crashing.

An aftermarket expansion chamber is usually an easy way to shave weight from the engine. We saved a pound on our YZ250 by switching to an aftermarket pipe a while ago. There's less excess blubber on the Honda, though. PSI's pipe was the lightest we could find and it saved just two ounces compared to the stock pipe. We discovered it was more than worth its weight when we test-rode the bike. The pipe pumped up the CR's low- to midrange power delivery without disturbing its ridability or its ability to rev out. We chose a Pro Circuit silencer because, at two pounds, it's lighter than most aftermarket silencers and a full pound lighter than the stock part. It's also got a clean, business-like appearance.

Pro Circuit provided a subframe for the CR made of trick, rectangular aluminum. It saved another full pound compared to the stock part and adds a works look to the back of the bike. All the stock pieces fit the Pro Circuit subframe perfectly, just like it was a stock Honda part.

The last item in our weight loss program was to have been an aluminum bolt kit for the low-stress areas on the bike, the bodywork, airbox and engine side covers from On the Line Racing. On the Line specializes in exotic, expensive lightweight parts like aluminum frames and carbon fiber brake rotors that cut serious amounts of weight, but



WHAT WE SPENT & WHAT WE SAVED

This chart shows the cost of each item on our lightweight project Honda CR500, its weight, the weight of the Honda part it replaced, how much weight it saved, the total cost for the parts and the total weight savings we achieved.

	Price	Weight	Weight of Honda part	Weight savings
Pirelli Sandcross front tire	\$75	7 lbs., 14 oz.	8 lbs., 4 oz.	6 oz.
Pirelli Sandcross rear tire	\$78	10 lbs., 6 oz.	15 lbs.	4 lbs., 10 oz.
O'Neal Arrow alloy handlebar	\$54.95	1 lb., 4 oz.	2 lbs.	12 oz.
Pro Circuit Aluminum subframe	\$185	2 lbs., 7 oz.	3 lbs., 7 oz.	1 lb.
Pro Circuit Aluminum silencer	\$64.95	2 lbs.	3 lbs.	1 lb.
PSI Performance pipe	\$159	5 lbs., 12 oz.	5 lbs., 14 oz.	2 oz.
On the Line Aluminum bolt kit	\$100	4 oz.	15 oz.	11 oz.
On the Line Titanium bolt kit	\$275	11 oz.	1 lb., 5 oz.	10 oz.
TOTAL WEIGHT LOSS				9 lbs., 3 oz.
TOTAL COST	\$991.90			

we were out to save money and weight, so we resisted their more costly goodies. When we hit the scales with our Honda it came up heavy! Shock and disbelief gripped the *Dirt Bike* staff. There was only one thing we could do: call On the Line Racing again! They suggested their 8mm billet titanium bolt kit for high-stress areas like the handlebar clamps, fork triple clamps, seat mounts and chain roller and subframe. The kit, at \$275, wasn't cheap but it dropped the weight of the Honda ten ounces, allowing us to reach our "illegal" sub-224-pound target weight!

CAN YOU FEEL IT?

Nine pounds is nothing to sneeze at. Any manufacturer would love to reduce the weight of their stock machines that much just because it would look so good in their brochure. The fact is, our project CR500 felt better than if it had merely lost the weight.

The feel of fresh tires (on appropriate terrain), the high-performance pipe and silencer gave the bike a lively, easy-to-control feel, and the weight loss was noticeable. A light bike is a real advantage in long races, when your strength starts to fade. Unfortunately, now that everyone knows about our bike, we'll have to race non-AMA events to avoid being protested! □

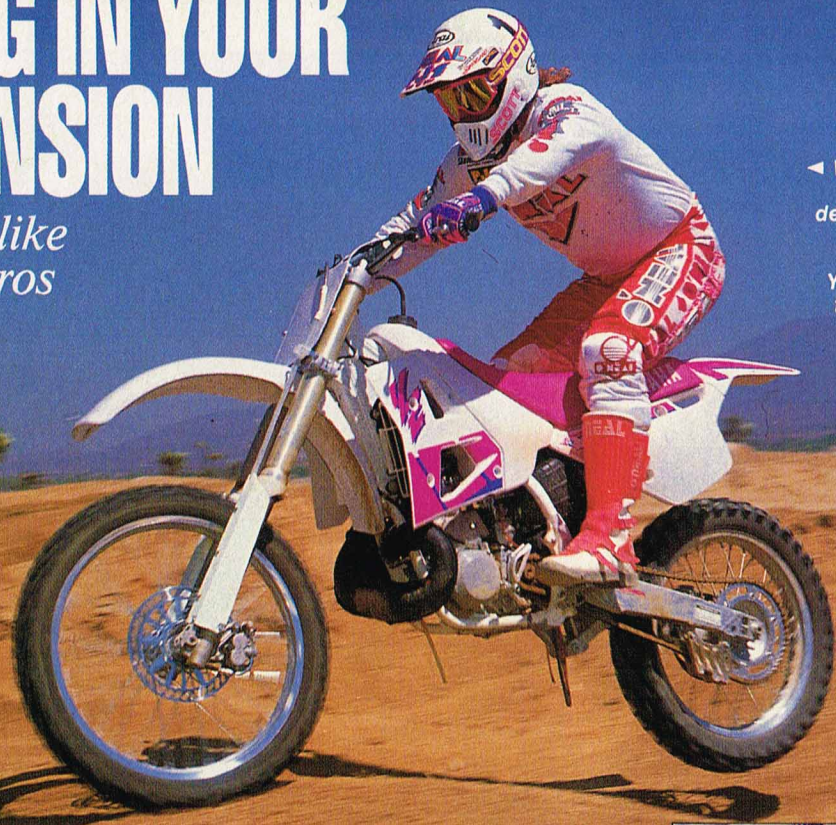
DIRECTORY

- On the Line Racing, 30 S. Wacker, Ste. 1120, Chicago, IL 60606; (708) 940-0111.
- O'Neal U.S.A., 9160 Jordan Ave., Chatsworth, CA 91311; (818) 998-1049.
- Pirelli, 2001 Gateway Pl., Ste. 700, San Jose, CA 95110; (408) 453-6222.
- Pro Circuit, 4214 E. LaPalma, Anaheim, CA 92807; (714) 993-5400.
- PSI Performance, Rt. 2, Box 309, Wild Rose, WI 54984; (414) 787-2430.

DIALING IN YOUR SUSPENSION

Setting it up like the factory pros

By the DIRT BIKE Staff



◀ Working systematically and paying careful attention to detail are the most important aspects of dialing the bike suspension. Here's how Yamaha sets up suspension for production runs and individual riders alike.

There is more to tuning your bike's suspension to your track, weight, riding style and ability than merely setting sag, then cranking a couple of dials on your shock and forks. Most people just crank in the compression adjusters until the bike quits bottoming, then complain about, or learn to live with, the harsh ride over smaller bumps. Or they send the components off to Fred's Flying Forks for revalving. For big bucks. That's why a vast majority of riders (those with small bucks) aren't getting the best performance out of their suspension.

Chances are, when you bought your bike it needed immediate suspension adjustments. All bikes are set up to suit a wide variety of riders but are targeted for a certain-sized intermediate racer. For example, YZ125s are set up for 145-pounders and 250/490s are aimed at 165-pounders. However, riders of the same weight ride differently and require different settings. Riders at the fringes of the weight ranges (YZ125 110-170 pounds, 250 140-190 pounds) may require different spring rates, which in turn require damping adjustments.

It can be pretty confusing without some know-how and a definite planned approach. Here's how Yamaha and the other manufacturers set up their suspension for each rider and test suspension setting—systematically. Even if you don't have a Yamaha, these tips will help you perfect your bike's suspension.

You don't have to have a works van and three mechanics to get the most out of your bike's suspension, just a knowledgeable friend, a few tools, a stopwatch and a careful approach to what you're doing. ▶

WHAT YOU'LL NEED

You'll need a rough track, a well-greased linkage (binding can throw off results), tools, tape measure, fork oil as recommended in your owner's manual, fork oil level tool, shop manual, Wrench Report (or equivalent) for your bike, stopwatch, a knowledgeable friend to help you set sag and observe suspension action on the track, race log and a pen to record settings.

If you own a VCR, buy Yamaha's *YZ Suspension Tuning* video or the video for your brand of bike. This video is invaluable in showing you how to disassemble your forks and set up your suspension, plus it shows you how properly set-up components react to the terrain. Bring along your video camcorder, if you have one, so your friend can record you in action, and you can review it between sessions.

Your Wrench Report will give you baseline settings for your particular bike and weight. If you are at the fringe of your bike's rider weight parameters and cannot dial in your forks with oil level and compression damping adjustments, you'll have to change to heavier or lighter springs. The same applies



to the shock. Try to dial it with the clickers before buying springs.

You'll also need plenty of patience, because you have to make only one small change at a time, test, make a slight adjustment, then retest. It may take a day or two, but the payoff can make the difference between winning and losing or even crashing. You may also end up saving the cost of sending your components away for revalving.

TUNING THE SYSTEMATIC WAY

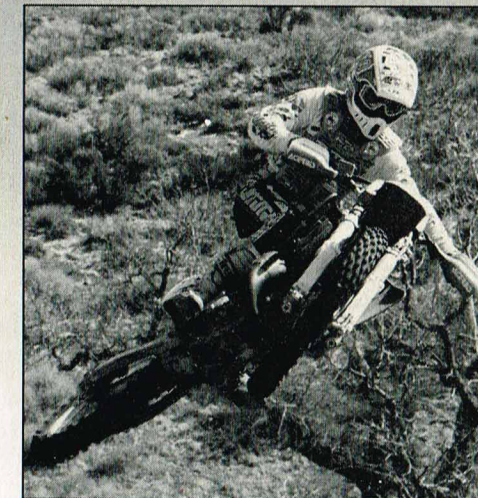
First, adjust your ride height to specification (usually 96mm-100mm), with all of

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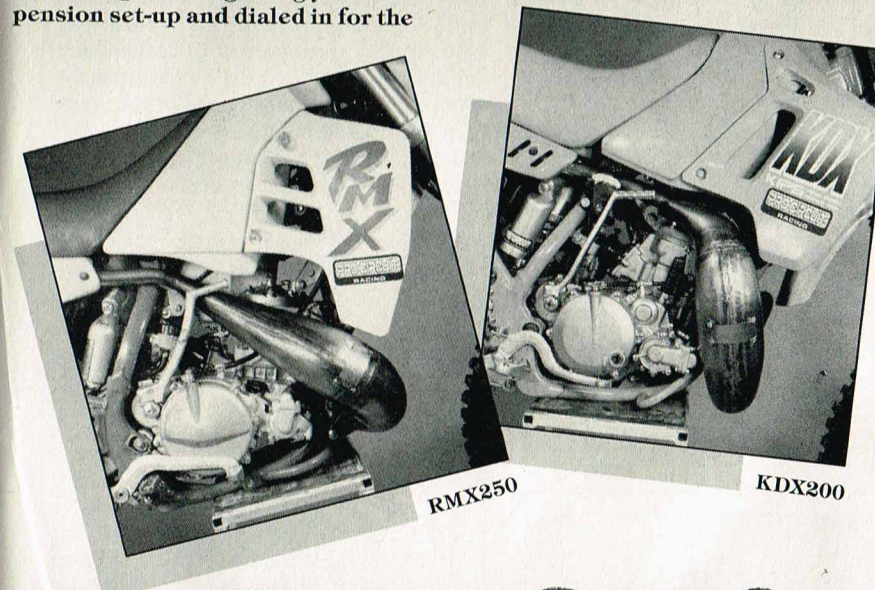
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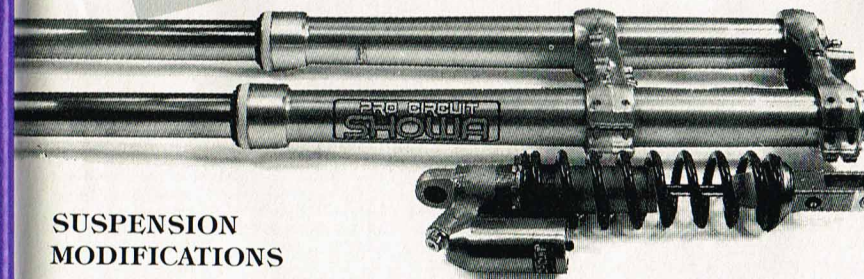


Larry Roeseler



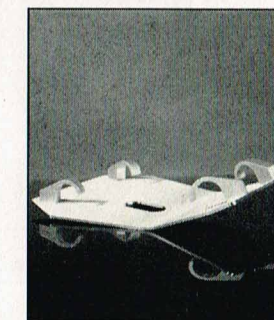
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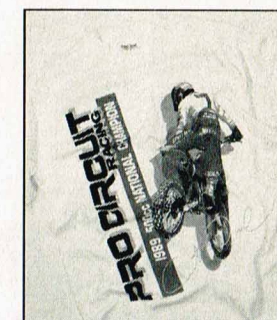
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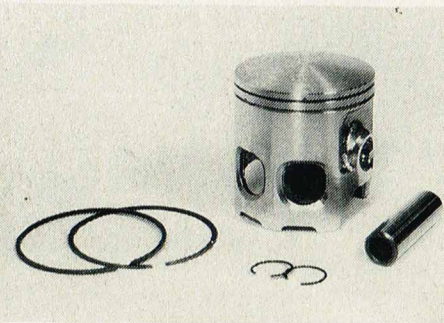
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YOUR SUSPENSION

your race gear on and you sitting in your normal riding position. Ride height, or sag, is the difference between the unloaded length (fully extended) and the length with you sitting on the machine, measured from the tip of the swingarm to the back of the seat. As a rule of thumb, bike sag (the amount it compresses under its own weight) is usually one inch, so, once you set rider sag, check bike sag. If it's less than an inch, you'll need a stiffer rear spring.

