# can-am

# motorcycles

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Looking back fifty years
Chapter three [ 1972-1973 ]
David McLean 1971 to 1976

From the very beginning, It was the intent of Gary Robison to build a strictly functionally designed competition motorcycle. However, it would be good if the bike was also attractive as well. For this he turned to Ski-Doo Design, headed by Sam Lapointe. For many years, Sam had been responsible for the success of many Ski-Doo models. It was requested that one of his people be assigned to the motorcycle project, and that person was to be Ron Ponech. He was a Canadian from Alberta and was educated in Industrial Design in California. Ron was part of the group from the beginning, designing the fiberglass gas tank on the concept bike [ late 1971 ] and also a similar profiled gas tank for the Agrati-Garelli mini-bike. When we started to make the prototype bikes for 1972 testing, each of these bikes required more fiberglass tanks. When our new air intake system was being designed in the spring of 1972, seat profile [ gas tank / frame merge ], rib reinforced fenders and side panels were designed. This was the era of hand drawings, clay models and molds for fiberglass prototype pieces. In the past, steel, aluminum and fiberglass were used for competition motorcycle parts, but these materials were no longer suitable now that flexible and durable plastics were available. In production we would use plastics for all of these parts, except the left hand side panel which wrapped around the rear of the expansion chamber, it was metal. Ron was also responsible for the off white gas tank and fender colour, the yellow and red accent colours and the bold can-am font. The gas tank and fender sides were flat, to allow the use of replaceable and durable decals. The plastic chosen for the fenders was crosslinked polyethylene, and as can be seen in the first can-am brochures, can be twisted to an extreme angle. For the gas tank crosslinked “ high density “ polyethylene was used as virtually no gasoline vapours would be able to pass through. Production parts were available at the end of 1972 for testing. The fenders performed just as designed but the gas tank, [ virtually no gasoline vapours did not mean 100% no vapours ] had a problem of bubbles under the tank decal after about a week. An expensive solution of sealing the interior of the tank only delayed the appearance of bubbles. This was a serious disappointment. The solution was to paint the sides of the tank by a silk-screen process, and the porosity of this application would allow the vapours to escape. This worked well for street use, but one muddy motocross event, and the rider's knees could grind the paint off. To make the bike look new again, required replacing the gas tank, and we were trying to produce a quality, durable and premium priced motorcycle.

For the gas tank fuel tap, a proven Japanese design was used. Motorcycle gas cap designs of the past often had a vent leaking problem when a dirt bike was used with a full tank of gas. A new innovative design was tried to eliminate this problem, a large diameter neoprene piece was captured inside the cap with a razor thin cut across the diameter and a baffle system below this. As gasoline was consumed, a vacuum would draw air in, and if vapour pressure increased inside the tank it could escape and no solid fuel could escape past the cut. This worked OK in the hand made prototype period but not very well in production.

There was still more testing to be done in the state of Georgia in Dec. 1972 and Jeff Smith and Bob Fisher alternated between heading this effort along with hired test riders. The time had arrived to design our own wheels. We had already evaluated many of the off road wheels available and now copied the best features. The one notable feature was the floating brake backing plate of the rear wheel. Husqvarna used this system on their good handling motorcycles [ a system which reduces the loss of rear suspension travel while braking ].
A six inch diameter brake hub size was chosen and hubs, backing plates and brake shoes were machined from solid aluminum. These were tested, and found to be structurally sound and then aluminum pressure die castings versions were made. Our designed spokes were used to lace to aluminum and steel rims. The problems while testing these new wheels were limited to brake linings and water, reasonable braking when wet and quick to dry out afterwards. A few different lining would be tried in the coming months. This was testing of new parts, but at the same time we were still plagued with serious problems we had from the beginning. The steel shaft that the gear shift mechanism rotated on, would come loose in the sand cast crank cases, which would require new cases. Gears were continuing to break in most of the engines, which may or may not require a crank case change. The kickstarter splined hub broke, the Bosch ignition continued to fail with regularity. Long term vibration [ particularly with the 175 ] would destroy the speedometer, tail light assy. the exhaust system and the fiberglass airbox. Particularly troublesome was this airbox, as often much dirt had passed through the engine before it was detected. Again, this is the short version of the many problems.

By the end of 1972 the cold temperature, rain and the Georgia clay made testing too difficult. More testing would be done in central Texas and again Jeff and Bob and hired riders would test and also ride weekend motocross events. The terrain was dryer and rockier but still got snowed on. The wheels continued to survive even destructive tests, such as continually riding over a six inch high railway tie. The inside wheel bearings would lose their interference fit and become a slip fit. We experimented with tighter interference fits, but this resulted in aluminum galling when the bearing was installed. We now knew why some of the hubs we evaluated had a steel ring around the inner wheel bearing. This was only happening with severe testing, so we left it as it was. The floating rear brake backing plate seized under dirty conditions and as expected a brass bushing and oil seal were needed. Piston seizures were rare but when ridden hard they would seize. Seat foam and cover and fiberglass base failures were a part testing one year ago and were still happening. How difficult can it be to make an item with no moving parts? Testing continued in Texas till the end of Feb, 1973.

