JODY'S LOOK BACK AT THE WILD, WEIRD & CREATIVE IDEAS OF MOTOCROSS

Inventions, concepts, products & ideas that highlight the wild and wooly days of motocross (From the Desmo Ducati to Thorks to the Rokon 340 Cobra)

By Jody Weisel

This is Jody's 1971 Hodaka Super Rat. Back in the day, you had to re-invent your bike to race it. It wasn't always a low-budget operation (although nothing like the costs of today). The Hodaka's forks, gas tank, top-end, footpegs, reeds, airbox, exhaust, swingarm, front rim, levers, shocks (all four of them), seat and fenders are not Hodaka parts. In the background you can see Jody's back-up leading link/fiberglass gas tank bike waiting in the wings.

Something that today's modern motocross racers will never understand, or experience, was the "Hot Rod" mentality of American motocrossers of the 1970s. Those of us who raced back in the glory days never raced the bikes the way they came from the factory (nor did we spend money on frilly anodized parts to make our bikes look better). Instead, we took off the junk and replaced it. We welded the frames, tossed the gas tanks, re-laced the wheels, moved the shocks (and of course, upgraded the stock shocks with aftermarket shocks). 1970s motocross was the mother of invention.

Above is a photo of my full-race Hodaka Super Rat (I'm guessing this is around 1971). It looks nothing like the bike that rolled off the Hodaka assembly line. I replaced the 30mm steel Hodaka forks with Swenco leading link forks (with twice the travel). The chrome toaster gas tank was swapped out for a smaller fiberglass unit (borrowed from my CZ—and it had been a replacement for my CZ's steel tank). The stock swingarm is gone and in its place is a two-inch

longer, rectangular, chromoly unit. The very comfy stock Hodaka saddle has been replaced by the smallest seat imaginable. The rear shocks are Arnaco 2nd shocks (*2nd* was shorthand for *"tuned"*). I made the footpegs myself (and if you look closely we can see that they are starting to bend backwards). The cylinder head is a Webco head and the front rim is a Borroni. Everything from the reed block to air filter canister to the exhaust pipe (note the lack of a silencer) has been changed. For some reason, I was running unbreakable Impact levers.

Chad, Ryan, Ricky, Dean, Jeremy and Bubba never had to reinvent the bikes they raced, but it was common for riders in the Golden Age.

All of these changes weren't the exception to the rule, they were the rule. Some of the most famous brands of the day, CZ for example, were rarely raced with the stock gas tank, airbox, air filter, handlebars (because the stock levers were welded on), carburetors (Jikov) or shocks (Pal). Heck, we didn't even run the stock Czech spark plug.

Inventions, new ideas and home-grown fixes were the order of the day. Sadly, we have forgotten how to be creative today. We depend on the manufacturer to build the perfect bike. We buy it, slap on some decals, invest in anodized doo-dads and call it a day. It's a shame. We have lost the connection that racers of the 1970s had with their machines...and we have even lost sight of our glorious past as *hop-up artists*.

How do you find your past? You search for it. To that end, I went searching for ancient artifacts of America's motocross past. As Earth's scientists and historians learn more about the past, we find that the decoded patterns of history may not be exactly the same time after time, but the similarities are striking. Our understanding of historic trends and their variation through time comes directly from uncovered artifacts.

Deciphering motocross history doesn't require the advanced approaches used in such abstract geological and archeological studies as sedimentology, geochemistry, stratigraphy, tectonics and geophysics. Instead, it falls back on basic oral history mixed with the analysis of ancient (pre-2010) artifacts.

Much like the pioneering Egyptologist who unearthed the massive Luxor temple on the Nile and deciphered the Rosetta Stone, American *motocrossologists* must dig through mounds of moldy photos, interview crusty adventurers and rely

on cultural evidence to create a clear view of what life was like for motocrossers just a few short years ago.

THE PUSH-ME, PULL-ME FOUR-STROKE ENGINE THAT WAS AHEAD OF ITS TIME

Imagine how much Ducati would charge if they made a Desmo dirt bike today.

Today, every guy who hits the jackpot buys a Ducati. It is the *status symbol* street bike of the modern era. Guess what? 40 years ago, Ducati build the *status symbol* dirt bike of the Golden Era of motocross. Except that no one bought it (and it only lasted one season). Ducati sprang to life by making a small bicycle engine to transport war-ravaged Italian citizens. The 1946 Cucciolo (little puppy) engine was sold in a box to be attached to a bicycle. Before WWII, Ducati had produced radio tubes and condensers, but with the Cucciolo's success, Ducati became a motorcycle manufacturer. Ducati's breakout moment was when engineer Fabio Taglioni was hired. Taglioni's big idea was to control valve float by having the valves positively opened and closed without valve springs. Taglioni's Desmodromic system prevented valve float. Valve float can cause both a collision between the piston and valve and poor valve seal. The Desmodromic system uses dual rocker arms on each valve (one for opening and one for closing the valve). The 1971 Ducati 450 R/T was the only motocross bike ever fitted with Desmodromic valves.

ATK 406 TWO-STROKE: MAKING A SILK PURSE OUT OF A SOW'S EAR

2014 MXA 250 FOUR-STROKE SHOOTOUT: CRF250 VS. KX250F VS. 250SXF VS. RM-Z250 VS. YZ250F
The MXA wrecking crew rides 'em, races 'em, wrecks 'em and rates 'em — all you gotta do is read about 'em

THE BEST MOTOCROSS BIKES OF THE PAST 34 YEARS — DID YOU OWN ONE OF THESE?
Have you ever wondered how your trusty but ru
Kawasaki KX125 ranks in the grand scheme of
here

MXA'S 2014 HUSQVARNA FC450 MOTOCROSS TEST: HOOSKA ROOSTA BOOSTA IS BACK
In Husqvarna's case, platform sharing allowed them to have products available in 2014 that consumers could buy, dealers could stock and KTM could sup...

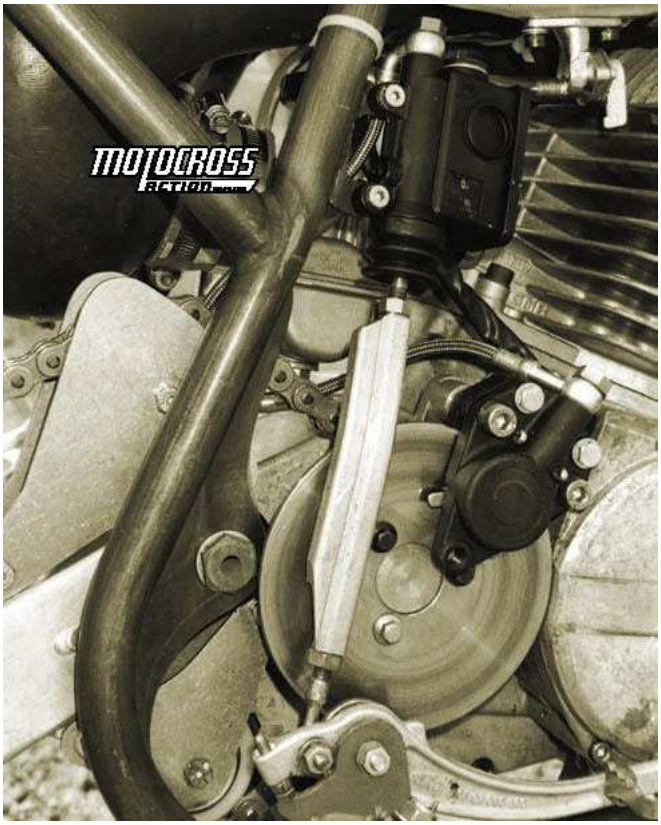
WE RIDE KEN ROCZEN'S RED BULL FACTORY KTM 450SXF
The MXA wrecking crew takes Kenny's bike for
good? It won two 450 Supercrosses this year s
enough for us

ENGINE TECH: MOTO3 ROAD RACE ENGINE VERSUS KTM 250SXF MOTOCROSS ENGINE
They both are 250s, but one makes 54 horsepower and the other revs to 15,000 rpm

MXA TWO-STROKE SHOOTOUT! THE 2013 KTM 125SX VERSUS THE 2013 KTM 150SX
Real tests! The two most talked about bikes of t
on against the MXA wrecking crew

The air filter on the ATK 406 is in the black box in front of the gas tank. There is no brake on the rear wheel. This complete Open class bike weighs 208 pounds.