Next, set your fork and shock compression and rebound adjusters to Wrench Report settings for your weight. Turn the clickers all the way in (clockwise), then count the clicks out until you hit the recommended numbers. If your bike is brand new, you'll want to ride it a bit to break in the suspension at this point. If it has a lot of time on it, you'll need to disassemble the forks and check for worn bushings and contamination in the valve stacks, as per the tuning video and/or service manual. Reassemble and set oil level to Wrench Report recommendations. Check tire pressure and adjust (too low or too high pressures can affect handling and suspension action), set fork tube height to spec and record all settings in your race prep and tuning manual.

Take some warmup laps to develop your lines and break in the suspension. You want

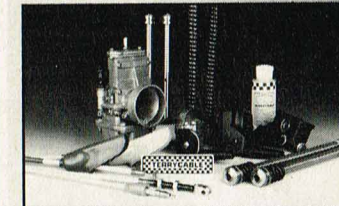
to use the same lines to keep lap times consistent. Do some hot laps for the stopwatch and pay close attention to what the forks are doing. Are they bottoming on medium-sized whoops and jumps? You'll need to raise the fork oil level 5mm. If they're not using all of their travel, you'll need to drop oil level 5mm. Work in small increments and record all changes. Retest and re-time. If you reach the minimum or maximum recommended oil levels, it's time to change fork springs and reset clickers to the recommended settings for those springs (stiffer springs require more rebound and less compression damping and vice versa for softer springs). Note the settings and retest.

You want to concentrate on, and have your friend monitor, what the forks are doing. Do they rebound too quickly? Dial in two clicks on the rebound and test again. Work in small increments only and note all changes. Do the forks transmit spikes to your wrists? Soften compression (turn counterclockwise) two clicks. Does the bike headshake or oversteer? Lower the forks in the clamps to Wrench Report or service manual specs. If you overshoot berms (understeer), raise the forks in the clamps.

With the forks dialed, release air pressure and turn your attention to the shock. Recheck ride height (sag) and do some timed/observed laps. Is it bottoming? Crank in two clicks on the compression. Retest and reset as needed until you get maximum travel without bottoming. If you reach the maxi-

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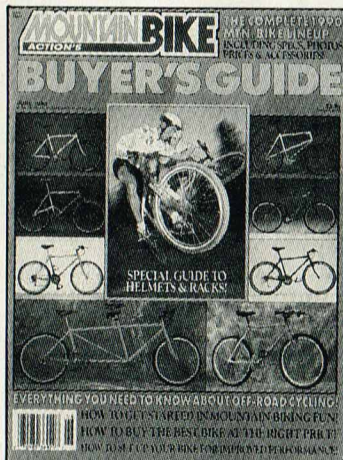


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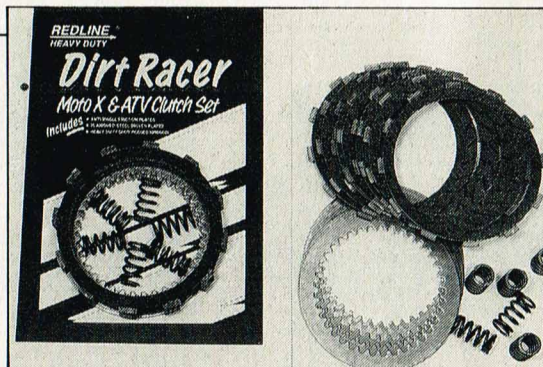
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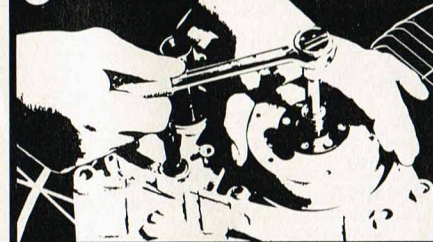
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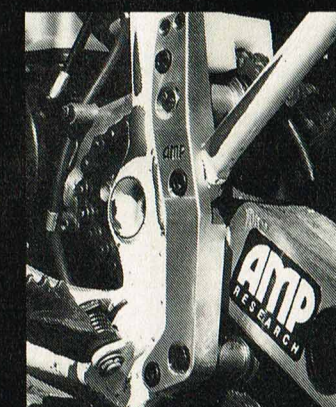
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YOUR SUSPENSION



If you come up short on the doubles, you're certainly going to bottom your suspension severely. This should be the only time your suspension bottoms, though, if it's set up properly.

Adjusting fork oil level in the field is simply a matter of collapsing the forks as shown, adjusting the oil level indicator, inserting it into the forks (beside the cartridge assembly) and siphoning off the excess oil in each leg.

mum compression setting and still get bottoming, go to the next stiffer spring (or vice versa if you reach minimum settings and still don't achieve full travel on big hits). If you change the spring, reset adjusters to spec. Do more laps, paying attention to rebound. Is it packing in the whoops? Lighten rebound two clicks, note the change and retest. Is it kicking now? Crank it in a click and retest.

You want to use all available travel without bottoming and have rebound dialed to prevent packing and kicking. With this systematic approach to tuning, you now have your bike dialed for maximum performance with minimal money spent. The stopwatch should show a sizable drop in lap times from your first outings. With these settings recorded in your log book, you can dial your bike for different tracks with a click or two, using this systematic approach.

TESTING WITH YAMAHA R&D

We had a chance to do some testing with Yamaha, comparing their '90 and '91 YZs and testing different settings on the '91s. It was very controlled and systematic, so the Yamaha engineers could evaluate changes visually and with the stopwatch. Before each session, sag was checked and adjusted as needed to specifications. Warmup laps revealed any needed adjustments, then lap times were taken for the '90s. The process was repeated for the '91s.

Each rider was instructed to take the same lines and ride in the same manner and speed for both bikes. We weren't shown our lap times until testing was completed, as knowing our times could cause emotional interference. Ed Scheidler, Yamaha's head R&D engineer, had us fill out forms comparing the '90 and '91 and comparing suspension changes on the '91. He also paid close attention to the bike and rider in action. Was either end bottoming or packing? Was it kicking the rider or transmitting visible jolts to the arms? Was the bike smooth with the rider flowing well with the bike? Applying the rider opinions to the lap times and his own observations, Scheidler evaluated each

setting and deduced needed changes.

Once we went the wrong way, and the stopwatch showed it. Backing off compression on the shock made it ride lower into the curve. This made the forks kick out (chopper) and seem harsh, along with the rear being more busy on whoops. We dialed in more compression and saw a big improvement. This illustrates how misadjusting one end can make the other worse, and how going too soft can result in harshness just as going too hard can have the same result. This is why you change only one thing at a time, record each change and then quantify the change with times, opinions and observations.

Yes, it takes time and elbow grease. Scheidler says, "Suspension testing is often monotonous work—test and change, test and change, day after day—but we come up with the best combination for the widest variety of riders. Then we fill out paperwork to advise Japan on settings. Any change after the production run starts can cost big bucks, so we have to be very thorough. Then it's up to the rider to dial his YZ for himself, and the payoff is a more enjoyable ride and faster lap times."

THINGS JAPAN DOESN'T TELL YOU PRELOAD IS ALSO A FACTOR

• Horst Leitner, the father of ATK and AMP Research, doesn't agree with the Japanese on raising oil level to fight bottoming. He feels it's a Band-Aid fix for too light fork spring rates; you lose active travel and there is a higher chance of blowing your fork seals. Horst notes that Kawasaki, Suzuki and Yamaha have too much fork preload to fight too light a spring rate. This causes stiction, because the fork resists movement due to the high preload, then it sails into the travel. AMP has adjustable preload kits for Sho-

wa and Kayaba forks for \$29.95 and has AMP Links for Honda and Kawasaki for \$129.95. AMP Links eliminate chain torque from acting on the suspension and allow you to use 2.5 inches of sag instead of four inches. This gives you more active suspension travel out back.

Here's how Horst dials suspension:

- First, he increases fork spring rate, backs off compression and cranks in rebound damping three to four clicks. Then he lowers oil level towards the minimum oil level indicated in the owner's manual. If your dialed-in forks have a harsh initial ride, you may want to install the preload adjusters and go the Horst route to fork tuning. Horst goes for two to 2.5 inches of rider sag in the forks.

- Most Japanese bikes have way too little grease in the linkage pivot points. Disassemble and grease for bindless action. On Hondas, most people think the lower shock eyelet is a sealed bearing—it isn't! Pry the dust covers off and grease the heim joint. Check rear sag again after greasing.

- Send the rider out with properly set front and rear sag, then watch the forks and make rebound and compression adjustments as needed.

- Follow manufacturer recommendations for dialing the shock. Spring rate isn't as critical, compared to the forks, because of the progressive linkage. The critical points are lubrication, correct sag and running as light a rebound setting as possible. You want it just heavy enough to stop kicking. □

2 WHEELS VS. 4 WHEELS

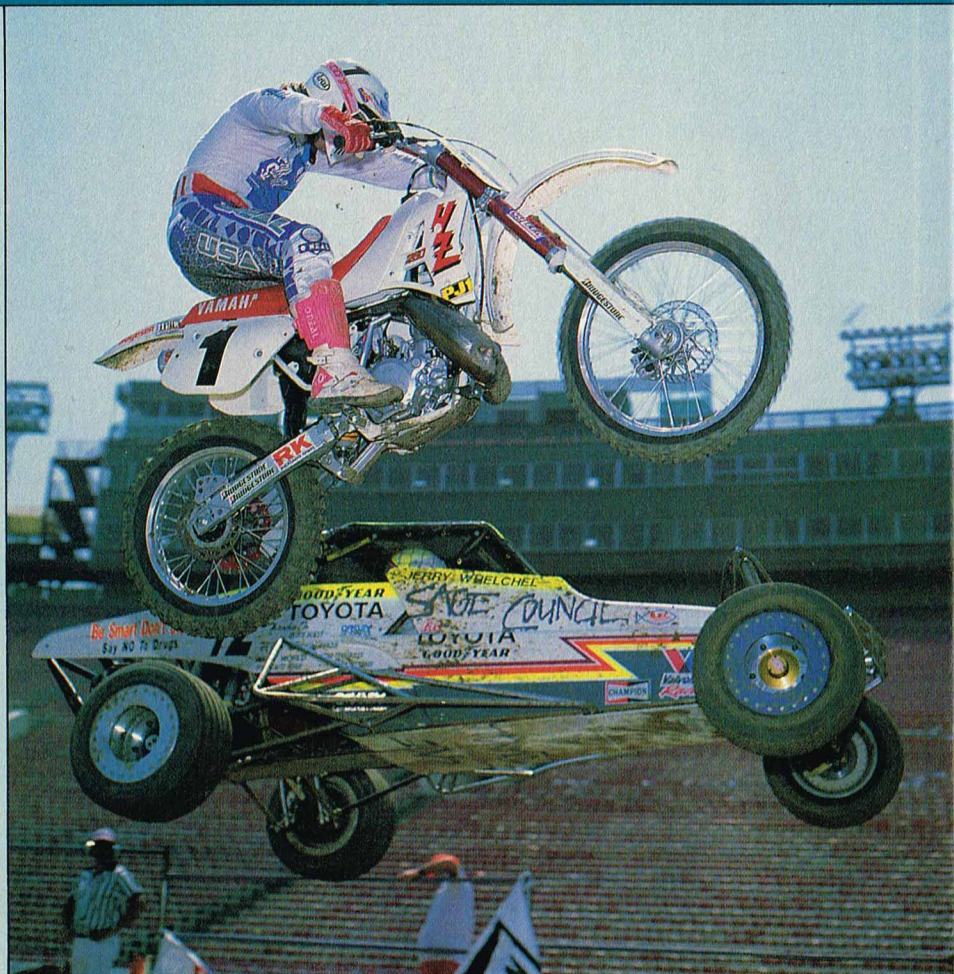
Off-road showdown

By the DIRT BIKE Staff

You'll never see an inverted, one-footed finish-line cross-up at a car race. Bob Hannah will never jump a Grand National Sport Truck up a sheer cliff. Marty Tripes will never do 180-degree aerials in a dune buggy like he did on a bike. Cars and trucks weigh too much and are too cumbersome for even the best driver in the world to do stunts like a bike rider can.

