U.S. Military M1030 Motorcycle Restoration Story

By Allen Foley

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Part 1 - Background

Like most of us we love mechanical things. At age seven I learned how to drive on 1955 Ford tractor during the summers spent on the family farm. As a young teen in the late 1960's my dream was to buy a Rupp mini bike. But this dream turned into the classic case of "champagne tastes on a beer budget". Then at age thirteen a neighbor was getting rid of a Bridgestone 90cc motorcycle. It didn't run but was only $25. After getting it home and making some repairs and I was "Born to Be Wild", (not really). That started my love of cars, trucks and motorcycles which still exists today.

Over the years I have owned many rare, classic or show cars. I eventually gravitated to primarily collecting military vehicles. While military vehicles are fun, I got the urge to own a military two wheeler. Around the year 2005 there was a military Harley Davidson 45 WLA for sale listed in the local Craigslist. The seller had turned into a bobber and painted it flat black. I purchased it and restored it back to WWII specifications. The bike ran good, was easy to start but it really felt uncomfortable while riding. Between the suicide shift, so-so brakes, too much engine heat and the potential of coil overheating problems, it was time to "Let Go". After selling that bike the idea of owning military motorcycle still continued. Several years pasted and then it was decided to get a newer model military motorcycle. So the quest for a modern military bike began.

Now the question was what types of military motorcycles were available? Doing some research I came up with a list of modern military motorcycles made from the 1980's to the present time. This list was then narrowed down to motorcycles only used by the U.S. Military. Here is the list:

- M1030 - Based on the 1984-2005 Kawasaki 250cc KR250 (M1030's were 1980's and early 1990's)
- M1030B1--Based on the 1987-2018 Kawasaki 650cc KLR650 (All M1030B1's were based on the model year of 2000)
- M1030M1 – A diesel 611cc variation of the 2000 production M1030B1
- KLX110L – Kawasaki small frame 110cc 4-stoke dirt bike
- Suzuki RS70 – Suzuki small frame 70cc 2-stoke dirt bike
- Suzuki DS70 – Newer Suzuki, updated RS70 70cc dirt bike
- Honda XR250R – Honda 250cc dirt bike with larger fuel tank and IR light
- *Note: Harley Davidson MT500 and MT350 were not used by the U.S. Military*

My research found out that the only military motorcycles issued in enough quantities to have a government NSN number were the Kawasaki M1030 series motorcycles. This narrowed my choice and it was decided to look for a M1030, M1030B1 or M1030M1. Besides being easier to find they were also street legal dual sport bikes. The search for M1030 series started in 2014. At that time there were only one or two of the diesel M1030M1 models in civilian hands. The story went that if you had one of the diesel motorcycles, it was stolen. With this in mind, it limited my search choices to either the Kawasaki 250cc or the 650cc gasoline powered motorcycles. As a note, in mid 2018 the U.S. government released around 10-20 of these diesel M1030M1 motorcycles to the public. Lately I have also seen some of these come up in municipal auctions.

M1030 Photo of a late model 250cc (Picture source ***"Google",*** (missing handlebar protector)

M1030B1 650cc - Registration Number 598880 (Photo source from ***eBay*** seller in New Mexico)

Here is a little history on the M1030 series motorcycle. In the 1980's the military decided to adopt a motorcycle and they chose the Kawasaki KLR250. Since Japan would not sell these directly to our government, our military outsourced it to a company called Hayes Diversified Technologies or HDT. This company is located in Hesperia California. Hayes modified the KLR250 by adding a custom rear storage rack, handle guards and a front goggle carrying case. They modified the wiring and added military convoy blackout driving and stop lights. Then it was painted with 383 CARC green. As a note the handlebar guards are referred as buffalo bars and the CARC paint is really a coating. CARC is an acronym that means "Chemical Agent Resistant Coating". In later years, Hayes further modified these KLR250's. This was done by adding an extra engine guard, a larger capacity plastic fuel tank. They also changed to smaller sized convoy blackout lights. The military liked these bikes but someone in the government wanted a bigger payload and longer range so it was decided to use the larger Kawasaki KLR650. This model became known as the M1030B1 and Hayes was the contracted supplier. These larger 650cc bikes came with special racing progressive front fork springs and mono rear shock absorber. They added larger off road foot motocross pegs, an extra engine protector, the buffalo bar and the goggle pouch located on the fender pouch. Modifications also included a larger 6.6 gallon plastic translucent fuel tank and convey blackout lights. When using the translucent gas tank you could see how much fuel remained in the tank. The paint remained unchanged using green 383 CARC.

Later the owner of HDT, Fred Hayes, worked with the military to design a diesel powered motorcycle. His company came up with an engine that could be retrofitted into the existing M1030B1 model. This diesel motorcycle got over 100 miles to the gallon. HDT received the government contact to retrofit the M1030B1 motorcycles. The new diesel powered model was given the destination as M1030M1. In 2005 the US military adopted the M1030M1.