In the mid-'80s, Laguna Beach, California, motorcycle designer Horst Leitner was hired by Bombardier to build a prototype two-stroke motorcycle to try to keep the failing Can-Am dealerships alive (they had been selling British-made Armstrong bikes after the Canadian assembly line was shut down). The only catch to the Bombardier contract? Horst had to use Can-Am's antiquated, air-cooled, rotary valve, Rotax 250 and reed-valved 406 engine—a design that dated back to the days of Jimmy Ellis. Why? Because Bombardier owned both Rotax and Can-Am. According to John Stewart, "The Can-Am/ATK/Bombardier/Rotax 406 engine used a reed valve. The 250 and smaller engines of that era used rotary valves as evidenced by the large cover on the left side of the engine. The 406 used a reed engine for narrower width and better bottom/middle performance. The 406 didn't need screaming top-end performance and had a smaller and more compact left side cover." With either air-cooled engine installed, Horst pulled out all the stops on the bike's innovations to hide the archaic powerplant.



ATK's rear brake was mounted on the countershaft sprocket.

What did he do?

(1) The airbox was mounted under the gas tank.

(2) The intake tract was designed like a snorkel to maximize air velocity from

the gas tank-mounted air filter back to the carb.

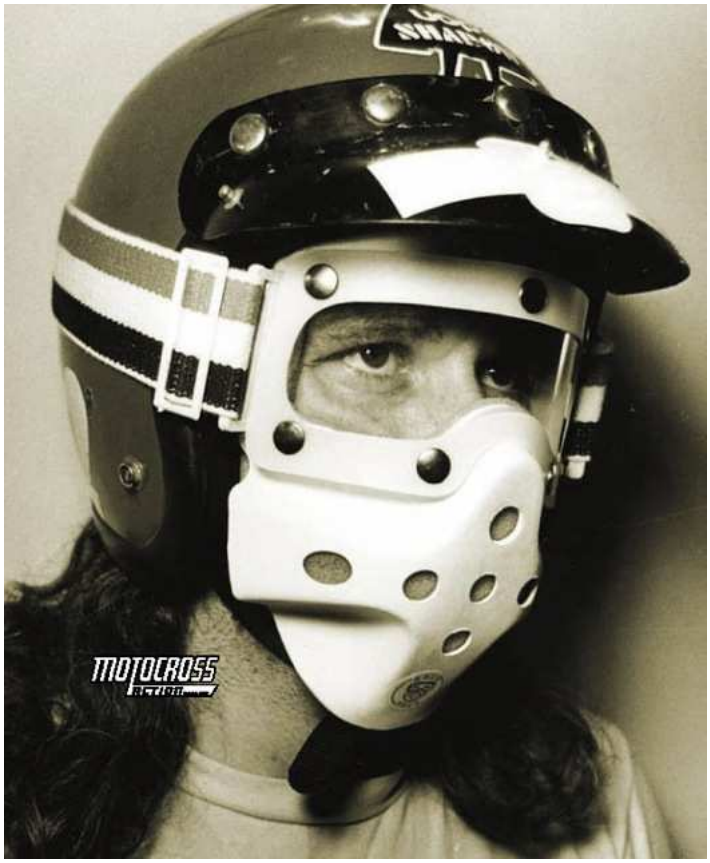
(3) The rear brake was mounted on the countershaft sprocket to reduce unsprung weight on the rear wheel.

(4) The single rear shock was mounted on the left side of the bike (sans linkage).

(5) The chain was routed over frame-mounted rollers that eliminated chain torque on the rear shock.

In the end, Bombardier decided to get out of the motorcycle business. The Can-Am dealers, left without product, decided to fund Horst's bike to replace the missing product from the previous Can-Am network. That is how the ATK 406 was born.

RACEFACE: FULL COVERAGE FOR OPEN FACE HELMETS



The Raceface filled a void during the transition from open face to full-coverage helmets.

In 1978, American motocrossers had not yet embraced the concept of the full-face motocross helmet, even after Roger DeCoster gave them a graphic demonstration of the downside of racing with your mug exposed during the 1975 Trans-AMA series. Instead, racers stuck with their open face Bell helmets and outfitted their goggles with face masks to ward off danger.

The strangest of the goggle/face mask combinations was the Raceface. It wasn't a mask that snapped on to your existing goggles, but instead was a one-piece face mask that looked like the one Jason Voorhees wore in "Friday the 13th, Part 3." Paradoxically, the Raceface came out four years before the horror movie.

The Raceface was not just intriguing because of the hockey mask look, but because the goggle lens snapped in place with seven visor snaps, the strap was two inches wide, and the retail price was only $16.95. In the end, it didn't catch on.

JONES BALL GRIP: IN SEARCH OF THE NO-SLIP GRIP

READY 2006 HONDA CR250 TWO-STROKE
Honda may not build a two-stroke, but even if th probably what they would be shooting at

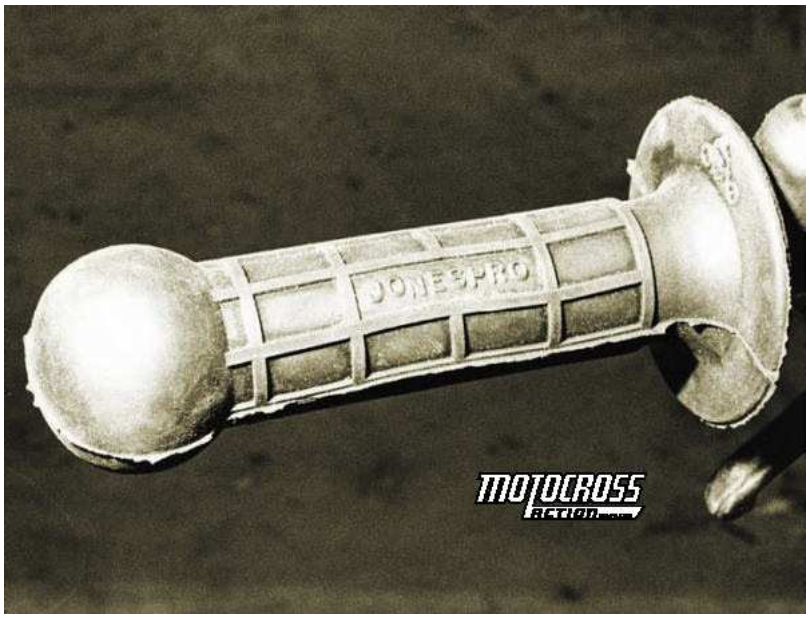
MOTOCROSS ACTION AMA RULE OF THE WEEK: YOU CAN PROTEST EVERYTHING — EXCEPT YOU CAN'T PROTEST THE AMA
You have 30-minutes after the posting the race results to file a protest —any later than that and it is "Sorry Charlie"

THE EUROPEAN 125 TWO-STROKE CHAMPIONSHIP VIDEO
Dutch rider Davy Pootjes looks like the hero of the tiddlers

YOU ARE THERE! WATCH THE BULGARIAN GRAND PRIX
This was the only major race this weekend ...so

BULGARIAN GRAND PRIX RESULTS: HERLINGS WINS AGAIN, BUT TONUS HOLDS ON TO A SLIM 4-POINT LEAD
Tony Cairoli takes another 450 win and now has

LOCAL GUIDES



The Jones Ball Grip was designed to keep you hand from slipping off the grip and to provide a massage ball to lessen arm pump during long races.

Motorcycle grips have come in every shape, size and pattern, but one of the most unique grips of the 1980s was the Jones Ball Grip. It got its name because of the round rubber ball molded onto the end of the grip. Designed by Don Jones, father of four-time 250 National Champion Gary Jones, it had three unique features:

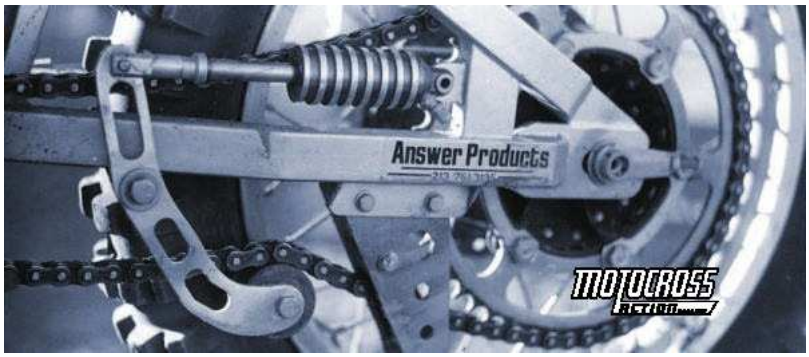
(1) The large rubber ball stopped the rider's hand from slipping off of the grip in the whoops–without being abrasive.