When it comes to head-to-head racing, dirt bikes have a big advantage over cars and trucks. At this year's Baja 500, Larry Roeseler, Danny LaPorte and Ted Hunnicutt Jr. beat Robbie Gordon's Class 8 Ford pickup by a tad under 18 minutes and Ivan Stewart's Class 1 Unlimited Toyota by about 22 minutes. The four-wheelers are closing, though. In the 1988 Parker 400, Dan Smith beat Bob Gordon's Class 2 buggy by over 42 minutes. Stadium racing is a bit closer, with Jim Holley cutting laps 1.5 seconds faster than the Super 1600 of Jerry Welchel and 2.7 seconds faster than Stewart's Grand National Sport Truck.

What makes these figures more interesting is the fact that these four-wheeler racers all have something in common. Bob and Robbie Gordon, Ivan Stewart and Jerry Welchel all have won major off-road championships, and they all have motorcycle experience. The list of bike racers who have become successful car or truck racers is impressive—Robbie Gordon, Tommy Croft, the Gillman Brothers, Jim Fishback, the Mears Brothers, "Smokin'" Joe Leonard (the three-time dirttrack GNC who went on to Indy car championships), Dave Ashley, Marty Tripes, Malcolm Smith, Rod Hall, Jack Johnson, the Cook Brothers, Jerry Welchel and Marty Hart. Walker Evans and Ivan Stewart ride bikes to kick back and have fun when they're not racing desert or stadium trucks.



Other motorcycling heroes have shown they can apply lessons learned from bike competition to make the jump to four wheels. Bob Hannah, the all-time MX win record holder, recently completed the Barber Saab driving school with lap times faster than veteran car drivers. He then went on to finish a close second in the Toyota Long Beach GP Celebrity Race. Eddie Lawson did some three-quarter midget testing at Ascot and, within a few laps, was turning laps fast enough to make the main event.

MUTUAL RESPECT

Ivan Stewart, who plays around out in the dez on his XR350, has tremendous respect for riders like Dan Smith: "Dan could easily make the transition to four wheels, if he got with someone like myself or Walker Evans. Dan understands the abuse a vehicle can take, and he knows how to set up his suspension. In truck racing, just as with bikes, setting up the suspension to use all of the travel on every serious bump is the key. Right now my Toyota runs 14-16 inches of travel, and you transfer weight like a bike, only you're using the throttle and brakes instead of your body to preload for bumps. I think Dan could adapt much faster to my truck than I could to his race bike."

Stewart knows the advantages Smith has in the desert but feels he can someday nab the overall win ahead of the bikes. "Bikes are much more agile in the tight stuff, quick-

er out of turns and have more top speed than my truck," he says. "Robbie's Class 8 is faster on top-end but is more cumbersome in technical sections. We're close now. It'll take a lighter four-wheel-drive Class 1 truck that is faster out of the hole to beat them in the future. I've beat the bikes in the past but they have more suspension and a better power-to-weight ratio now."

Smith has the utmost respect for the "Iron Man," who earned his nickname for racing long desert events without a co-driver—and winning. When he gets too banged up to race bikes anymore, he'd love to strap himself into a Class 1 pickup truck and continue racing. Smith drove one of Ivan's Toyotas back in '86 and was pumped with the machine: "Ivan's truck was a lot more stable on the fast, rough sections, with a much more plush ride. I hit stuff that would spit me off a bike . . . and I could hardly feel it."

Jim Holley, '88 and '89 MTGP Ultracross Champion, got a chance to try out Walker Evans' Jeep Grand National Sport truck and was hooked. "It's the most fun I've had on any vehicle in a long time," said Holley. "I thought it would thrash me over the jumps, but it was really comfortable. It's so much easier to handle than a bike. It has a two-speed transmission, and you just use low for the start, then it's all throttle and brakes. The truck is weighted to take jumps front-end high, like the old TT style of



Motorcycles have the cars beat in weight and power-to-weight ratios, making two-wheelers faster over jumps, through turns and in technical sections. Cars cost much more to race, but there's more room for sponsors' stickers.

◀ **For showmanship and safety, bikes run the MTGP tracks backwards. We set up a special test session where Jim Holley would run the same direction as the four-wheelers. Holley was fastest, and the car guys declined to run the track backwards, where the jumps are much steeper.**

jumping bikes, so you just have to gas it and go. You're strapped in and protected by the rollcage, so there isn't any injury factor to contend with. When I'm too old to beat the young kids on a bike, I want to be out there mixing it up in a truck. Look at Walker, who's 51, and Ivan, who's 44—they're out there banging metal and winning."

FROM BIKE FAME TO CAR SPONSORSHIPS

Tommy Croft earned a name for himself racing the Southern California circuit and landed a factory Honda ride from 1975 to 1979, then he switched to Kawasaki in 1980. That year Croft hyperextended his knee and sat out a whole season. He attended some off-road car races during his recovery and decided that was what he wanted to do. He bought a Super 1600 buggy and went racing. Much that he learned racing motocross helped him to quickly make a name for himself in the four-wheeled world.

"Motocross taught me to charge hard and to be aggressive but not to break the machine," says Croft. "Back then the suspension revolution was going on, and we were breaking a lot of chains and wheels. You had to charge but be easy on the equipment, like

with today's cars. Line selection, reading terrain and guarding lines carried over from motocross, and I had an advantage on setting up to pass other drivers coming out of corners.

"The fame of being a factory rider helped, too. Fans, announcers and sponsors already knew my name, so I just had to prove myself to pick up sponsors. I won the 1986 MTGP Super 1600 championship and the Eastern Cup in '86 and '87. Sponsorships are much more lucrative—people can identify better with cars and trucks, because that's what they drive to work. The big tire companies, like my main sponsor, General Tire, are heavily involved in sponsoring off-road racers.

"There's also longevity in car racing. I've been doing it for eight years and have never been injured. I'm driving Jeeps and my 1600 in the MTGP series next year, plus I'm taking the Barber Saab driving school. I hope to make the transition to pavement open-wheeled cars as Robbie Gordon did."

Sponsorships are more lucrative, but it costs a lot more to go racing four-wheelers. "A transmission alone costs as much as a motocross bike does today, and I've gone through two trannies in one day!" says Croft. Super Hunky, the master of the casual pace on bikes, also made the transition to trucks and agrees it takes big bucks to race trucks, compared to bikes: "At the Mojave 250 one year, Ivan had fully staffed pits every eight miles. It can take over a million dollars to put on a winning effort with four-wheelers, where a Dan Smith or Larry Roeseler may spend only \$50,000-\$100,000. But race wins or even consistency can bring high-dollar sponsorships."

POTENTIAL FOR SUCCESS

Hunky says, "Today's bikes have more potential than 99 percent of the riders out

there, but racing cars is different, like racing bikes of the '70s. You have to baby a car or it'll break. That's the key that makes Rod Hall so successful—he sets a pace right below hurting his equipment, and he's content to keep at that pace. He may not be the fastest guy out there every race, but he's consistent and has 20 Baja wins and several SCORE championships to show for it. Knowing how to make the equipment last and read the terrain are keys that make old-time bike desert racers winners behind the wheel. Guys like Roger Mears, Dave Ashley, who rode ISDE, Jack Johnson, Malcolm Smith, Jim Fishback and Tommy Croft learned those lessons and are cleaning up in cars and trucks.

"Even the younger guys who rode the more modern bikes are doing well in four-wheelers. Robbie Gordon has an advantage over guys who haven't raced bikes because he can read the terrain so much better. You have to read the terrain like a Dan Smith and Larry Roeseler to go fast on bikes, and that ability carries over to four wheels. The aggressive riding style pays off in stadiums, where the races are short. You have to stand on it and be aggressive to be a winner. Robbie definitely stands on it . . . now he's going pavement racing. It won't be long until he's either a NASCAR or CART contender."

WHICH IS BETTER, 2 OR 4?

For those who want to break into racing at the most economical level and work themselves upward, motorcycle racing is the only way to go. It teaches discipline, strategy and aggressiveness, and you could ride a whole season on less than a truck or car racer spends on tires in a year. Success on two wheels can lead to success on four wheels. As it stands now, two-wheelers are the king of the desert, and the fastest in stadiums across the planet. □

RACING GAS & OCTANE BOOSTERS

Power in a can, or hype from the hose?

By Rick Sieman

It all started with a letter to Mr. Know-It-All about racing fuel. A Kawasaki rider filled his gas can with what he thought was racing fuel and a good two-stroke oil. When he hit the track, he wasted a fresh motor—big-time. It turned out that he had purchased a “pseudo-racing gas” with alcohol in it. Alcohol is an oxygen carrier and it had the immediate effect of adding air to the engine, enough air to seize the engine tighter than a rusty chain.

The Kawasaki rider tried to do the right thing, because his bike pinged and rattled on normal pump gas. The mistake cost him over 800 hard-earned bucks.

So what's the answer? Can it be found in a can? Do octane boosters work? What about racing gas? How can you tell one racing gas from another?

RACING GASOLINE: HOW IT'S MADE

To get some straight answers, we spent a day with Bruce Conrad, owner of F&L Fuels and Lubricants. Bruce makes Pro-Gas and knows what works. He's also the man we did a story on last year: “The Man with 54 Huskys.”

Also answering questions was Randy Scoville, the Champion spark plug rep to IMSA and the NHRA. Both Randy and Bruce have extensive racing backgrounds, as well as a solid background in racing fuels.

Q: How are racing fuels made?

A: All gasoline contains the same general family of hydrocarbons—low-test, high-test, racing gas and aviation gas. General refiners are set up to make a large volume of gasoline, hundreds of thousands of gallons per day, to satisfy their retail market.

Making a racing gas goes like this: you start with a blending stock of gas, then you're going to add your own additives to



end up with whatever octane level you're after. A blending gas is a raw, basic gasoline with no additives or detergents. Iso-octane is an example of one that can be used.

You have to calculate what you want in a racing gas before you start adding things to a blending stock, or even what kind of blending stock you start with. For example, for the fuel that we make, we want to end up with an octane of approximately 108 research method with a motor octane that will blend back to about right at 103-104 RM/2. That's an average of research and motor methods of testing octane and is the most commonly accepted rating.

We add lead, lead scavengers, various aromatics, naphthatics and light-end hydrocarbons to get the correct Read Vapor Pressure to control vapor lock.

You have to change gasoline from a liquid to a vapor to get it into a proper state for an air/fuel mixture ratio so the spark plug

Improper head dimensions or ignition timing in stock machines can cause detonation; so can running pump fuel in a highly modified engine. How much octane do you need for your dirt bike? Read on.

can ignite it. A carburetor does this job of turning the liquid into a vapor.

Q: We see ads all the time, “this gas has 102 octane,” “this gas has 115 octane,” or another with 118. What do we need? Let's say you have an engine with 8.5:1 compression ratio; how much octane does it require?

A: That's a tough question. It has a lot to do with the combustion chamber shape, location of the spark plug, condition of the combustion chamber, the air/fuel ratio you enter into it—a huge number of factors including the air temperature and the load the engine is put under.

What we're talking about is trying to defeat detonation; that's the real problem. I



With a National title bringing lucrative bonuses and future contracts, the factory motocross teams leave nothing to chance. The motors are highly modified for optimum performance, and correct octane ratings and specific gravity of fuel are critical for perfect jetting.

can give you some approximate guidelines: If you're using a 10:1 and over engine, you need racing fuel. On a 9:1 engine, you're probably in the 98 octane area, and there are a lot of good strong 9:1 engines out there.

There is no real linear type of relationship between compression ratio and the octane requirements. You can have an engine with extremely high compression and really have a low octane requirement. I know people who have had engines in the 13:1, 14:1 or 15:1 compression ratio range and have used 103- to 104-octane fuel with no problems.

GOOD GAS/BAD GAS: MAKING IT HAPPEN

Q: What makes a good racing gasoline? Any secrets you'd like to give away?