All testing done away from Valcourt for the past 14 months had to be documented. Each time a motorcycle was tested, the number of hours and what happened, had to be recorded. This record was sent to Gary Robison in Valcourt and copies given to Scotty Sader

[ responsible for the chassis ] and myself [ responsible for the engine and electrics ], also during this period there were 17 files for engines that were worked on. It is from these documents that this history is written.

On Feb. 13, 1973 a memo from Gary Robison stated, our projected schedule has slipped back quite seriously. Our Production start date is Apr. 2,1973.

Could all involved meet this deadline? Could Rotax with the production pressure die cast cases and improved steel parts be a reliable engine? Could Bosch produce an ignition system that lasted longer than a few tanks of gas? Could we in Canada produce a chassis that was not in need of constant repairs.

As the production deadline approached , there were two major items that had to be solved with the chassis. The footpeg ass'y was a complicated design. Making individual hand made versions for the prototypes which held the flat peg surface horizontal initially and after long term use was achievable. However, making thousands with metal pieces and weld tolerances became a serious problem. The second, and most serious problem was the intake air box. The interior air volume had to be enough for not only the 125/175 engines, but also for the 250 future engines. Rotax had requested about six liters for the 250 race engines. Fiberglass air boxes were designed back in early 1972, when the high air intake enduro air system was designed. We struggled to increase the internal volume of this box. The front was limited by the far rearward position of the carburetor , the rear by the full forward position of the rear wheel on this short wheelbase motorcycle. The left hand side had to be relieved near the hot and high expansion chamber, the right hand side had to be relieved for the drive chain [ and often it was not enough, causing the chain to grind through and allow dirt to enter the engine ]. The bottom of the box was close to the swing arm gusseting [ but when a large rock would rest on the gusset, it would punch a hole in the box bottom and allow dirt to enter the engine ]. The top of the box was limited by the flat round air filter. The final box design was to be roto molded thin wall plastic, but this required a lead time to make the molds and produce the parts, and we were not ready to compromise on the small internal volume of the air box. Time ran out and the air boxes became expensive hand made, very thick walled and heavy fiberglass boxes. For security and because of the thick walls the internal volume was even less than the prototype air boxes. Very disappointing to see this ugly air box on the introductory motorcycles. Fortunately the two side covers shielded most of the box from view.

Production did eventually start and motorcycles were sold and the only notable feedback was the small % failures of the Bosch ignition, which were replaced under warranty. Magazines got to test them, and there were good reviews about the performance. It was during this time that parts books were produced and a photo by photo engine service manual made.

While all this dirt bike development was happening in Canada, at the Rotax R&D in Austria, they were developing their own 125cc road racers. By Aug. 1972 they had developed the 125 engine to a very high output and a dynamometer record sheet was sent to us.

30 bhp @ 11,500 rpm with gasoline
34mm Bing carburetor on LH crankcase side
water cooled / close ratio [small gear ] gear box

Early in 1973   Bob Barker [ a road racer, R&D machinist ] arrived to manage the 500cc twin road bike project. However, his first project would be something special, with all that 125cc horsepower available, the Bonneville record attempt was born. It is not known if the exact engine as described was used, but Bob built a semi streamlined chassis around a can-am frame. A team of people went to the Bonneville salt flats in Utah and Bob rode the bike to a 125cc semi streamlined motorcycle world record speed of 136 mph, a record that would not be broken for many years. It should be noted that the production 125cc engine produces 20 bhp @ 9500 rpm, corrected at the gearbox sprocket. This accomplishment was advertised, one could now have Ski-Doo racing power, now in a motorcycle.

The production bikes performed well in MX and Enduro events as well as a street / trail bike. The highlight of the year was the results at the " International Six Day Trial " in Massachusetts. Five can-am enduro bikes were entered [ based on the TNT models ] and the results were;

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| Bob Fisher - gold medal | 175 can-am |
| Eric Neison - silver medal | can-am |
| Jeff Smith - bronze medal | can-am |

and it was not recorded why the remaining two can-am bikes did not finish.
We were proving to ourselves and the public that these motorcycles were more than just OK

Testing was now being done on the 250 MX-1 which would be introduced next year.
As well, detailed improvements would be made to the 125 / 175 line up for the next models.

The year ended with the Bosch ignition failure problem remaining, [ we had to have faith that they would eventually get it right ] and thankfully those fiberglass air boxes did not vibrate into pieces as they did on the prototype bikes.

This is a draft of chapter three, from one person's perspective. Should others wish to add to this, please come forward.

David McLean