(2) Because of the strength of the extra-large ball of rubber, the Ball Grip resisted tearing in a crash.

(3) Many riders claimed that during a long moto, and remember motos were 45-minutes back in the day, you could slide your palm over onto the ball to massage away arm pump.

In the end, however, the Jones Ball Grip couldn't overcome its rather comical look.

LUFT HYDRAULIC CHAIN TENSIONER: WHEN MONEY WAS NO OBJECT



The early days of long travel suspension caused incredible changes in chain tension as the rear wheel arced through its stroke.

The inherent problem of the long-travel movement (that started in 1974 and lasted into the mid-'80s) was how to handle chain slack. Since the countershaft sprocket on old engines was located several inches in front of the swingarm pivot, when the swingarm moved through its arc, the chain would go from very tight to very loose. The eventual solution was to redesign the engine so that the countershaft sprocket would almost brush the swingarm pivot (lessening chain slack). But, until new engine and frame designs came along, there was a booming business in chain tensioners. The typical chain tensioner was a spring-loaded aluminum arm with a roller on it. When the chain went slack, the tensioner would move towards the swingarm to keep the chain from derailing.

Chuck Parks, with the help of AMA National rider Kenny Zahrt, started a suspension company called Luft. The company name comes from the German word for *air*. Luft's best-selling products were CNC-machined shock reservoirs, but its most unique product was an air-pressurized, hydraulic chain tensioner.

- All Local Guides
- Alabama
- Alaska
- Arizona
- Arkansas
- California
- Colorado
- Connecticut

Air pressure pushed a leverage arm against the chain, and hydraulic pressure kept it in contact. In the end, the Luft chain tensioner was too expensive to be a big player.

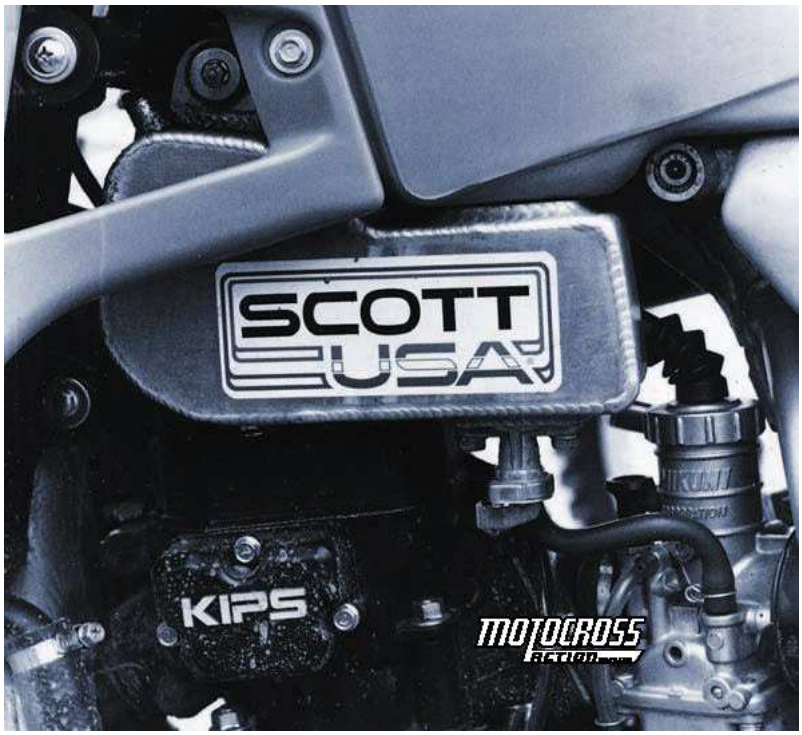
CAN-AM MX2: LOTS OF OPTIONS, BUT ONLY ONE GOOD CHOICE

If you look closely at the top triple clamp you can see that it is offset backwards from the center of the frame's steerer tube.

In 1975 the Can-Am 250 MX2 motcross bikes came with adjustable fork rake built into the triple clamps. By rotating an eccentric steering head bearing, the fork rake on the Betor forks could be changed from 25-degrees to 31-degrees (in 1/2 degree increments). It came out of the Bombardier factory set at 30-degrees. It should be noted that changing fork rake is not the same thing as changing the actual head angle of the chassis—and mostly affects wheelbase, front-center and trail. Gary Jones raced an MX2 to the 1974 AMA 250 National Championship with the fork rake set at 28 degrees (although Jones ran longer rear shocks, so his actual head angle was steeper).

Sadly, most Can-Am racers didn't like the extra maintenance needed to keep the slotted cones positioned properly, so they replaced the adjustment cones with the tapered bearings from the Can-Am enduro models (which made the fork rake stationary at 28 degrees). On a side note, the Gary Jones Replica MX2's were followed by the infamous MX3 Black Widow (Can-Am didn't call it the "Black Widow," the people who raced the ill-handling 1976 model gave it the nickname...and it stuck). The Black Widow had the adjustable triple clamps also.

WORKS KAWASAKI FUEL RESERVOIR: A LITTLE DAB WILL DO YA



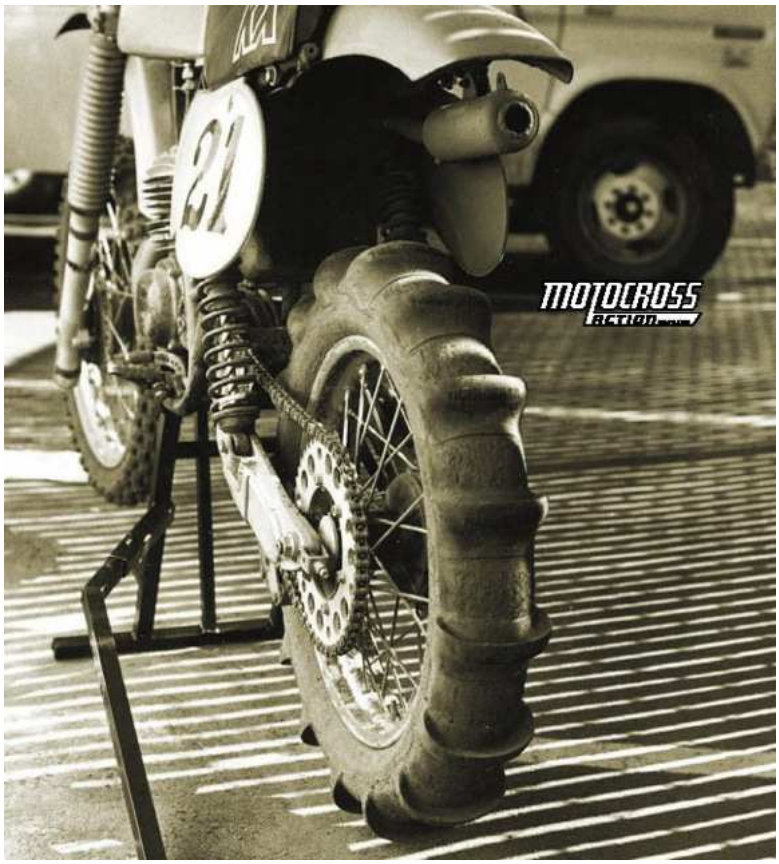
Even today, bikes run out of gas in the 30-minute-plus-two-lap Nationals (especially at Glen Helen and Southwick). This was Team Kawasaki's solution in the 1990s.

One of the reasons that the AMA will never return to the 45-minute motos of the glory days is that the gas tanks of modern production bikes couldn't go the distance.

Back in the '90s, Team Kawasaki wasn't taking any chances of running out of gas. The petcock was replaced with a welded aluminum tank, and the original petcock was attached to the bottom of the fuel reservoir. It was an insurance policy.

Today, the AMA allows the factory teams to run aluminum gas tanks that are larger than stock (they cannot be smaller than stock). Most factory bikes have aluminum tanks painted to look like stockers.

THE JAMMER'S PADDLE TIRE: ONLY LEGAL UNTIL SOMEONE USES IT



The Jammer pulled the greatest psyche job of all-time at the 1979 Oakland Supercross.

At the 1979 Oakland Supercross, Jimmy Weinert pulled the racing coup of all-time when he showed up on the starting line with a 16-scoop paddle tire on his works Kawasaki. Under AMA rules, the tire was legal, and on the sandy Oakland track, Weinert used it to win the *last* Supercross of his career. The competition was stunned, not just by the Jammer's audacity, but by the pulsating roost of the sand dune paddle tire.