A: We buy a blending stock from two different companies. There are two different stocks and we co-mingle those. Now this is important: these stocks are sold by an ASTM specification and it means they'll be the same quality and molecular weight each time.

We try to control the variables as tightly as possible, by buying the same group of chemicals, time after time, with the same chemical characteristics. What we end up doing is giving you a base fuel that you can tune with and use, and it doesn't change.

It has the same chemical components, the same chemical characteristics, the same specific gravity and all of this is very important for consistency. A racer doesn't want to change the variables; fuel is one of them.

We've done our own testing, and without naming names, I can tell you some startling facts. We've sent samples of certain racing fuels to the lab for testing and one time it's 114 octane, a month later the same brand of fuel tests out to be 108. It's got a specific

gravity of .76 one time and the next batch tests out at .73.

You splash it in the motor one time and it runs great. The next time, the specific gravity of the fuel is different and it flows differently. Different specific-gravity fuels flow through the jets, or the carburetor, at different flow rates. By just changing the fuel, you can richen or lean out your engine.

Let's say a major refiner wants to make an 86-octane fuel and they want it blended as economically as possible. The building blocks used to make a higher-octane fuel are expensive! The benzenes, toluenes, xylene complexes, or the BTX complexes—they want to use as little of these as possible. That's why lead was always so effective, because they could splash a lot of lead in it and bring the octane way up, and do it really cheap. These major refineries are only making a cent, two cents or three cents a gallon profit once the smoke clears. They have to keep production costs down.

Refiners of race gas are not under that restriction, because these fuels usually cost three dollars a gallon or more and the profit potential is greater, at least on a per-gallon basis.

Given the reliability of race gas, you should be able to make a good fuel, with repeatable characteristics, time after time. A consistent standard is the single most important thing to look for in a racing fuel, I feel.

Q: More important than high octane numbers?

A: Absolutely! Look, if you had a bike where you used a dozen pipes during testing and all of them were different, you wouldn't know where you were at! You couldn't time the motor . . . you couldn't jet it.

Take a drag racer, for example. He might go through three or four sets of pistons in a race. If each piston had a different compression ratio, how would they know what to do? They'd be lost. So the important thing in any racing situation is to have the

same kind of fuel, day after day, time after time, year after year.

WHY DOES RACE GAS COST SO MUCH?

Q: So the real expense for racing fuel is in the quality control, the assurance that it's consistent all the time. Why can't this be done with pump gas?

A: For a major refiner to make racing fuel is out of the question; he's not going to touch it. It's a pain in the butt to make, there's a lot of quality control that has to be done and there has to be a level of cleanliness you're not going to find in high-volume production.

Q: How can we, the consumers, tell a good racing fuel from one of lesser quality?

A: Given that they all can provide you with an octane, say 103, it may be just window dressing. A lot of people think that by buying a higher octane, it'll make your bike get to the finish line quicker and you may do better. As to usability in a motor, ultra-high numbers are questionable.

Octane will make up for some sins that an engine builder might have built into the motor, but an engine only needs what it needs . . . not a bit more.

What makes a fuel better? Our fuel has been identical for ten years . . . same specific gravity, same Read Vapor Pressure, same octane, whether it be research or motor method of rating.

Some people advertise outrageously high octane readings, which makes it particularly attractive to people who don't understand what they need.

Consistency, reliability, cleanliness . . . these are all important. If you're putting a three-dollar-per-gallon fuel into your gas tank, much of what you're paying for is careful filtering, the water traps, the care taken in delivering it and testing it.

TOO MUCH OCTANE CAN BE BAD!

Right now in the racing fuel business, there's a race to market the highest octane fuel that can be made. People relate the highest octane to “my motor is making more power.” That couldn't be further from the truth.

One the downside to building a fuel with ultra-high octane is adding components that really slow down the flame front in the combustion process. You can get the flame front so slow that the engine is now running in a too-rich condition. This takes away horsepower. So here you are, slowing down the flame front and getting rid of detonation at the expense of losing horsepower. I see this all the time at the track. I see engines running “heavy”; they're trying to tune it to lean it out, when actually the flame front is causing the problem.

Q: Are there good ways to get the good octane numbers and are there bad ways? I guess our question is, are there shortcuts?

A: I've seen some fuels with compositions of 25 to 30 percent aromatic content. Aromatics are a reliable, correct way to build oc-

RACING GAS

tane, but people tend to think that if a little bit is good, then more ought to be better and a whole lot is just great!

If you run reliable lab tests on octane and incrementally increase the aromatic content, most lab people feel that if you get up above the 10 to 15 percent aromatic content, your octane falls off.

What the engine does is start making more heat, which requires more octane, which makes more heat: a real vicious cycle. It's like a dog chasing its own tail.

The bottom line is this: let's say your motor needs 92 octane to run correctly and you fill up with 125-octane wonder gas. You will not run any faster. In fact, you might end up running slower because of a radically slowed flame front.

MIXING THE GOOD STUFF WITH THE BAD STUFF

Q: Let's say that we have a racer on a budget. He's got a lightly modified engine and would like to run racing gas, but can't afford it. Can he mix race gas with pump gas, and if so, what ratios?

A: On a stock motor, I don't think the racer would need to run racing gas, except during the summertime when it's very hot. Here, you stand a very real chance of vapor lock with pump gas. I'd recommend that the racer start out with a good stock major brand gasoline of at least 92 octane rating, then go out and test. Find an area where the engine is going to be taxed hard, like a long uphill sand wash. If the engine runs fine and doesn't ping or detonate, that's good. You can use that gas. Just make sure you buy it at a very busy corner with a high volume turnover. This way you stand a better chance of getting fresh gas, and no substitute gas.

If you do have some pinging and detonation, try one gallon of racing fuel to three gallons of pump gas. In a stock motor, this should do it. Test it again under the same circumstances to check it out. You're going to have to check this regularly, because the variables in the street gasoline will change, while the variables in a good racing fuel will not.

The combination of 92-octane street gas and 103-octane racing gas will kick up the actual octane two or three points. There's no real chart you can draw . . . it's not a linear thing, but that's all it might take to make the motor happy.

Now the racer with the mildly modified motor should notice some real improvements. There should be a little crisper, quicker throttle response. Say the racer is running a 9:1 or 10:1 compression ratio—he might be able to get away with one gallon of racing fuel to one gallon of street gas.

Here's something startling, and I almost hesitate to say it. You don't get any increase in performance with racing fuel. Not a bit. Not any racing gas. Good racing fuel allows you to run your timing more radically, to ex-



The 1990 KTM 250 requires 92 octane or better, so unleaded premium or regular fuel with an octane booster is needed for good engine life. Dan Smith and other top KTM off-road pilots use racing fuel for a winning edge.

tract more horsepower out of what you've got. I can take any racing fuel made—including ours—and make the engine hammer and detonate by have the timing set too far out. Timing lead is critical.

You want to make the engine ping? Easy; just add too much lead. Conversely, running the timing closer to top dead center will cool things down. Remember the TT bikes of ten years ago? They ran so much lead, they could not be kick-started; they had to be push-started.

HOW TO KNOW WHAT YOU'RE GETTING

Q: How can a customer—a user of race gas—know what to look for when he lays his money on the line? Everyone has big numbers . . . everyone tells you their stuff is great . . . is the best. What can a person do to check quality himself?

A: One way is to look around and see what successful teams are using. That's one indication. Ask for information about the racing fuel . . . not just flashy hand-out brochures, but test data and ASTM and VVG test numbers. You can show this to someone knowledgeable and have them in-

terpret it for you, because without experience in this field, the numbers are next to meaningless.

I would not buy any racing gas with alcohol in it. That's the first thing I'd ask: "Does it have any alcohol?" It's not that you can't use alcohol. Ethyl alcohol is a good additive; it can be used up to ten percent in most cars. Alcohol really offers a different fuel/air ratio than gasoline. Racers who do run alcohol have to use enormous jets and really drink the stuff through the carb.

Make sure that the fuel does not have MTBE in it. It's a very effective new additive, but it may be illegal in your organization, as it is in many. It's an oxygen- or nitrogen-bearing compound.

Probably the single best thing you could do is to test several containers of the racing gas you're considering buying with a hy-



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Off-road racers can face cool, dense air in the morning and hotter temperatures or even severe elevation changes as the event progresses. Hours of demanding terrain can cause a motor to ping or over-heat if the fuel doesn't have sufficient octane rating, but too much octane can actually hurt performance.

drometer. This will give you the specific gravity of the fuel, and if it varies from container to container it will tell you a very sad story about quality control. You can buy a gas testing hydrometer for about four or five bucks. All savvy tuners test with them before they start tuning, or if they cannot use their regular gas.

You don't see the privateers using a hydrometer, because they just don't know any better, but you can bet the top teams test their fuel on a regular basis.

AVIATION GAS: MYTHS & FACTS

Q: What about using AvGas, or aviation gas, for racing fuel?

A: There's an old wives' tale about Av-Gas out of World War II and I don't know who started this, but it says that if you put AvGas in your car, you'll burn the valves. There's no doubt that aviation fuel can be used in any internal combustion engine and driven up and down the highway at cruising speeds.

It doesn't make much sense to use it for that, as it goes for something like \$1.75 or \$1.85 in this area, and it is leaded and not easily obtainable.

They have two versions now, even though there used to be three. Now you have 100 low-lead, which is blue, and 100/130, which is green. Some 115/145 [purple] is used by the military only.

A racing bike and an airplane really live in two different environments and they make the gas differently for those environments. A dirt bike runs on the surface of the earth from sea level to normally 6000 feet or so. Outside temperature is generally 50 to 100 degrees.

An airplane generally takes off, climbs to its altitude and the general outside temperature is at or below zero. Even in the summertime, it maxes out at 10 or 20 degrees up there. An airplane does not turn high rpm; a typical prop job loafs along at 2000 to 3000 rpm. Of course, there are some high-performance exceptions. The engine just drones along at low power settings, except for take-offs.

MIXING LEADED & UNLEADED GAS FOR A GAIN?

Q: Here's a story that's going around: some people say that if you mix leaded regular—typically 87 octane—together with unleaded high-test—92 octane—you end up with an overall gain in octane. True?

A: That's chemically and technically impossible! One and one don't add up to three. Some people will believe anything.

Q: Any last thoughts on racing gas?

A: Yes. Because many racing gasolines contain lead—ours contains 1.75 grams per

RACING GAS

gallon—you have to treat it with great care. Do not wash filters in it, or any gas for that matter. If it splashes on you, wash it off quickly and completely. If you soak clothing in gas by accident, do not wear the clothing.

Lead is absorbed through the skin into the kidneys and can accumulate and hurt you. Wear rubber gloves when you handle racing fuel.

PUMP GAS: IT'S NOT WHAT IT WAS A FEW YEARS AGO

Everyone complains about the new-generation pump gasoline we burn in our cars, trucks and bikes. You know what? They're right! Take a gallon of leaded regular gas, for example. In the good old days, a gallon of decent regular leaded gas contained about two and one-half grams of tetraethyl lead. Today, the average amount is less than four-tenths of a gram! You can find leaded regular with as much as seven- or eight-tenths here and there, depending on the rules and regulations of a certain area, but, by and large, four-tenths is the norm. Old-fashioned high-test [premium leaded] gas used to come with about 4.27 grams of lead per gallon. Hot stuff! So we now have to deal with a future of unleaded gasoline.

This wouldn't be so bad, except that the new gasolines suffer from more than just the removal of lead. Among other things, modern gas does the following:

- Builds up varnish and deposits much faster than "good gas."
- Won't tolerate high-compression engines.
- Stores poorly.
- Reacts poorly to the presence of oil, as in a two-stroke pre-mix situation.

OCTANE: WHAT DO THE NUMBERS MEAN?

The octane rating of a gasoline is the measure of the anti-knock quality of the fuel. Knock is just that . . . a hammering sound inside your engine.

When a charge of fuel is introduced into an engine and ignited, the flame spreads out from the spark plug to the cylinder wall. If this happens all at once, you get detonation . . . or knock. A steady, even, slow burn is desirable.