Here is a photograph of Fred Hayes with newly upgraded M1030M1 diesel motorcycles.

Photo from Google search

Fred passed away in 2018 and the rights to build the diesel motorcycle were sold to a company in India. There was talk about producing the diesel motorcycle for the U.S. civilian market but it never happened. Kawasaki also showed an interest to manufacture this diesel but they also declined.

It should be noted that there are no replacement engine or specialty parts available for the M1030M1 at this time. Current civilian owners of the military released diesel motorcycles will find that keeping theses motorcycles running will become a problem.

Part 2 - The Search

As was mentioned earlier, around 2014 I started searching for either a M1030 or M1030B1 motorcycle. I located a M1030B1 for sale on eBay. It was poorly listed, had a bad description and it did not sell. After the auction I contacted the seller and we worked out a selling price. The bike was part of an air war museum in Texas. It was complete and sort of ran. It had been left in the desert for several years and was heavily bleached and had sun damage. I paid the seller and had it shipped home. *Now I had found my military motorcycle!*

When it arrived it needed a good restoration. After many man hours, replacement of parts, new tires and paint, I now had my modern U.S. military motorcycle. After the restoration was completed it was driven twice for a total of just under two miles. Here is a photograph of the motorcycle after the restoration. It is Registration Number 598880.

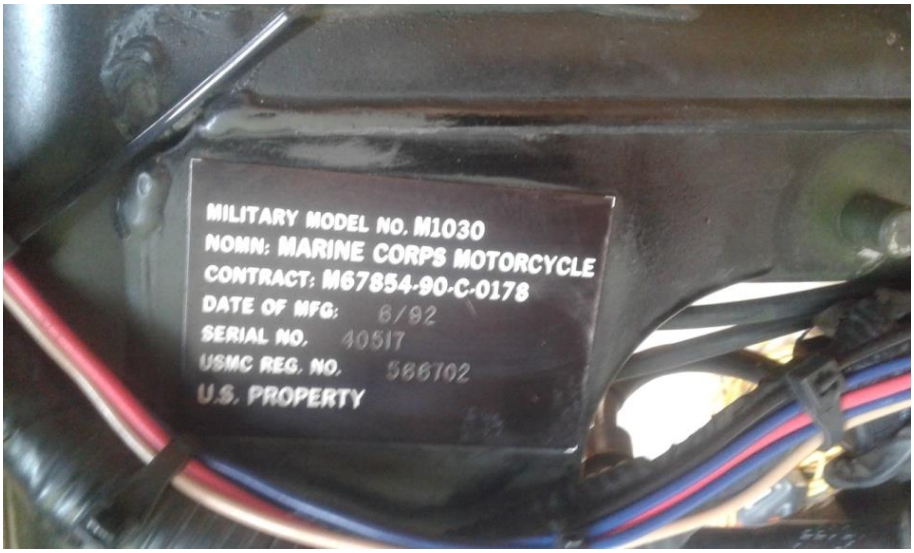
It looked great but I did not like it because of the following reasons. It weighed in at around 360 pounds. Not a problem but the large 6.6 fuel gallon gas tank was mounted very high which made the center of gravity too top heavy. This coupled with a seat height of 35 inched made it "tippy toed on one foot" for me when it came to a stop. Remember that a seat height of 35 inches is really more because as you straddle the motorcycle seat, you lose a couple of inseam inches. The civilian KLR650's have a very devoted group of follows called Adventure Riders. That group talks about their members dropping their bike at least once or twice because of the high center of gravity. This was not going to work for me. I looked into the possibility of lowering the

suspension by installing longer frame links and dropping the front forks at the triple clamps. The lowing links would drop it down two inches but that really would not solve the problem. Another option was to cut down the seat cushion foam. Changing the contour of the seat would not look right. My dream bike had turned out to be not such a dream. Performing both of these modifications would make the motorcycle look out of proportion. Like the old saying goes “Be careful for what you wish for”. So it went up for sale on eBay, was sold and shipped to a person in New Mexico. The discussion was now made to search for the smaller, shorter and lighter M1030 250cc version.

Finding a replacement of the 650cc to the smaller 250cc took awhile. This is because all of the original M1030’s were last delivered to the military by the early 1990’s. Since that time they had long been phased out and surplused from the military. Trying to find one on the used market was nearly impossible because most of the people who owned them usually kept them. I searched eBay, Cycle Trader and Craigslist throughout the country for about a year. I did find two or three for sale while I was shopping. One was in Alaska and another one was painted desert tan. The bike in Alaska would cost too much to ship to Illinois and the seller with the tan motorcycle was asking stupid money. I kept searching and in September of 2017 found a M1030 just outside of San Diego California. The ad was posted in the local southern California Craigslist and when I called number the owner stated that it was for local pickup only. He had other people interested in it but after several conversations I convinced him to sell me the motorcycle. The history of the motorcycle was that it had been given to the California Highway Patrol from the U.S. military. The highway patrol repainted it black and white. They removed the blackout lights, toggle switch and the front fender goggle pouch. It was later sold at a public auction. The current owner purchased it from that auction and it had been sitting idle for a few years. Here are the Craigslist photographs.