The AMA didn't ban paddle tires immediately, but after Pat Moroney used one a month later to win a sand race, the AMA acted. A new AMA rule, which is still in existence today, banned tires with continuous knobs, studs, paddles and knobs taller than 3/4 of an inch.

Today, Pirelli has a sand tire that flirts with the rules, but stays on the legal side of Weinert's paddle tire rule.

ROKON 340 COBRA: LOOK MA, NO KICKSTARTER AND NO SHIFT LEVER

Rokon used a snowmobile engine to power the 340 Cobra. The Rokon had disc brakes, front and rear, in 1976.

Rokon was famous in the '70s for building a quirky, two-wheel-drive trail bike called the Trail-Breaker. The Trail-Breaker was an ugly, utilitarian machine that could actually carry spare fuel or water in its hollow hubs. Rokon changed hands just as the motorcycle market started to expand. And, in an effort to cash in, Rokon's new owners decided to switch the focus from their unique trail bike

to equally unique one-wheel-drive enduro and motocross bikes.

Most famous of the bikes was the automatic Rokon RT-340, which was spun off for motocross as the Rokon 340 Cobra. The most famous of the Rokon motocross racers was Floridian Don Kudalski, but Bob Harris, Ron Bishop, Dave Mungenast and Jim Hollander were all major players during Rokon's short history in racing. Powered by a 335cc Sachs two-stroke snowmobile engine (that was started with a pull-cord), the Rokon 340's most unique features were its disc brakes, shiftless centrifugal clutch transmission and Red Wing rear shocks.

In the end, the RT-340-based bikes didn't put Rokon on the map, and the development of the RT-340 contributed to Rokon's financial woes in the '70s. Just a handful of Rokon 340 Cobras were built between 1974 and 1976. Today, Rokon is still building its two-wheel-drive Trail-Breakers, available with either Kohler or Honda four-stroke engines. They have a factory in Rochester, New Hampshire.

WORKS HONDA LOW-BOY GAS TANKS: MASS CENTRALIZATION ISN'T A NEW THING

Before it was discovered that placing the weight at the center of gravity was more important than placing it below it, Team Honda's works bikes had exotic, hand-made, aluminum, low-boy gas tanks. Hidden under the gas tank is a tunnel that funnels air to the airbox.

Although Yamaha made headlines over the last few years with the YZ450F's creative mass centralization program (which included rotating the cylinder towards the center of the bike and turning the cylider head around backwards), the move to centralized weight was spearheaded by Team Honda in the early '80s when their works bikes came with special aluminum gas tanks that not only positioned the majority of the fuel lower on the frame, but also scooped air directly into the airbox via a gas tank venturi tunnel. To get fuel from the lowered gas tanks to the carburetor, Honda incorporated a special pulse fuel pump to transfer fuel upstream.

Later on, Suzuki would attempt to build a works bike with the airbox where the gas tank was and the fuel tank in the airbox's location. It was raced by Mark Barnett and Scott Burnworth, neither of whom liked the handling of the bike. Cannondale tried a variation on this theme in 2001 and the upside Husaberg FX450 and Husqvarna TX449 put the gas tank under the seat.

RICH THORWALDSON'S THORKS: DON'T CALL THEM FORKS, CALL THEM THORKS

Thor forks were a modern update on the Earles forks of the 1960s.

During the 1960s and early '70s, many motorcycles came with leading link forks, often called Earles forks. Unlike the typical telescopic fork, leading links had the uncanny ability to climb over bumps and obstacles by folding their shock absorber-suspended front link up and back with the force of the bump. Greeves, DKW, Sachs and even BMW were big supporters of leading link forks. Leading links eventually fell out of favor and were replaced by telescopic forks.

By the late '70s and early '80s, many racers from the early days of motocross believed that the idea of turning a swingarm around and using it to arc back towards the bike was the best way to make front suspension. One of these was former Team Suzuki racer Rich Thorwaldson. After his racing days ended, Rich started an aftermarket company named Thor Racing that produced a very popular line of aluminum swingarms for race bikes. And in 1979, he decided to build his own set of leading link forks.

Thorwaldson's forks, called *Thorks* (for Thor forks) were four pounds lighter than the 36mm telescopic forks of the day. The Thorks used two S&W Stroker II shocks and featured 11 inches of travel. Thorks retailed for $375 without shocks or $475 with shocks.

Unfortunately, Thorwaldson's leading link forks were too radical for the racers of 1979. Although they worked really well, the look was too weird for most. Rich eventually closed Thor Racing and became a successful Honda dealer in Nevada. He was tragically killed in a road race accident in 2004.

PETTY NO-DIVE: MAINTAINING A STEADY KEEL

Although the mechanical No-Dive system may look Rube Goldberg, it was used on the works bikes of Roger DeCoster, Broc Glover (shown here) and Kent Howerton.

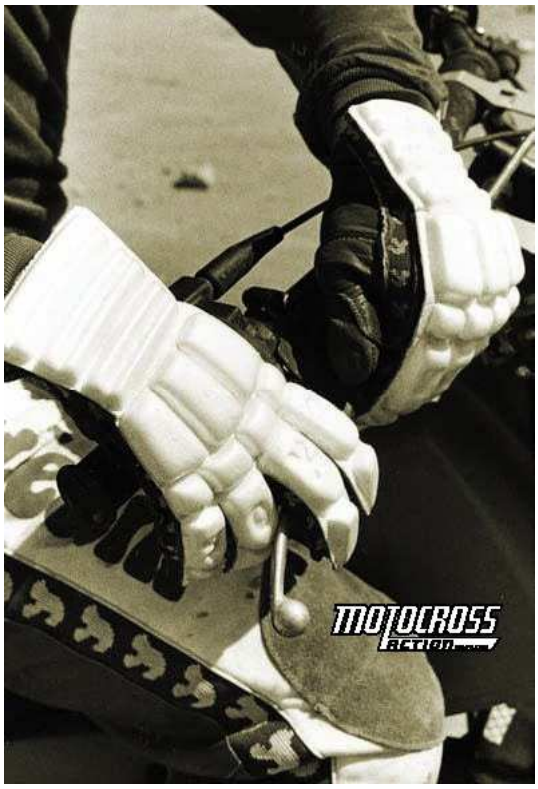
Racers from the '60s remember Preston Petty as one of America's fastest riders. Racers from the '70s know him as the man who invented the plastic fender. Racers from the '80s think of him as being responsible for the injection-molded enduro headlight, Tuff Tub, plastic skid plate and Petty hex grip. And, had the world been a more advanced place, riders from the '90s would have remembered Preston for inventing the Petty No-Dive.

Shown above on Broc Glover's works Yamaha, the Petty No-Dive was a lever arm that attached to the front fork with a heim-jointed strut transmitting force to the triple clamps. Under hard braking, a Petty-No-Dive-equipped bike would not dive. The concept was to keep the frame geometry the same (head angle, trail and wheelbase) so that the rider could work from a stable platform.

Although the Petty No-Dive was used and tested by Roger DeCoster, Broc Glover and Kent Howerton, it never caught on in motocross. It was, however, a standard feature on many road race bikes of the late '80s and '90s. Unfortunately for Preston, the manufacturers didn't buy his patent, but instead took his concept and made it a hydraulic feature of their forks.

Today, Preston lives a quiet life as a computer programmer.

YOKO FOAM-BACK GLOVES: FLOTATION DEVICES FOR YOUR HANDS



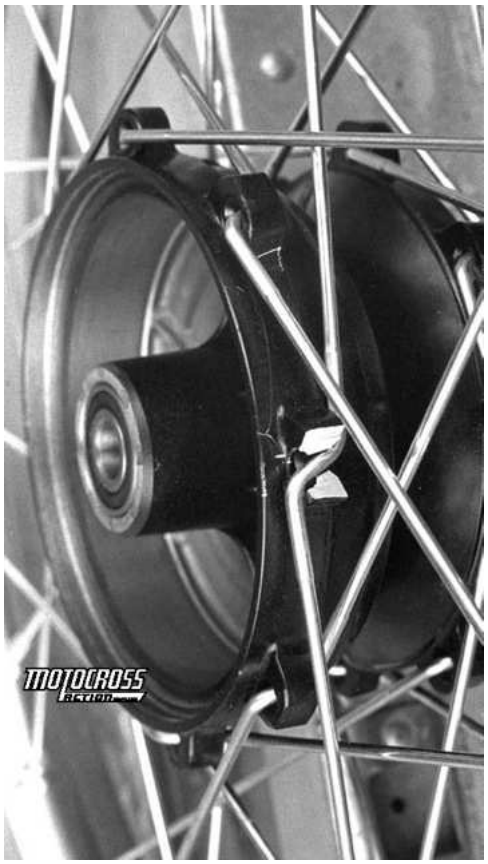
Yoko's Foam-Back gloves offered a lot of protection, but limited movement.