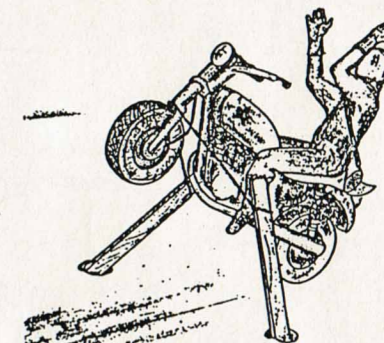
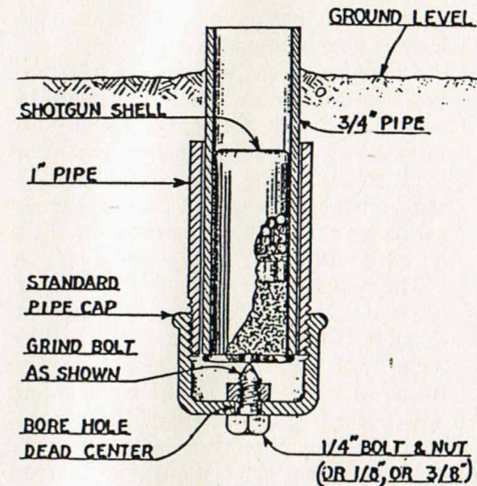
Octane, or an increase in the octane level, will not increase your horsepower, no matter what your buddy tells you. However, insufficient octane can cause an engine to lose horsepower. All the octane you need is what your engine demands to keep from detonating. Higher compression ratios and full racing engines invariably need higher octane levels.

ENGINES & OCTANE REQUIREMENTS

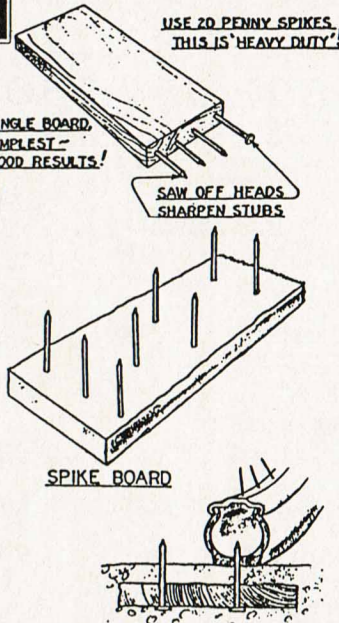
Some theory is needed here. Without getting into upper trig, you can assume that the higher the compression ratio of an engine, the higher its octane requirement. The mechanics behind compression ratios is simple,

DEATH TRAPS!

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SHOCKING? Yes, but it's happening. Eco-freak groups like Earth First are spiking trees, putting traps on trails, destroying equipment and trying to put an end to off-roading as we know it.

WHAT ARE YOU GOING TO DO ABOUT IT? You can find out who these people are, who gives them money for their terrorist activities, where they meet, where they live and how they go about their immoral and illegal activities. You can do it by joining THE SAHARA CLUB.

DO IT! OR LOSE IT! If you don't get off your butt, public land will continue to be taken away from us at a staggering rate. The Sierra Club, for example, has over 500,000 members. We have millions of off-roaders in this country who simply will not even lift a finger to fight. We could easily match the clout of the eco-freaks... but you'll have to get involved. Join. Tell a friend.

WHAT IS THE SAHARA CLUB? Formed by Rick Sieman and Louis McKey, the SAHARA CLUB was formed to fight the Sierra Club head-on, just the way they fight. We plan to use the legal system like a battering ram to get more than our fair share of media coverage.

WHO ARE THESE GUYS? Louis McKey, also known as the Phantom Duck of the Desert, has been fighting to keep our public land free since 1974. Rick Sieman was the first editor of *Dirt Bike* over 20 years ago, and is now a professional off-road racer on the SCORE/HDRA circuit, as well as a writer for several off-road publications. Together, they won a landmark case in 1981 that kept all existing roads and trails open for public use. Lou and Rick have been battling for your right to use your land for a long time . . . and now they're ready to turn pro and go for the throat full-time!

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RACING GAS

brutal and creates problems for high-performance engines. The smaller the space you try to squeeze the burning fuel into, the more power you'll develop—all other things being equal.

READING THE PUMPS

The number you see on the gas pump is supposed to tell the octane reading of the gasoline. It's not quite as simple as that. Here is how it all adds up.

The research, or "R" method, of rating octane is done on a standard test engine in a lab. The air temperature is controlled on this to a strict 125 degrees Fahrenheit. Mild loads are put on the engine, just about the same loads you might put on your family car under normal driving conditions. This is called an F1 test.

The next rating test is called the Motor Method. Here, another engine is used on a dyno, but the air is introduced into the inlet at a hot 300 degrees Fahrenheit. Heavy loads, similar to full-throttle acceleration and passing on uphills, are dialed into the engine. The engineer notes ping and detonation at certain load conditions and the octane rating is determined by its ability to control the detonation. This is called the F2 test.

The number you see on the face of your gas pump is known as the Road Octane rating and is a combined average of the Motor and the Research Method. In fact, if you take a close look near the posted octane number, you'll more than likely see . . .

M0+R=92 OCTANE

or whatever the actual octane rating is of that particular gas. For example, if the F1 test showed 94 octane and the F2 test indicated 86, then the Road Octane rating would be 90.

MEXICAN GAS

For you folks who drive in Baja, here is the scoop. Pemex is the government-controlled gasoline, and it's not as bad as the stories would have you believe. However, the octane rating is in the low 80s and that's why most engines will ping and detonate badly when using it.

Mexican gasoline feels very oily compared to United States stock. That's because their refining process is not as elaborate as ours and there are less light ends and volatilities than in typical U.S. gas. Also, contamination and the presence of water is a very real problem.

If you buy Mexican gas in a busy city location, chances are it will be of decent quality, even though the octane rating is low. Buy your gas along the road at a small station, and you'll more than likely buy a fuel that's been stored for a considerable time and suffers from contamination. If you drive in Mexico, a good fuel filter is a must and it should be checked and cleaned regularly.

One last word of warning: the very low octane rating of Mexican gasoline can cre-

ate a lean condition in an otherwise properly jetted carb. Consider going larger on the jetting, or even backing the ignition timing off if you must run this gas for any extended period of time in a high-performance engine.

OCTANE BOOSTERS TO THE RESCUE

You've seen them on the shelves at your local bike shop and on the counter at local discount auto parts stores: cans of octane booster in every color of the rainbow, ranging in cost from a buck to five dollars.

Do they work? Sure! The good ones do.

First, let's take a look at what a good octane booster will do to your gasoline. Please make note of that word "good," because there is a lot of trash out there on the market.

An ounce of an effective octane booster should raise your octane rating by 2-1/2 numbers. That is, if you start with 86-octane gasoline, one ounce of booster to a gallon will take it to 88-1/2 octane. A note of caution: octane boosters decrease in effectiveness as their quantity increases. Just because one ounce gives you 2-1/2 numbers more, ten ounces will not give you 25 numbers. Here's a good scale of just about how decent octane boosters will work:

One oz./gal. = 2-1/2 numbers increase;
Two oz./gal. = 4-1/2 numbers increase;
Three oz./gal. = 6 to 6-1/2 numbers increase;
Four oz./gal. = 7 to 7-1/2 numbers increase.

A good rule of thumb is that anything over three ounces per gallon is wasted. Some crazies dump in a whole can of booster,

thinking they're going to get radical gains. Actually, they'll get a decrease in performance, as excessive ratios can cause the volatiles in the gas to deteriorate and excessive aromatics can make the engine run "heavy," or rich.

WHAT ARE OCTANE BOOSTERS MADE OF?

There's no mystery here. Most octane boosters are nitrogen carriers. Common ingredients are methanol, isopropyl alcohol, naphtha, xylene, toluene, benzene, hexane, nitro benzene and aniline. Available octane boosters do not have tetraethyl lead in them, as lead is very toxic.

There are lead substitutes for sale also, but very little substantiation and research is available on these.

Aniline is the best octane booster available and is the prime ingredient in the better boosters. Nitro benzene also works well, but is not as effective and costs a great deal. Aniline is made by Dow, and is a very poisonous liquid that can actually be absorbed into the skin on contact. It's not volatile.

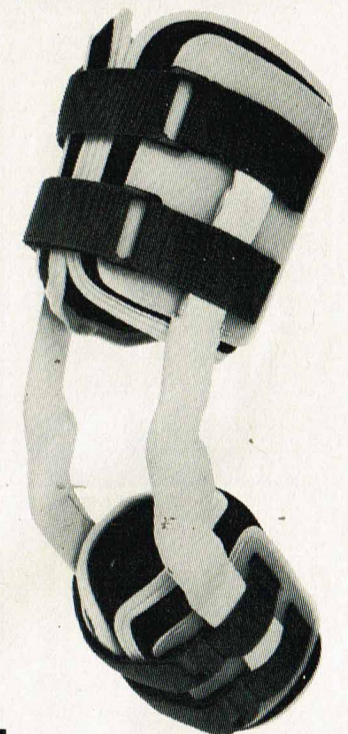
Nitro benzene smells like shoe polish and castor oil. Alone, it's not too effective, but used in conjunction with other additives, it can do a decent job. You'll also find it used as an additive in some of the more expensive castor bean oils for use in two-stroke engines.

Octane booster is completely legal in all racing associations, such as AMA, HDRA, SCORE, Baja Promotions, etc., because oc-



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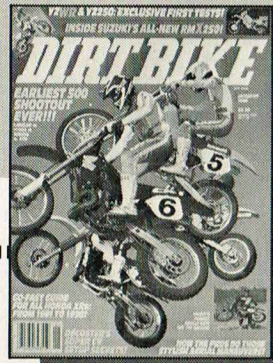
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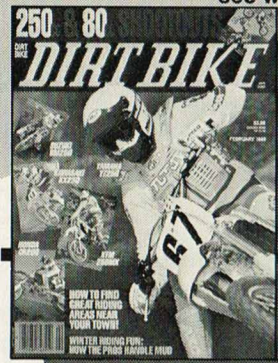
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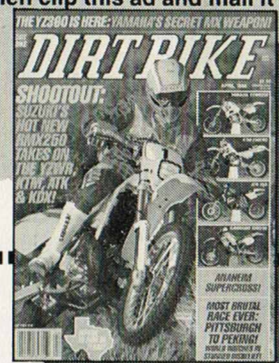
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FEB '89
History of Yamaha, Baja 1000, Barstow-to-Vegas Desert Classic, Mudriding Secrets, 80cc Motocross Shootout.



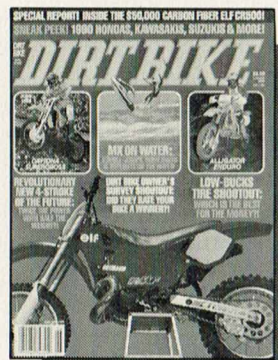
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APR '89
Camel/AMA Anaheim Supercross, Pittsburgh-to-Peking Rallye, Project Hodaka, 250 Enduro Comparison.



MAY '89
Quicksilver Nat'l. Enduro, Kawasaki Factory Setups, Brake Bleeding, XR600R Mania, Honda XLR250R Baja.



JUNE '89
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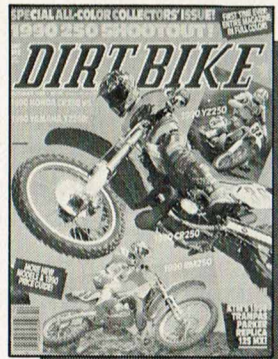
JULY '89
Sacramento 125/250 Nat'l., Pontiac Supercross, Brown Jug 100, Oxygen Sensor, History of Honda Part II, Yamaha DT200R.



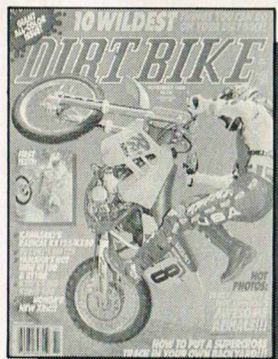
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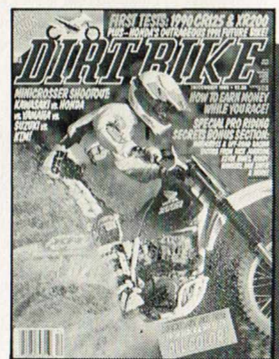
SEP '89
Supercross Wrap-Up, Blackwater 100, 500 Motocross USGP, '89 Long-Term 125 Report, Crash & Burn Spectacular.



OCT '89
Mauna Kea Hawaii Enduro, 2nd Annual Incas Rally, 125/250/500 GP Report, '90 Yamaha YZ250A, '90 Honda CR250R.



NOV '89
6th Annual Langtown Supercross, 500 Nat'l. Opener, AMA Loretta Lynn's Amateur Nat'l's., Kawasaki KX80 ISDE Special.



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RACING GAS



Jetting can be a nightmare for supercross, because of the changing air density and temperature. Some stadiums have huge air conditioning units that supercharge the air, so knowing exactly what you're putting into the fuel tank is mandatory. Pump gas won't get it here.

tane boosters are not oxygen carriers *per se*; it's not considered a power additive.

WILL OCTANE BOOSTERS ADD HORSEPOWER?