There was a time in motocross history when riders worried about the well-being of their fingers, knuckles and hands. In today's era of minimalist gloves, it's hard to imagine that finger protection was one of the major features of old-school motocross gloves. The original motocross gloves, imported by Torsten Hallman, had rubber strips sewn down each finger, and this progressed to gloves with injection-molded plastic pieces in the '90s.

Perhaps the most unique of all the gloves were Yoko's 1983 Foam-Back gloves. Covering the back of a basic pair of leather gloves was a blown-foam coating, reminiscent of the foam used in kick boxing and karate gear. The articulated fingers and wrist allowed for free movement, but, unfortunately, the thickness of the foam interfered with reaching your fingers up to the clutch and brake levers. Often, the Foam-Back gloves would catch on the under side of the levers.

Today's gloves are a far cry from the protective gloves of yesterday, which probably accounts for the popularity of hand guards.

YAMAHA Z-SPOKES: THE WORST SPOKE IDEA EVER



Technically a great idea, the Z-Spoke was a disaster for Yamaha.

In 1984, Yamaha made the disastrous decision to equip their motocross bikes with Z-spokes. Instead of 32 individual spokes, Yamaha's engineers thought that 16 continuous-length spokes would transfer the loads better from one side of the rim to the other. While that load shift may have taken place at the ends of the long spokes, just the opposite happened where the long spoke wove through the hub flange. Even a slightly loose spoke would cause the very long spoke to bow in the middle, and the bending force would crack the hub.

Although the Z-spoke still found limited use in Yamaha's trials bikes, after 1984 it would never be used on a motocross bike again.

ADJUSTABLE FOOTPEGS WERE ALSO SELF ADJUSTING

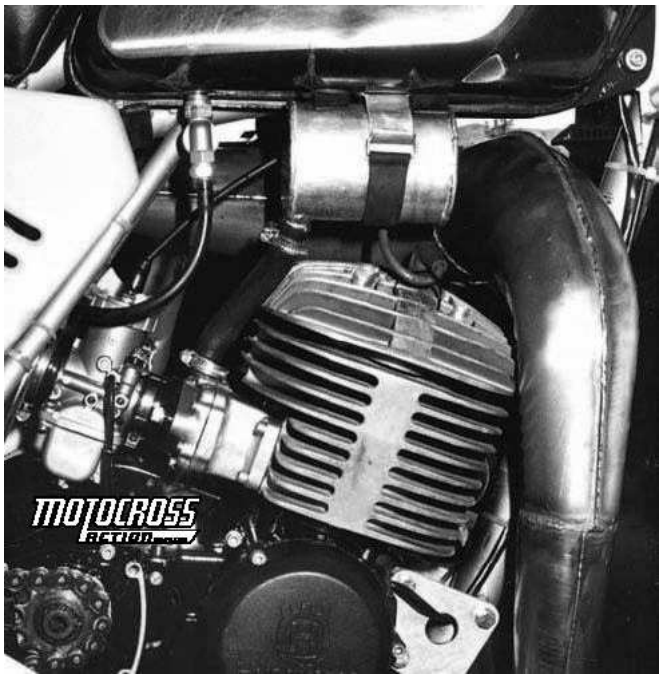
The 2012-13 Kawasaki KX450F has adjustable footpegs (over 5mm), the 1971 Hodaka Super Rat 100 had footpegs that could be adjusted across a four-inch range.

Only Hodaka Super Rat 100 riders will remember that the Rat footpegs were adjustable. A footpeg bar ran above the lower frame cradle (it held both the left and right footpegs—which were rubber covered). Under the frame there were two bolts that could be loosened so that the footpegs could be slid forward or backwards across a four-inch range. In theory you could change the position of your weight in relation to the front and rear wheels and compensate for large or small feet. What was the fly in the ointment? When you landed from jumps, the footpeg bar would slip in its slots...and every Super Rat rider had to get used to riding with one footpeg forward and one footpeg back. Most hardcore Super Rat racers, which included most of the future stars of the 1970s would weld the footpegs to the frame (Alex Steel sold pre-mitered footpegs just for this purpose).

BOOST BOTTLES: GIVE ME A BOOST

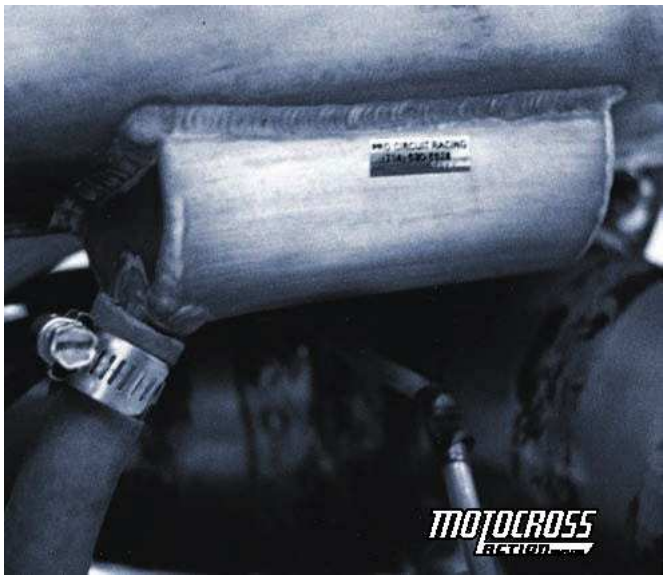
Yamaha put boots bottles on their bikes as an OEM part.

If you raced in the '80s, your bike most likely was equipped with a boost bottle. In fact, Yamahas came stock with boost bottles for several years. Of course, if you weren't around 25 years ago, you might not know what a boost bottle is. The simplest explanation is that a boost bottle is an empty bottle that is attached between the carburetor and the reed block. Typically welded out of aluminum and attached to the intake manifold with a rubber hose (via hose clamps), the variation in boost bottle designs was endless.



As an aftermarket part, this Pro Circuit Husqvarna has an aluminum boost bottle attached to a rubber hose. The hose fits between the carb and reed block.

How did they work? As the engine ran, fuel was drawn into the engine by the suction of the crank going up and down. With each rotation, fuel was sucked into the intake tract, where it waited for the reed valves to flap open so that it could be drawn into the engine's lower end. Obviously, at 8000 rpm there was a lot of sucking and flapping going on, and not all of it was in the proper direction. The boost bottle's hose was attached in the perfect location to siphon the fuel that was rejected at the reed valve up into the bottle, where it was stored until the reed valves opened again. In essence, a properly designed boost bottle was like a mini-supercharger, providing not only a place for excess fuel to go, but richening up the fuel supply when the vacuum of the engine went in the correct direction. The midrange was where the effects of a boost bottle could be felt.



Andy Jefferson's Pro Circuit Husqvarna had the boost bottle built into the aluminum Husqvarna gas tank.

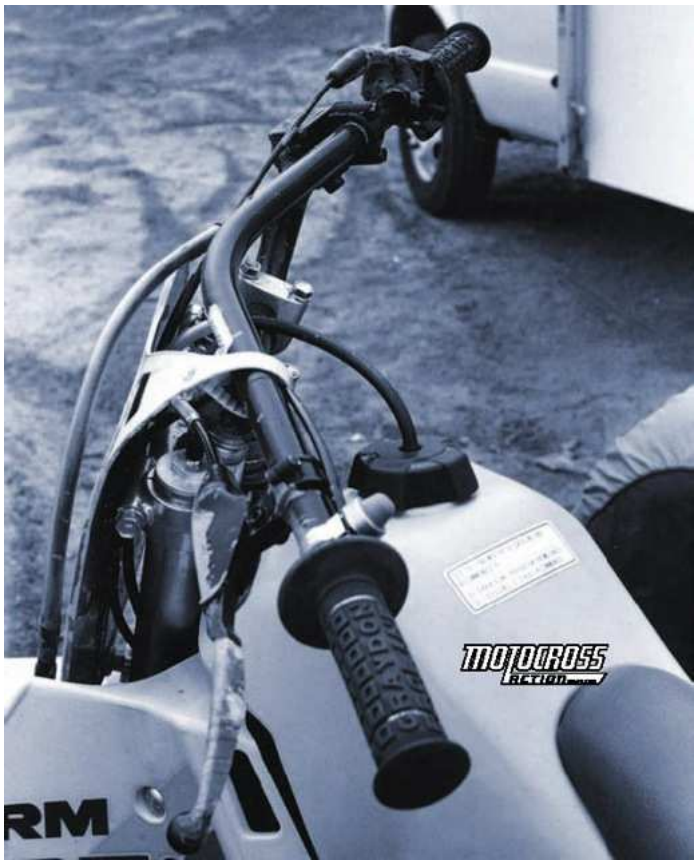
No one knows why the boost bottle phenomenon stopped, but suddenly boost bottles disappeared. The cottage industry that made millions from selling them moved on. By all accounts, the concept would still work on a two-stroke today.