No. This is a misconception. Octane in itself does not add power. However, an engine that's forced to run on fuel with a lower octane than what's needed will run hot, detonate and eventually lose power. The proper octane level will let the engine run to its full potential, but won't transform it into something special.

When a combustion chamber gets a charge of fuel, the plug sparks and it's burned. With the right octane level, the burn is clean and even. With too little octane, the burn can be uneven and a hammering can result.

BAD SIDE EFFECTS OF OCTANE BOOSTERS

- Will attack plastics, rubbers and some fiberglass.
- Will discolor and attack most paints.
- Foam filters will deteriorate if cleaned in a booster-carrying gasoline. So will the glues holding the filter together.
- Some oils are affected by octane boosters. Most normal oils are not bothered, but if you have any doubt about your favorite brand, check with the manufacturer, just to play it safe. Two-stroke users have to pay particular attention to this.

- Can make an engine run rich. Re-jetting may be necessary.
- Are toxic to the skin, and the fumes can make you sick.
- Exposure to air can cause a 50 percent breakdown in effectiveness.
- Ultraviolet rays—that's plain old sunlight—will make octane boosters deteriorate.
- Will attack gas tank sealants and could plug up your entire fuel system if used together.

NOW . . . THE GOOD SIDE

Don't let all of that scare you. Octane boosters have a real place in the off-road world today. Here are some of the good things they can do:

- Give better throttle response. You can actually feel it.
- Gets better mileage. Also, you can often lean out the carb slightly when using octane boosters, which will give improved mileage.
- Best performance possible from your engine, short of using race gas.
- Reduce detonation and pinging—clean out deposits. A good booster will actually let the engine run cleaner and inhibit carbon build-up.
- Acts as a gasoline stabilizer when the machine is left to sit for a period. Gas stores longer with a good octane booster in the fuel.
- Lets you use whatever gas is available at the time.
- A good booster doubles as an emulsi-

fier and can keep small amounts of water in suspension. Fuel system condensation is a very real problem, especially when the machine sits for long periods of time between uses.

HOW TO TELL A GOOD OCTANE BOOSTER FROM A POOR ONE

The market is loaded with octane additives. Here's one rule of thumb: If the product comes in a clear or transparent bottle, don't even consider it. Ultraviolet rays cause deterioration.

There should be specific directions on the label—how much octane booster to use to how much gas, for example. There should be a listing of how many numbers the octane will be raised per ounce of booster used to each gallon of gas. A good octane booster will raise a gallon of gas by two-and-a-half numbers with one ounce added. If the label isn't specific, don't bother with the product. We've had good results with Octamax, but there are a few other good brands around.

Consider the cost per ounce. You can get a good octane booster to add 2-1/2 numbers per ounce per gallon for around 30 cents per ounce. Some of the cheaper products might not be as efficient as the more expensive ones.

Make sure the label has a toxicity warning. If it isn't toxic, it isn't going to work. If it is toxic and there's not a prominent warning, the manufacturer is bordering on criminal negligence. Some of the better octane boosters are aniline, nitro benzene and toluene. Additives like acetone and sulphurs can be very corrosive.

Better octane boosters also have metal deactivators in them. This lessens the corrosive action of the additive on brass. As you know, all of your jets are made of brass, as are a number of parts in the carb and fuel system. Traces of brass can destroy volatilities in the gas.

HOW MUCH OCTANE BOOSTER SHOULD YOU USE?

Ideally, you should only use what you need to stop pinging and detonation. An engine makes the most horsepower and has the best throttle response when there's just a light trace of pinging under a maximum load situation.

In air-cooled engines, play it safe and allow for heat build-up and potential detonation, as it does happen. A water-cooled engine is much more stable during the time of the race and can be jetted much leaner; a bit of pinging can be tolerated without harm to the engine.

You're better off starting with the best pump gasoline you can buy and then adding small amounts of octane booster, rather than getting low-octane gas and adding a lot of booster. Most gas stations have available unleaded premium in the 90- to 92-octane range. An ounce or two of a good octane booster added to this should be more than enough to handle the demands of a stock engine running hard under hot and heavy off-road conditions.

SUMMING IT ALL UP

Here's how the *Dirt Bike* staff goes about it. In our hauler trucks, we simply run unleaded premium with the highest octane we can find. If there's a rattle in the engine under a load, we add a small amount of octane booster, as needed.

In most enduro bikes, we run normal 92-octane unleaded premium gas with a fairly lean oil ratio. None of the staffers go any richer than 32:1 (most run leaner). In high-strung enduro bikes, we add an ounce or two of octane booster to a five-gallon can; that seems to do the job nicely.

In all-out race bikes, one ounce of octane booster per gallon of 92-octane unleaded premium works well for us. Some of the highly modified 125s demand three ounces per gallon. If the temperature is high, we like to add one gallon of real race gas to three gallons of pump gas.

Naturally, top pro racers cannot afford to take any chances, and you'll see them using only pure racing gasoline. When your livelihood is on the line, you get rid of all the variables and only take chances with the terrain, not with what goes into your tank. □



Cheng Shin

Table listing motorcycle tires with columns for size, price, and model (e.g., C755 Inter/Hard Terr., C183D Mud/Sand).



METZELER

Table listing Metzeler motorcycle tires with columns for Moto Cross, Multi Cross, Soft Cross, and Price.



BRIDGESTONE

Table listing Bridgestone motorcycle tires with columns for size, price, and model (e.g., M22 Mod/Hard Terr. Rear, M40 Soft Rear).



Goggles and Accessories

Table listing motorcycle goggles and accessories with columns for item name and price.

Enduro Jackets

Table listing enduro jackets with columns for item name and price.

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Table listing helmet specials with columns for helmet model, price, and sizes available.



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Table listing motorcycle helmets with columns for color, size, and price.

Helmets



Table listing motorcycle helmets with columns for brand/model and price.

Kidney Belts



Table listing motorcycle kidney belts with columns for brand/model and price.

Boots



Table listing motorcycle boots with columns for brand/model and price.

Pants



Table listing motorcycle pants with columns for brand/model and price.

Gloves



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MS Racing Pro Comp Pants

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Table listing chest protectors with columns for brand/model and price.

Fanny Packs



Table listing motorcycle fanny packs with columns for brand/model and price.

Gear Bags



Table listing motorcycle gear bags with columns for brand/model and price.

Acerbis

Table listing Acerbis motorcycle accessories with columns for item name and price.



Super Trapp Exhaust

Table listing Super Trapp exhaust systems with columns for item name and price.

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Table listing Boyesen reeds with columns for model and price.



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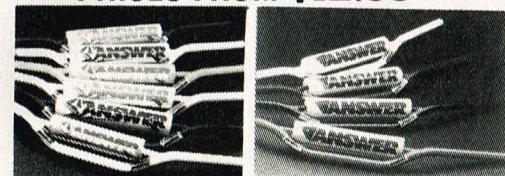
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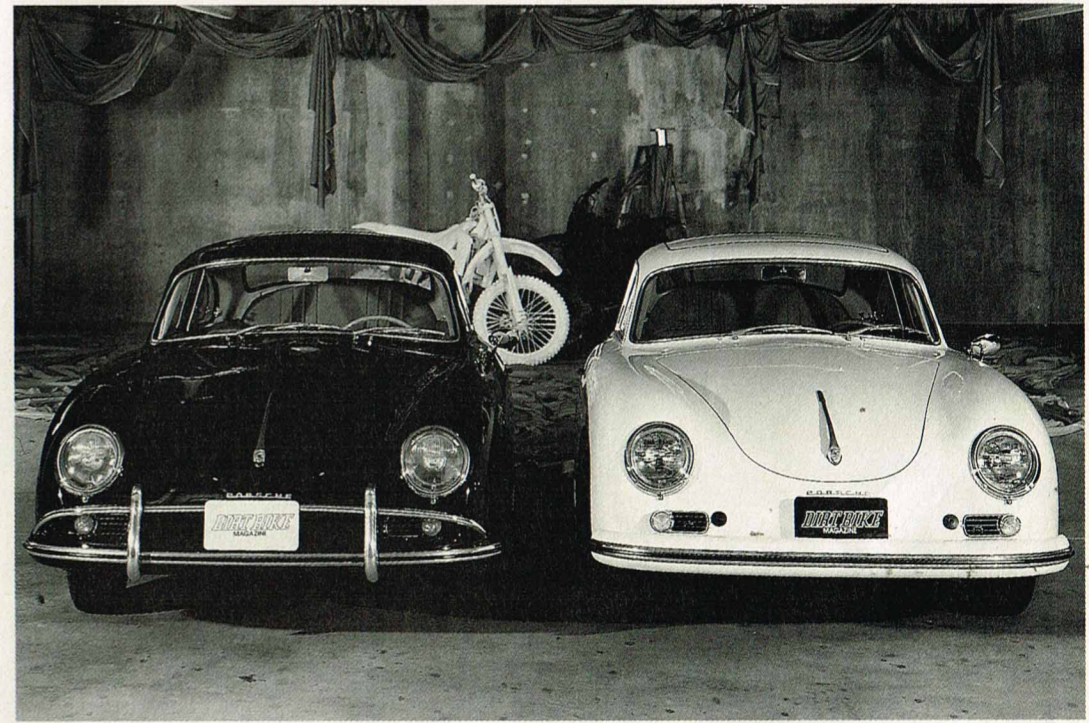
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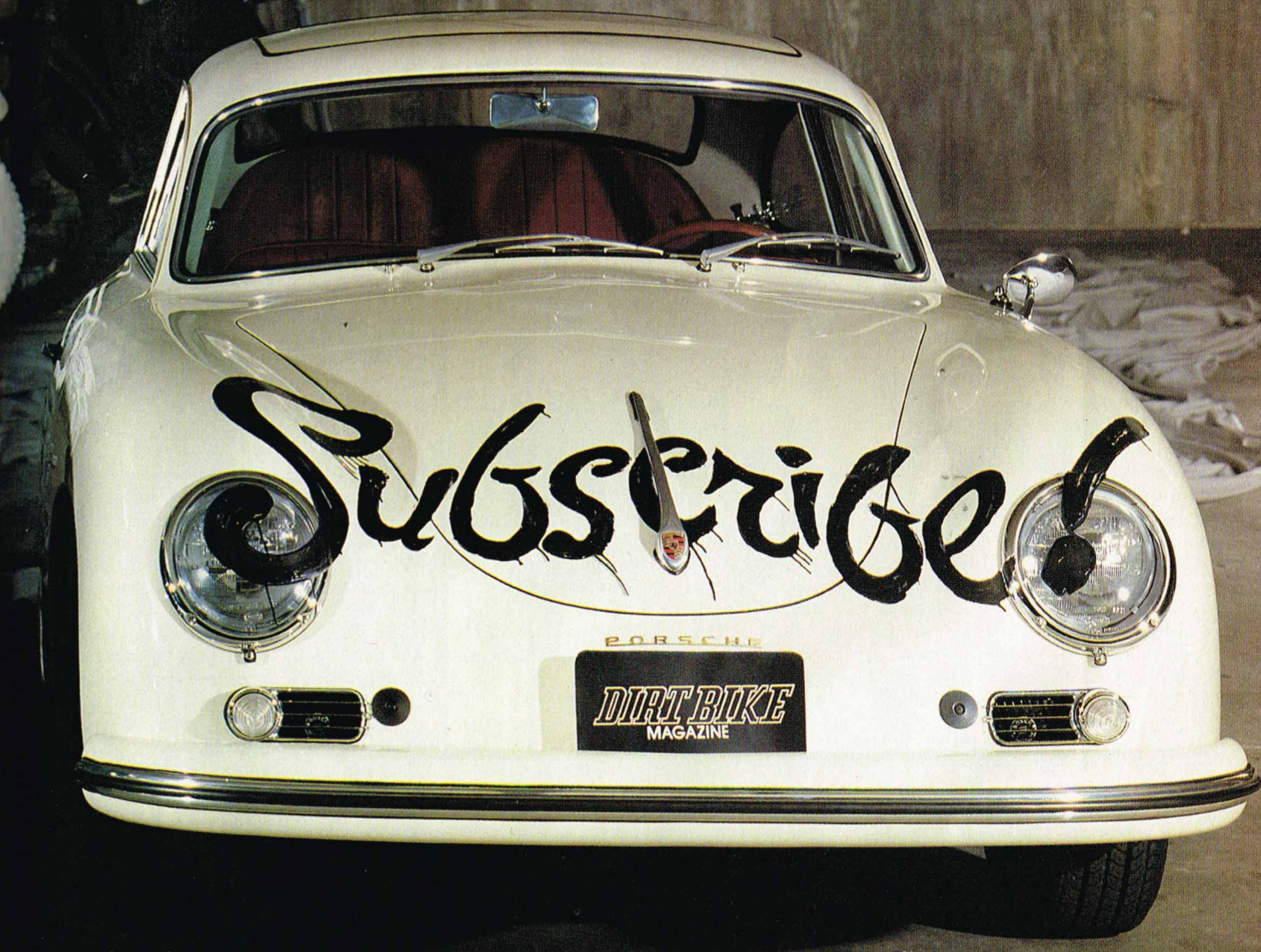
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MR. KNOW-IT-ALL

By Rondo Talbot

TOO MUCH OIL CAN RUIN A PERFECTLY GOOD ENGINE

Dear Rondo,

Please help! I need your brilliant mind for re-jetting my bike, which is a CR105R. It's been sleeved, has a Pro Circuit pipe, Boyesen reeds, Twin-Air filter and holes in the airbox. At my home, the temperature is from 35°C to 95°C and the altitude is from 6000 to 7000 feet.