WRINKLE FIN MONTESA: NOTHING FACE CREAM CAN'T FIX

The wrinkles increases the surface area of the cyiinder's fins.

In the age of air-cooled engines, excessive heat was a problem that led to cylinder warpage, seizures, bad jetting and ring clatter. The most logical solution was to make the fins on the cylinder bigger to bleed off the heat. But, there was a limit to how big the fins could get. Montesa's solution was the famous "wrinkle fin" cylinder. By wrinkling the cylinder finning, Montesa's engineers increased the surface area without increasing the width.

TOP BAR HANDLEBAR: ALL THAT MATTERS IS WHERE YOUR HANDS END UP



Rather than bend the 7/8-inch tubing, it was used across the top. An added section was welded on below.

Until the advent of the oversize ProTaper handlebar, there was rarely anything new in handlebar design. Oh, don't get us wrong, handlebars went from steel to aluminum, there was the Jones V-brace bar, the solid aluminum Inter-Am bar, and all manner of bends. But no one pushed the design in the '60s or '70s.

One of the exceptions was a 1987 bar that turned the handlebar world upside down. Instead of bending a tube to fit into the bar mounts and then welding on a crossbar, this unique bar used the 7/8-inch handlebar as the cross bar (and welded on an extra loop to go down to the bar mounts). It was billed as a stronger way to make handlebars because it featured no severe bends. Unfortunately, it weighed about twice as much as a conventional bar because, instead of a small crossbar, the complete crossbar was made out of large steel tubing. Very few of these bars ever saw the light of day.

VERTEMATTI BILLET SWINGARM: MORE THAN ONE WAY TO SKIN A CAT

Vertematti's swingarm was machined from one piece of billet aluminum. This idea was later copied by play bike designers.

In the beginning of motocross, swingarms were made from regular steel tubing, often as small as one-inch in diameter. Over the decades, swingarms became larger in diameter (although still made from steel tubing), eventually getting gusseting and cast axle blocks. Except for a short sortie into titanium by BSA, steel was the material of choice until the late '70s, when rectangular aluminum tubing became de rigueur for its light weight. Aluminum has held sway ever since, although a modern swingarm is composed of forged, cast and extruded aluminum pieces (and is a far cry from the simple steel tubes of the earlier eras).

Back in the mid-'90s, the Vertematti brothers decided that rather than mix three different aluminum construction techniques into one swingarm, they would CNC-machine a solid billet of aluminum into a one-piece, I-beam-style swingarm for their GP bikes. It was an expensive and time-consuming method of building a swingarm.

Today, the Vertematti brothers are consulting on the yet-to-be-released Benelli 450 motocross bike, and CNC-machined swingarms can be found for 110cc play bikes.

WORKS YAMAHA PANCAKE PIPE: HAKAN AND THE PANCAKE PIPE

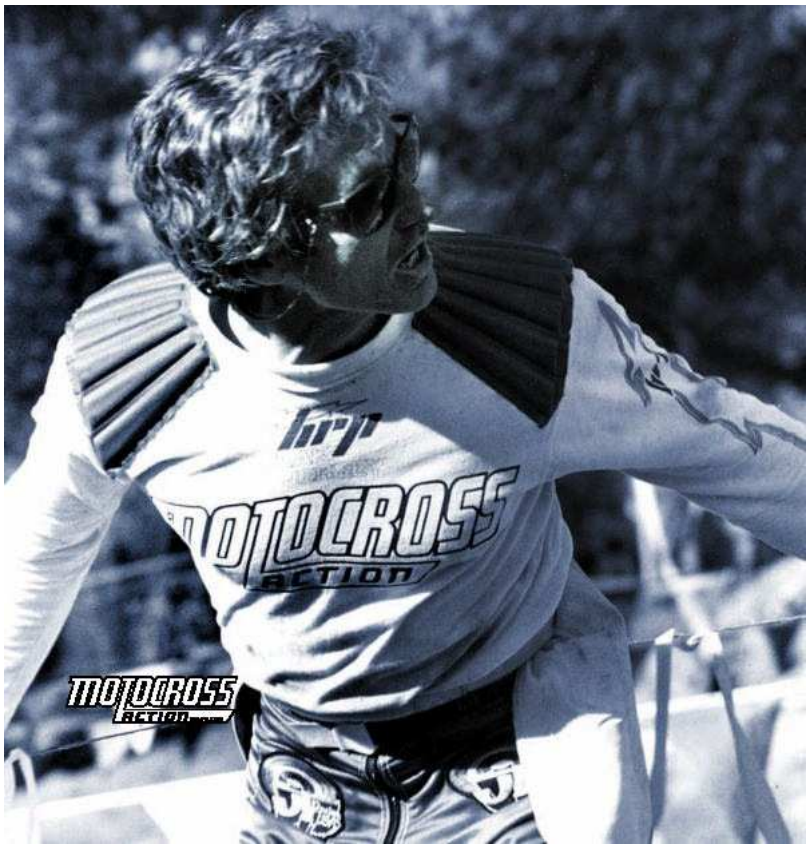
Engine cooling was aided by the flattened exhaust pipe. It allowed cool air to get to the cylinder.

As the motocross world started to go to water-cooling, the last holdouts, apart from the ATK 406, were the Open bikes. Hakan Carlqvist was racing the 500 GP's for Team Yamaha with an air-cooled YZ490. This was after his competition had switched to radiators. Hakan often complained that at the midway mark of a long moto, his Yamaha YZ490 would start to ping (something that local racers often noticed at the two-minute mark).

Yamaha's solution to Hakan's overheating problem was the *pancake pipe*. Yamaha designed an exhaust pipe that was squashed on its inside edge so as not to impede air flow to the cylinder fins. The pancake pipe was not a flash-in-the-pan idea. Carlqvist used it for two full race seasons. Because his Yamaha put out lots of power, he could afford to give some back with an oddly shaped expansion chamber. It was never put into production.

HRP BIO-FOAM JERSEY: THE SHIRT OFF THE

HURRICANE'S BACK



The shoulder pieces of the HRP jersey are padded with Bio-Foam pads.

HRP stood for Hannah Racing Products, and during the heyday of the Hurricane, HRP sold a complete line of pants (with kidney belts attached), vented pants (with so many vents that you needed to take a shower between motos), plastic chest protectors (still sold today) and a really cool jersey.

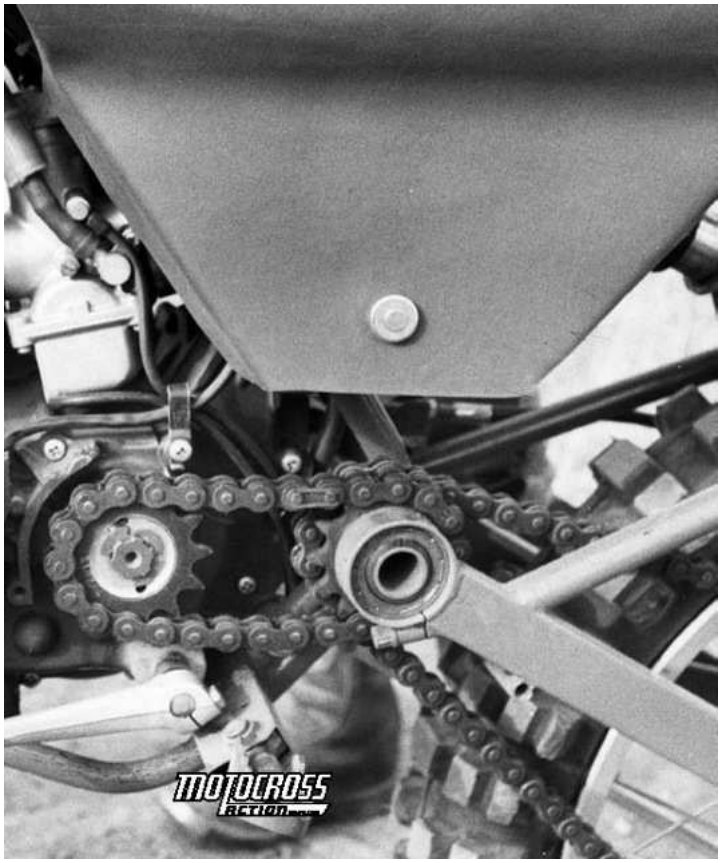
The HRP jersey was made from cotton, which might seem low-tech today, but back-in-the-day pro riders demanded cotton jerseys because of their comfy feel and absorbent nature. The trick part of HRP's cotton jersey was that Bob used BioFoam padding on the shoulders to provide a higher level of protection. Bob's BioFoam jersey worked exceptionally well under an HRP chest protector, because it provided additional padding in the shoulder area. The downside was that the BioFoam and the cotton didn't like going through the washing machine together—the cotton would get baggy while the BioFoam stayed stiff.

Hannah Racing Products is still on the scene (their famous chest protector has been marketed by someone else for years). To see what the Hurricane is up to, go to www.hannahracingproducts.com.

THOMPSON JACKSHAFT CR125: WHEN TWO IS BETTER THAN ONE

Dave Thompson didn't just install a jackshaft system, he turned his 1979 CR125 into an Fox AirShox-equipped monoshock.

In order to eliminate the need for unreliable chain tensioners, in the '70s many inventors turned to jackshafts. The most famous of these was the dual-chain jackshaft that Gaylon Mosier used on his Wheelsmith Maico. By using two chains and an additional sprocket at the swingarm pivot, chain adjustment became a snap.



The jackshaft guaranteed that the chain would never get loose.

In 1979, inventor Dave Thompson combined a jackshaft with his own version of long-travel, monoshock rear suspension. The jackshaft was simple science—if the chain starts at the same spot where the swingarm pivots, then the chain length will never vary. As for Thompson's contention that allowing the swingarm to rotate backwards with the force of the bump would improve the quality of the suspension, the jury returned its verdict long ago. The monoshock-style swingarm on Thompson's '79 CR125 test mule was suspended by a single Fox Airshox. The load on the Airshox was so great that the air pressure made the shock stiffer as the shock got hotter.

Jackshafts, chain tensioners and air shocks went all out of vogue once engineers moved the countershaft sprockets closer to the swingarm pivots. The BMW 450 enduro bike and up-coming 2011 Husqvarna TC450 have the countershaft sprocket directly in line with the swingarm pivot.

RIBI QUADRILATERAL FORK: THE SECOND MOST FAMOUS VALENTINO

The Ribi Quadrilateral fork wasn't about suspension travel as much as geometry change.

Roger DeCoster put Italian suspension designer Valentino Ribi on the map when he began running Ribi's radical Quadrilateral fork on his works Suzuki in the 1979 GPs. Roger's unpainted, chromoly fork was actually built by famous American suspension engineer Bruce Burness, who tuned the Ohlins shocks to work for Roger's style.

For all of its complexity, the Ribi Quadrilateral fork weighed no more than the works forks it replaced. In motion, the Ribi fork didn't move in the same line as a telescopic fork. Its multiple links folded like an accordion to lessen the effects on rake, trail and head angle. Ribi's design was not the same as the leading link forks of a decade before (or the much-later Rich Thorwaldson-designed Thorks). Ribi wasn't depending on rotary movement to climb over bumps, but rather wanted to achieve control of the bike's front-end-geometry throughout the stroke. The Ribi Quadrilateral forks had a light, easy steering feel to them and, thanks to dual Ohlins shocks, absorbed blows better than the telescopic forks of the day.

Horst Leitner took the linkage elements of his motocross fork and miniaturized it to produce the AMP Research B4 mountain bike fork. It is a four-bar linkage that folds on impact. The tiny aluminum shock is a thru-shock (in that the shock shaft come out of the opposite end of the shock body) and a pull shock (the shock is extended under movement instead of compressed). The spring is inserted between the linkage (and is visible at the back of the fork).

American riders might be more familiar with the Horst Leitner's AMP Research "AMP Link" fork that offered the same benefits with a different approach. The AMP Research fork never saw production as a motorcycle fork, but did reach some level of success as a lightweight mountain bike fork.

Roger talked Honda into buying Valentino Ribi's invention and although they never produced it, you can't help but marvel at a twin-cylinder CR125 with CNC-machined Ribi Quadrilateral forks.

Roger DeCoster loved Valentino Ribi's design so much that when he moved to Team Honda, he convinced them to buy the rights to the exotic fork from Ribi. Honda made a prototype set of Ribi forks out of CNC-machined aluminum, but it never saw production. Honda claimed that the complexity made it financially impossible.

MOR-POWER MOR-FENDER: DID YOU GET THAT GUY'S NUMBER?

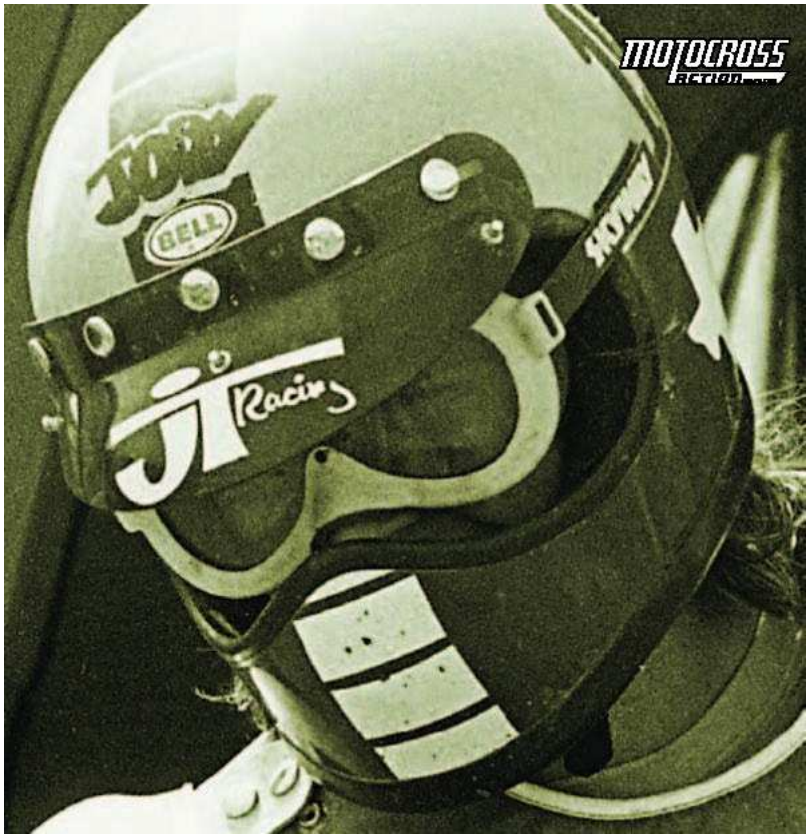
Lance Moorewood's Mor-Fender was weird, but it did make scoring easy.

The name Mor-Power wasn't big in the '80s, but when it was called "Myerscough Machines" in the '70s, it was one of the big players in the minicycle world. Started by NMA owner Ted Moorewood, Myerscough Machines specialized in totally hopped-up Yamaha minicycles. Later, as Mor-Power, Lance Moorewood used the company to design a series of creatively unusual products, most of which never saw production because they were too wacky.

Lance's Mor-Power front fender was the strangest of all of his ideas.

The Mor-Power front fender was an injection-molded front fender with number plates built in. It gave scorekeepers three chances to write down Lance's number. Lance actually used the odd front fender at the 1979 Superbowl of Motocross. Strangely enough, he was the only AMA pro rider to ever use it.

SKYWAY FOAM FIT GOGGLES: THE WORLD'S MOST COMFORTABLE GOGGLES



Skyway Foam Fits were held in place by Velcro straps.

They may not have been all that attractive, but Skyway Foam Fits were the most comfortable, lightest and cheapest motocross goggles ever made. Believe it or not, Skyway Foam Fits sold for $6.95.