I used to use Bel-Ray MC-1+ oil at 50:1, but then I switched to Honda Pro-Chem at 32:1 and my bike seized on me. I found holes in the top of the piston and the cylinder head. I think it had too much oil. What happened?

Dwight Charles
Many Farms, AZ

Dwight, Dwight, Dwight.

I used your name three times to get your attention. You have made a truly classic mistake of enormous proportions. You see, jetting a bike requires that you get a careful balance of fuel to air. When this ratio is correct, the bike will run in a happy fashion. Obviously, you have a hyper powerplant, one that is built to the max. With this type of engine, minute changes are critical.

By going from 50:1 to 32:1, you have added a great deal more oil to the gas, thereby reducing the amount of gas that's fed to the air. In effect, you have leaned out your engine.

However, I would still check the carb for water or debris that might have clogged the jets, or you might even have an air leak that aggravated the problem. If you choose to stay with the 32:1 ratio (assuming that your former jetting was correct), you will have to go up one size on the pilot jet, one on the main and move the needle one notch richer, for starters. Obviously, this is just a guideline, and some fine-tuning might be required. If your engine was running happy and strong before you made the oil switch, why not just go back to what worked before? Or is that too logical for you to handle without spiraling off into the clear blue skies of Arizona?

THE UPS & DOWNS OF HARD-STARTING MINIS

Dear Mr. Know-It-All,

I ride a 1980 XR80 and it works great. There's only one problem: I can't start it. I can start my brother's Honda 50 easily. My dad can start mine easily, but I can't. My dad has tried to help me, but I still can't start it. I would appreciate some tips from you.

Kyle Wilinsky
Denver, CO

For oh so many years, I have made the following statement and it appears that

the advice has been largely ignored "en masse." The advice? Do not ride a bike that you cannot start easily. In this manner, nature sees to it that you only ride a machine that you're capable of handling. Apparently, you are ignoring this most basic law of riding.

Your letter gave me no specs as to age and body mass, but from your wretched handwriting I suspect that you are very young, or have seven thumbs on each hand.

One option (other than trading bikes with your brother) is to purchase a hill from a reliable source, preferably a downhill. Then, when you stop riding, simply park your bike at the top of the hill. When you are ready to ride again, you can then bump-start the bike down the hill. If you can get a better price on an uphill, then by all means purchase one, as it can simply be turned around and will double as a downhill. Good luck, and I hope that you start lifting some weights and eating your Wheaties.

COULD THIS BE THE NEXT MR. KNOW-IT-ALL?

Please forward to the work bench of Mr. Know-It-All:

I own a 1986 KX250 that used to foul a plug every five minutes. The first thing I did was review all 20,000 copies of Mr. Know-It-All letters ever printed in *Dirt Bike* mag. I knew if I wrote you about my saddening dilemma, you would first give me a smart-alecky remark, then suggest I refer to my owner's manual, clean my air filter, change my jets and re-do my top end.

So this letter is to inform all those dim-witted Rondo worshipers that all they need to do is de-carbonize the top of the piston and inside the head.

One more thing, sir. I plan on attending MMI Motorcycle School, so I can be a wise old man like you. I'm real serious about my career, which is only a couple of months away. Is this a good way to get started? How did you get started, Mr. Master Mechanic?

M.J. Fournier
Laconia, NH

Mr. Fournier,

You certainly could not have picked a finer role model than me. Since you have shown a modicum of respect, I will give you some general advice. The school is a good idea, and you will learn many valuable techniques and get a good working knowledge of how things work, but beware of becoming a parts changer and concentrate on learning how to be a real mechanic.

There's a world of difference between the two. A genuine mechanic will con-

stantly ask "why" a problem happened, instead of simply swapping parts. He will investigate, think things through, learn to understand the inner workings of the system and approach the motorcycle as an entire functioning unit rather than a collection of odds and ends that just happen to fit together.

My background? I was an excellent student and spent my spare time reading technical journals, instead of writing little ditties on bathroom walls, as many youngsters are wont to do. I took things apart for the pure joy of it, learned how they worked and put them back together—everything from toasters to generators.

I quickly gathered a reputation as "that smart young Rondo who can fix just about anything." With my rapidly increasing skills, I earned extra money and avoided mowing lawns or herding goats. With this money, I accumulated tools—good tools. This opened up a whole new world for me and gave me even more confidence.

By the time I graduated from school, my knowledge was intimidating. Thus, when I joined the military, the officers recognized my abilities and I was assigned duties as a mechanic, while others peeled potatoes and scrubbed trash cans.

I soared through the ranks and achieved officer status with absurd ease. College followed, and I refused to take "trash" courses. Instead, I immersed myself in the sciences. Physics simply became a useful tool that proved the various skills that I had taught myself over the years.

Riding and racing motorcycles over the last 40 years gave me an essential "feel" for motorsports and the related hardware. I learned to master the intricacies of racing autos, thereby rounding out my mechanical skills to a level that most people only dream of.

Journalism came naturally, and being able to relate my mechanical expertise became a pure joy. In the process, I learned to respect honest, intelligent questions and to scoff at rampant stupidity and blustering know-nothings. Thus, trying to "know-it-all" became a way of life. Fame and fortune followed.

There you have it, Mr. Fournier. The secret to success . . . the keys to becoming a master mechanic . . . the path to enlightenment. Can you become the next Mr. Know-It-All? It's possible, if you persist. You have already taken the first, and most important, step: you have solicited advice from me.

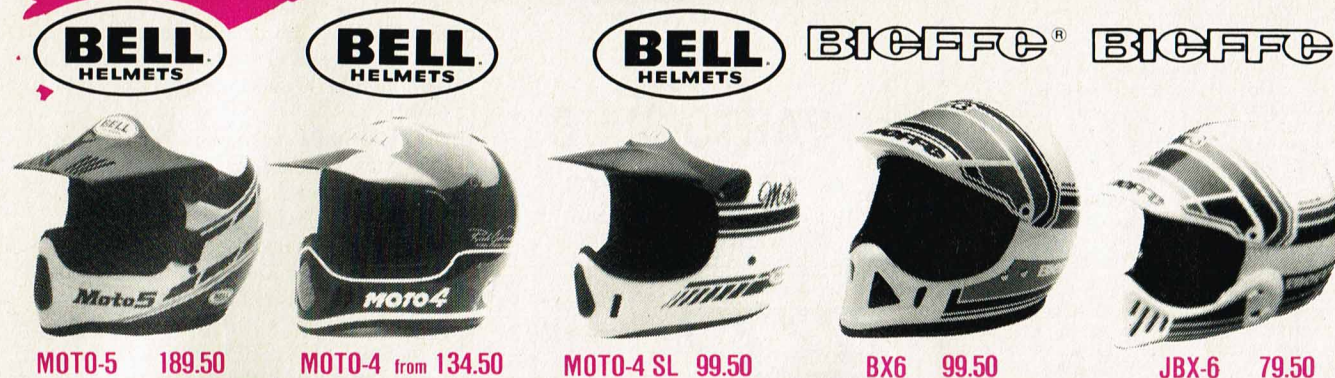
SHOCK BLUES SOLVED

Dear DB,

Every time I walk by my bike, a tear forms in my eye. A lifeless form is resting on a stand instead of out exploring new wooded trails. Why can't I ride it? Because Kawasaki won't sell me the part that I need! My bike is a 1984 KDX200.

(continued on page 78)

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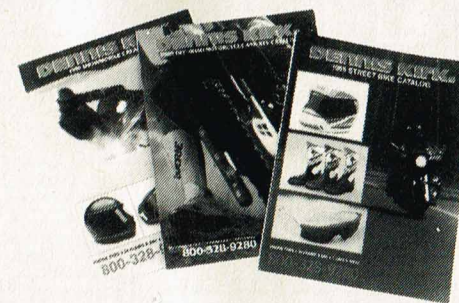
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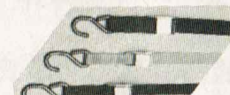
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MR. KNOW-IT-ALL
(continued from page 76)

The shock blew out its guts not too long ago, so I went down to the local Kawasaki shop to get it rebuilt. Kawasaki won't just sell me the seal. The entire piston/rod assembly is \$300 and a new shock costs \$500.

I really miss riding, and I swear that I saw a tear coming from the front headlight of the bike!

David Ketchum
Charlotte, NC

Fear not, Mr. Ketchum. Your problem is not unique, but is solvable at less than the dealer cost. A call to Works Performance ([818] 701-1010) should help. They have a rebuild kit that sells for something in the \$50 range, but do not recommend using it without doing a "heart transplant" to the stock shock. One of the technicians told us, "The valving in the stock shock is lame; it's just a bunch of wimpy flappers that get all bent and deformed quickly."

The transplant costs \$149.95, so you're probably looking at something around the \$200 mark total, plus shipping. The benefits are twofold: first, you'll have a vastly superior shock that will bring you many hours of pleasure on those trails, and second, your shock can now be rebuilt cheaply in the future when it wears out again. □

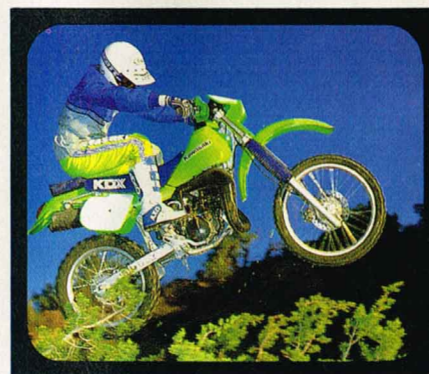
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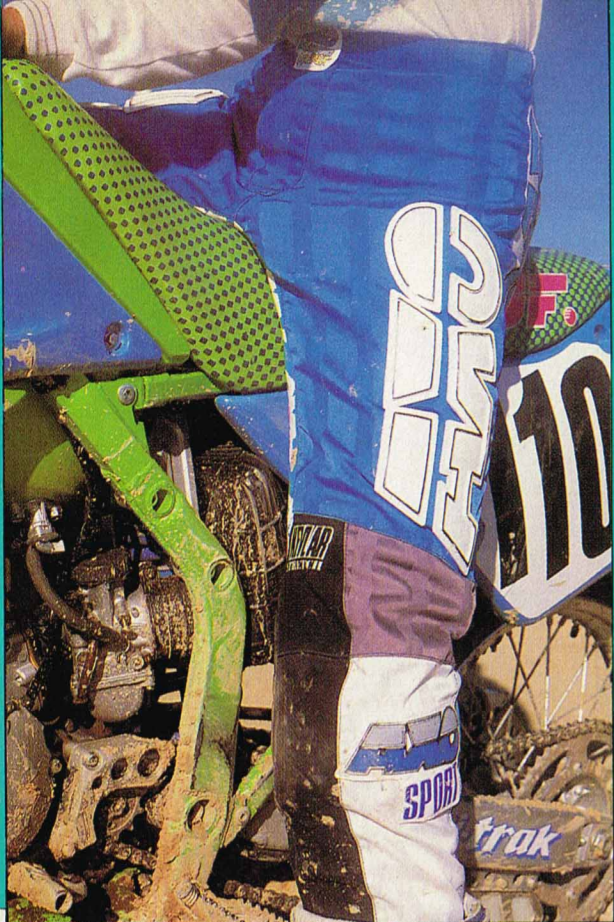
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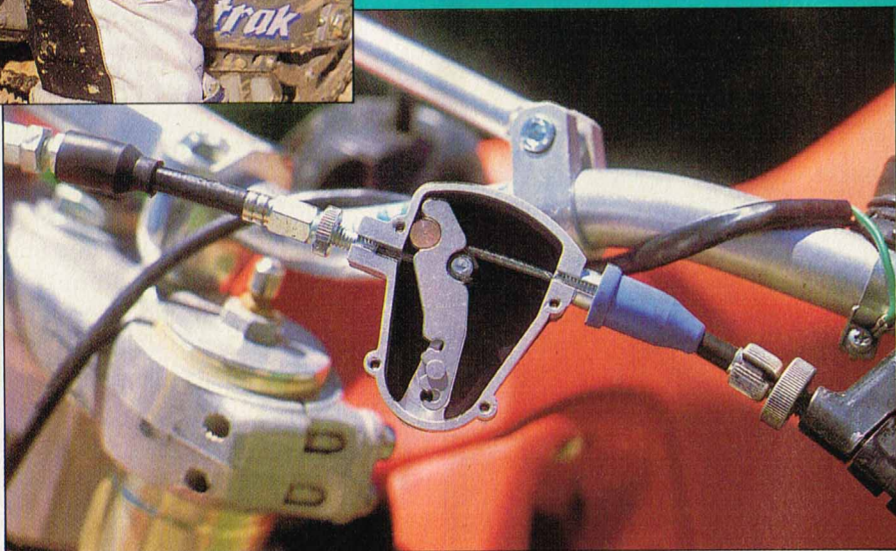
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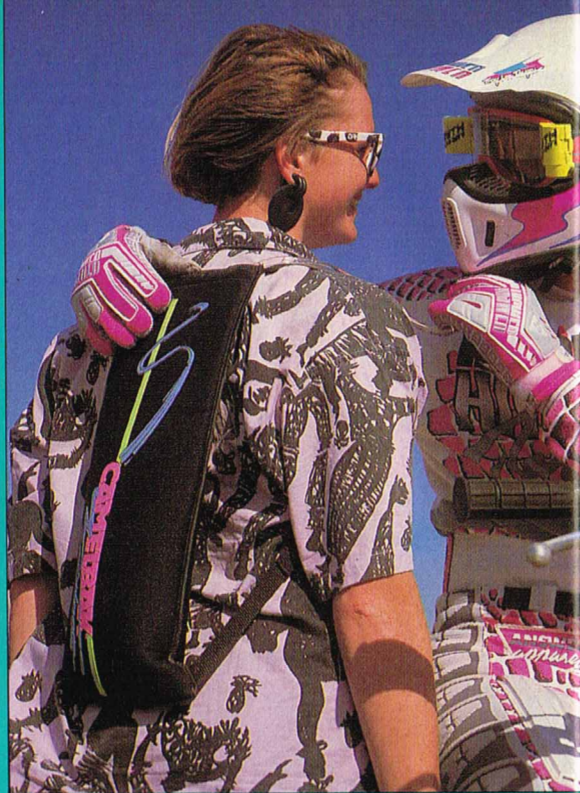
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four hours when worn on the body in 90-degree weather. Because it is fabric-covered foam rubber, the close-fitting Camelbak kept our backs a little warmer than normal even though we had cool liquid inside. We didn't have an IceBak to test but the hot (or cold) water bottle concept has been proven to work. The Camelbak or Icebak can withstand any liquid you care to dump in, even the kind you don't want to take riding. The CamelBak when empty still offers crash protection for your back. There's also enough room in the case for some papers and tools, though it would be wise to keep sharp tools in some kind of case. **CONTACT:** Camelbak/Fas-Trak Systems, Inc., *Dirt Bike Dept.*, P.O. Box 4972, Odessa, TX 79760; (915) 335-0494, 800-SOS-TRAK.

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COBRA SUZUKI DR/DRS HIGH-PERFORMANCE SPARK ARRESTER/SILENCER
PRICE: \$99.95. **FEATURES/PERFORMANCE:** Cobra's Suzuki DR spark arrester/silencer fits the dirt-only DR250 and 350 and the dual-sport DR250S and DR350S. This thing makes the



DRs rip! Our DR350 wheelies with a twist of the throttle in fourth in conditions where it could barely lift the front end in third! Performance is increased at all engine speeds. For both big DRs and the DRS250 and 350, you need to run the needle in the fourth position from the top, cut three 1-1/8-inch holes in the airbox (or leave the airbox's side access cap off), remove the backfire screen where the intake boot meets the airbox and, depending on how and where you ride, install a pilot and main jet one or two sizes larger than stock to get the most from the freer flow this silencer provides. The silencer will cause a mild performance increase but won't upset the smooth stock throttle response or damage the engine if it's installed without any re-jetting or airbox mods. This is a mean-looking, beautifully finished chromed steel and aluminum unit that bolts on (to the stock head pipe) easily as long as you have a new muffler gasket on hand. Cobra's instructions suggest reusing the one from your stock muffler. Don't try this unless your bike is brand-new. You'll waste precious riding time trying to pull out the original

gasket and you'll destroy it in the process like we did. You can always fake it with high-temp silicone. All this and it's two pounds lighter than the stock part! Cobra's DR silencer/spark arrester is noticeably louder (95 dB; stock DRs are 85 dB, DRSs are 84 dB) than the stocker, but the stocker's lawn tractor exhaust note can't compare with the Cobra's racy sound. This unit is designed for off-road use only. **CONTACT:** Cobra, *Dirt Bike Dept.*, 4760 E. Bryson, Anaheim, CA 92807; (714) 779-7798.

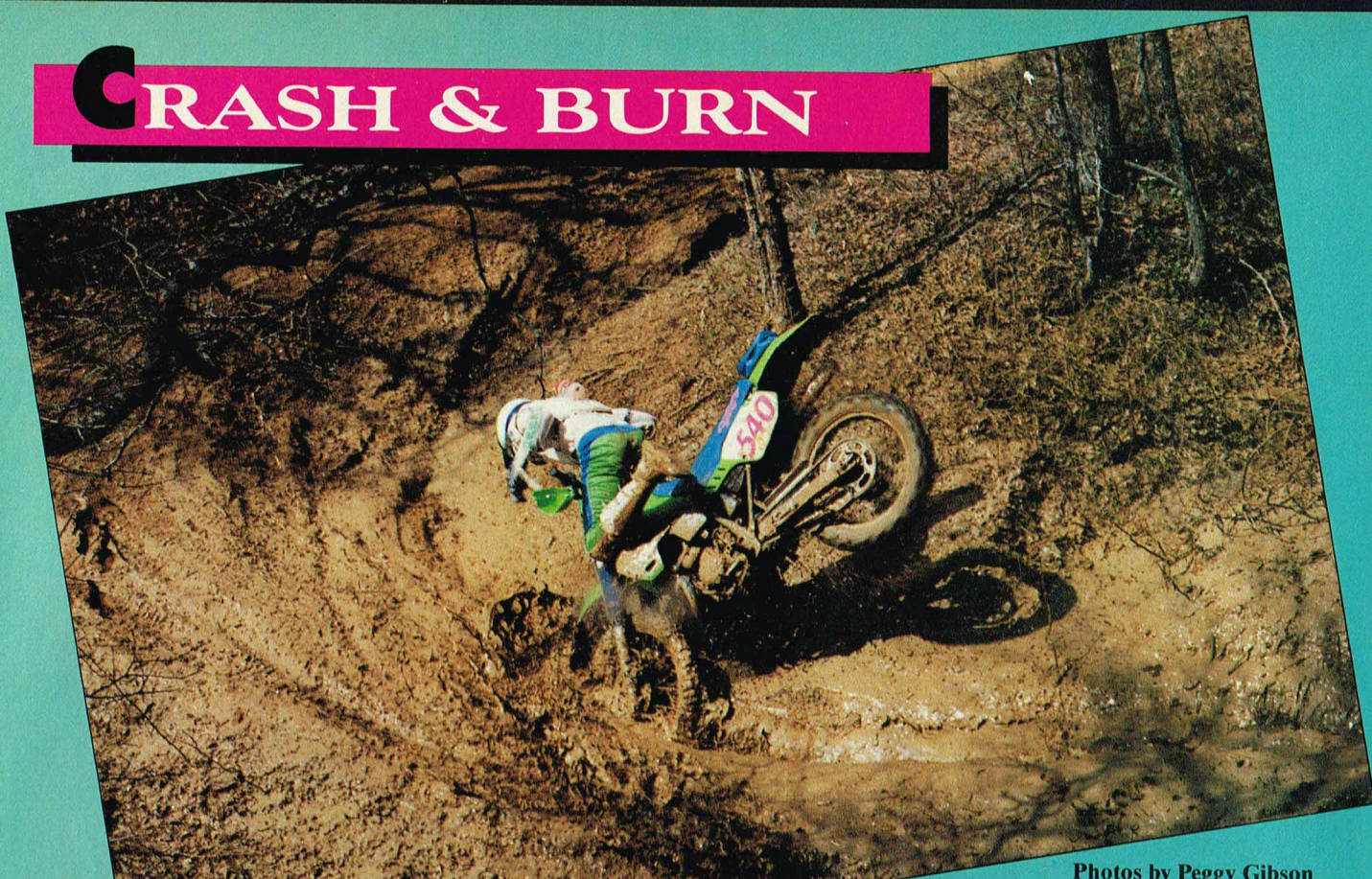
PRO-VUE SMITH SMX PRESCRIPTION GOGGLES & LENSES
PRICE: Complete prescription lens-equipped Smith SMX goggles, \$119.95. Prescription lens-equipped Smith SMX lens only, \$99.95. **FEATURES/PERFORMANCE:** Pro-Vue goggles have prescription eyeglass lenses neatly and securely mounted, four screws per lens, to a second goggle lens mounted behind the external lens. The second pane holds the lenses at an angle much like eyeglass frames, eliminating the dis-



ortion which would occur if the lenses were mounted directly to the more curved goggle lens. They offer better vision, comfort and convenience than contacts or glasses worn under goggles, which fog easily and flop around. They add a bit of weight to the front of the goggle but the thick face foam on the Smith goggle frames gives enough support to prevent any significant loss of comfort. Pro-Vue mounts prescription lenses to Smith SMX goggles *only* due to the unique deep interior of this goggle which allows adequate space for the second lens. To order, give Pro-Vue your prescription, including your pupillary distance ("P.D.") measurement, goggle frame color preference (where needed) and money. They'll return your prescription Smith SMX goggles or prescription lenses ready to install in frames in about three to four weeks. **CONTACT:** Pro-Vue, *Dirt Bike Dept.*, 10630 N.W. 3rd Ave., Oronoco, MN 55960; (507) 282-0323.

1991 O'NEAL TYPHOON ENDURO JACKET
PRICE: About \$150. **FEATURES/PERFORMANCE:** O'Neal has updated their feature-filled Typhoon jacket with a shiny new Dupont Denier Antron-type water-resistant fabric (the heavy, highly abrasion-resistant material used in top-quality motocross pants) and wider neoprene bands at the collar and cuffs. It still has the two-way front zipper that lets you open the jacket from the top and/or bottom with the weather-proof Velcro zipper cover, large zippered torso vents and large integral rear tool belt pocket. We only had access to the prototype model shown for an afternoon of riding, so we can't give you the scoop on long-term durability, but we can say this jacket is as comfortable and as well designed as any we've tried. Production models will have a few tastefully sized and positioned O'Neal logos and will be available only in the gray and aqua color you see here. **CONTACT:** O'Neal USA, *Dirt Bike Dept.*, 9160 Jordan Ave., Chatsworth, CA 91311; (818) 998-1049. □

CRASH & BURN



Photos by Peggy Gibson



FACEPLANTS THAT REQUIRE LITTLE SUNLIGHT: Scientists have long been baffled by the proliferation of faceplants in areas where sunlight never penetrates. Do these organisms exist by photosynthesis, or do they feed on bottom-dwelling algae?

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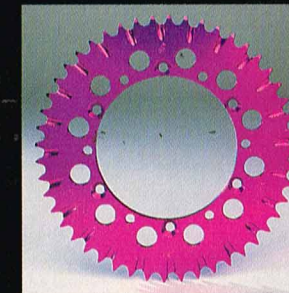
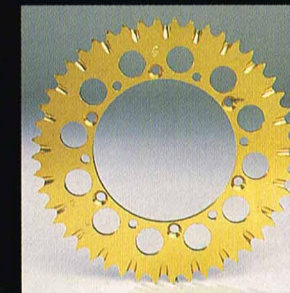
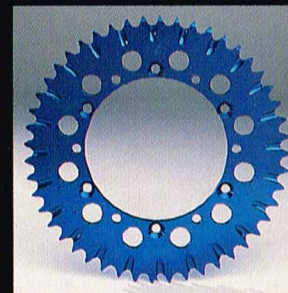
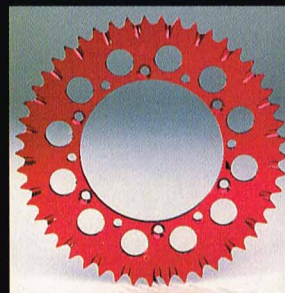
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