Why were they so cheap? There was nothing to them. The goggles consisted of a plastic front plate (that the goggle lens slipped behind) and about one-inch of face foam. There was no frame; the frame was the goggle foam. There was also no strap; instead the Foam Fits came with two short Velcro strips that attached to Velcro pads on each side of the rider's helmet.

Why weren't they a success? They looked weird, largely because the lens was not curved (because there was no frame to make it bend), and peripheral vision was reduced over conventional goggles. But they were 100 percent dust-proof, never leaked and could be removed in a split second (and left attached to your helmet between motos). And at that price, you could throw them away after every race and buy a new pair.

JT RAIN SUIT: THE RAIN FALLS MAINLY ON THE PLAIN

The JT rain suit wasn't just a rain suit. It had your name and number silk-screened on the back and mesh panels to keep it cool.

Roger DeCoster started a craze in the '70s when he would show up for practice with a pair of Suzuki coveralls over his gear. Roger's idea caught on, and it became common to see young American riders going out in practice wearing coveralls to insure that their gear would be clean for the first moto.

In the '80s, JT Racing decided that Dickey coveralls weren't stylish enough, so they designed and built a special Nylon rain suit. Not only did it have a cinch belt around the waist, but it used heavy woven nylon for the chest, lightweight nylon for the legs, vented nylon for the arms, stretch panels on the back, leather patches on the knees and had your name and number on the back. Plus, they came in snazzy two-tone color combinations.

They were cool then, and they would still be cool today.

SRP SLATER SKINS: SPONSORS LIKE TO HAVE A BILLBOARD

Dave Miller of DMC fame made these body panels for the Pro Circuit team. SRP still offers body panels for modern bikes.

One of the reasons that it is so hard to find outside sponsors for motocross is that there is no place for signage. A NASCAR racer has a giant hood and rear bumper to put a Pepsi, Viagra, Budweiser, Kelloggs or Kodak logo on. A motorcycle doesn't. John Slater has dedicated his life to changing that with his SRP Slater Skins.

Starting in the early '90s, SRP began making special bodywork panels that enshrouded the complete motorcycle to give sponsors room for their logos. SRP was joined by DMC, ADB, Acerbis and UFO in quest to make full body work acceptable. Although the idea of full coverage body work was endorsed by every forward thinking team, none of them would run them. Why not? The motorcycle manufacturers didn't want to sponsor race teams that covered up the stock look of the bike. And motorcycle manufacturers are what make modern professional racing go 'round.

This is MXA's Honda CR250 with full bodywork back in 1996. The lack of big logos to attract sponsors is still what hinders teams from finding outside money. Bodywork solves that problem.

In the end, SRP got a few Arenacross riders and freestylers Mike Metzger, Mike Jones, Kenny Bartram and Jeremy Stenberg to run the skins. SRP is still in business and ready to design full-color skins for any team looking to make a splash. For more info go to www.srpinternational.com.

DG PRO-FLOW SCOOP: TRYING TO KEEP AIR COOLING VIABLE

The DG Pro-Flow Scoop may seem like a crackpot idea, but both Yamaha and Honda copied it.

Just before water-cooling became standard-issue on the motocross circuit in 1981, the shortcomings of air-cooled engines were becoming evident. As the engines got hot, the horsepower declined, the jetting went haywire and the engines rattled more than a Marfa, Texas, snake wrangle.

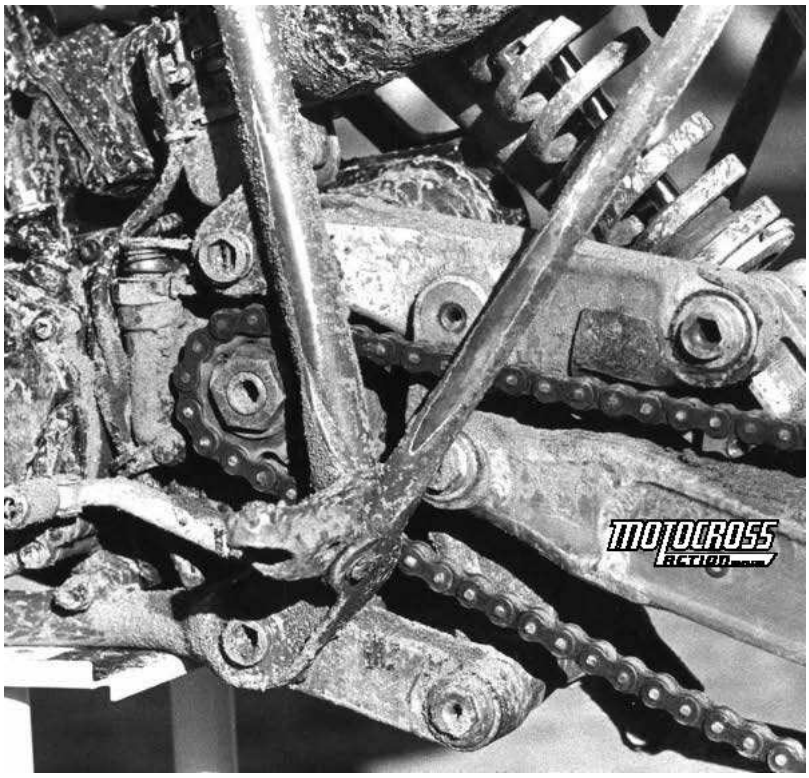
To mitigate the problems, while waiting for water-cooled production bikes, air-cooled engines started to bristled with scoops, vents and holes. Front number plates, even on works bikes, had air scoops in them to direct more air onto the top of the cylinder, while the DG Pro-Flow scoop directed air into the cylinder fins. It may not have seemed all that high-tech, but the plastic Pro-Flow scoop was so popular that both Honda and Yamaha incorporated the design into their air-cooled YZ490 and CR500.

The DG Pro-Flow Scoop was the precursor to the 1984 Honda CR500 scoop and later the 1986 Yamaha YZ490 scoop.

Jody's note: As the inventor, I should note that among my many inventions this

was by far the easiest to come up with and the least profitable (because water-cooled bikes wiped out my scoop empire within two year). It should be noted that neither Honda nor Yamaha paid royalties for using the idea on the 1986 YZ490 or 1984 CR500.

BOYESEN LINK: HOW MANY SWINGARM PIVOTS ARE TOO MANY?



Eyvind Boyesen could explain how it works, but you still wouldn't understand.

Chain Torque. It's a phrase that almost never crops up in conversation, unless you are talking to Horst Leitner or the late Eyvind Boyesen. Both men spent a large percentage of the last 30 years trying to convince the motorcycle industry of the evils of chain torque.

The parallelogram Boyesen Link has been tested by everyone from Bob Hannah to Jo Jo Keller (who made the top five in an AMA 250 National on the bike) to Roger DeCoster - and always with rave reviews. However, it's confusing to look at the multiple linkage arms that replace the bike's normal swingarm pivot.

In action, the Boyesen Link produced four major effects:
(1) It reduced pitch changes (because the polar moment of inertia was reduced).
(2) It improved rear wheel contact (because the shock absorber was not subject to outside forces).
(3) Suspension rise was lessened under varying throttle loads.
(4) It balanced out the chassis by reducing chain torque.

Unlike ATK and AMP Research designer Horst Leitner, Eyvind didn't want to start his own motorcycle company to get his anti-chain torque knowledge into the mainstream. He wanted a major manufacturer to license his design (most manufacturers paid Boyesen royalties for his reed and porting designs). They never did. Not because it didn't work, but because the tooling and development costs were too expensive. As for Eyvind himself, his personal bike has a Boyesen Link on it.

ALUMINUM FRAMES AREN'T NEW

The British-built Greeves motocross bike had a cast, one-piece, aluminum head tube and down tube and stamped engine cradle starting in 1954.

Most modern motocrossers think that aluminum frames were developed at the advent of the 1997 Honda CR250 – not true. As far back as the 1950s motocross racers were riding on aluminum and aluminum/hydrid frames. The two most famous being the 1954 Greeves and 1977 Hagon.

Back in the 1977 British speedway and sidecar builder Hagon built monocoque aluminum motocross frames to accept a wide variety of four-stroke engines.

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Dirt Bike


Dirt Wheels


ATV Action


MBA


RBA


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WARNING: Much of the action depicted in this magazine is potentially dangerous. Virtually all of the riders seen in our photos are experienced professionals. Do not attempt to duplicate any stunts that are beyond your own capabilities. Always wear the appropriate safety gear.