Note the remains of the CHiP police star marking on the gas tank.

I closed the deal in late September of 2017 and had it shipped home. It was in early October before I started to really look at the motorcycle. During an inspection I noticed that the police department had done a superb job repainting the bike. They even used epoxy Imron paint because it would barely sand using #40 grit sandpaper. The engine, cables and wiring also had some overspray on them. The use of the imron paint meant that the restoration would take a much longer time than planned. On the plus side the data plate and both Kawasaki identification stickers had been masked prior to the CHP painting. Even though they had been masked, they did have some slight overspray. Using care and spending time I was able to save them. Notice the extra wires attached to the wiring loom from the Hayes conversion. The green circle on the right was not painted black because it had a rubber cap covering that area.



I drained and replaced the old gas, changed the oil and filter, made sure the piston was lubricated, replaced the spark plug with a new one and tried to start it. The Kawasaki 250 does not have an electric starter so it has to be kick started. I tried to start it but it would not fire. OK back to the basics. Fuel, check…… spark, a little weak but it should fire, attached battery charger, check……. air to carburetor, pulled air filter, …vacuum leak, carburetor seal, check …….. compression, seemed good. After a few more starting attempts the carburetor was pulled and the bowl had debris in the bottom. Did a rebuild and reinstalled it. Still it would not start. Ok maybe it was a choke problem. Tried full choke, half choke then quarter choke. Maybe it was flooded so opened the throttle wide open and continued to kick start. Then tried using starting fluid and it still wouldn't start. With all this kicking there wasn't any gasoline smell coming from the exhaust pipe. Pulled the spark plug and it was wet. It must be a timing issue. I then checked and adjusted the valves. They were way out of adjustment. After adjusting the valves to the correct specification, the motorcycle would still not fire. Now it was mid October and between the colder weather and the endless kicking of the motor, it was time to stop the project.

Part 3 - The Mechanicals

With the weather now turning colder and not having a heated workplace the motorcycle was just parked. During the next summer of 2018 no work was done on the motorcycle as I had another project. It sat in the corner unable to start, painted with the old epoxy paint and now collecting dust. In May of 2019 it was decided to start working on the project. I purchased a set of shop manuals it was now time to get the motorcycle running. Again tried starting but had a weak spark. The KLR250 has a magneto and some people say you do not need a battery to start or have it running. The problem is that my old battery was connected and it was dead. When trying to kick start the motorcycle, the power from the magneto during the kick was being divided. It was trying to give spark to the engine, charging a dead battery and light the headlight. The KLR250 has a full time daylight running headlight.

I purchased and installed a new battery and unplugged the headlight bulb. The headlight would remain disconnected until the starting issue was solved. With the new battery installed there was a nice blue spark at the plug while kick starting. But with a good spark it still wound not fire. During the starting procedure there wasn't any gas smell coming from the exhaust. The spark plug did show some gas but it was decided now to recheck the carburetor.

After pulling the carburetor the jets were found be clogged. The gas had not been drained from the carburetor bowl since a year and a half ago. It was now gummed and the ethanol gas had clogged the jets. At this point I opted for a rebuild kit. Once the carburetor was cleaned and rebuilt it would be one less item checked off of the starting issues. Cleaned, rebuilt and reinstalled the carburetor. Time to start… ignition - key on … run/kill switch – Run Position … Fuel Petcock – on …. Fuel flowing to the carburetor – check …. Choke in the full open left position – check …… now kick….and kick…and kick. No joy, thought maybe it was flooded, opened the throttle wide and kick…kick …. KICK …. and nothing. Got out the starting fluid and sprayed it directly into the air cleaner, kick, kick, and kick ….nothing. Time to take a break.

The bike never really smelled of any gas while trying to kick start. So it's back to the basics. Fuel – check, spark – check, timing? The valves had been adjusted when I first got the motorcycle and at that time they were way out of adjustment. The factory valve settings are supposed to be set at 0.009 inch. The two intake valves were set at 0.004 and 0.003 of an inch. This meant that the intake had not been getting fuel. My concern now was that if the motorcycle had been driven with these old valve settings, maybe the valves were bent. It's time for a compression check. The bike felt like it had good compression but needed to have it verified. My compression gauge had did not have the correct size deep adapter so I had to rent one. The rented unit also did not have the correct fitting. It's time to rethink. I decided to recheck my work from a year and a half ago. Pulled off seat, pulled radiator side panels plastic off, disconnected the fuel line, pulled off the gas tank, loosened top engine mount, removed top

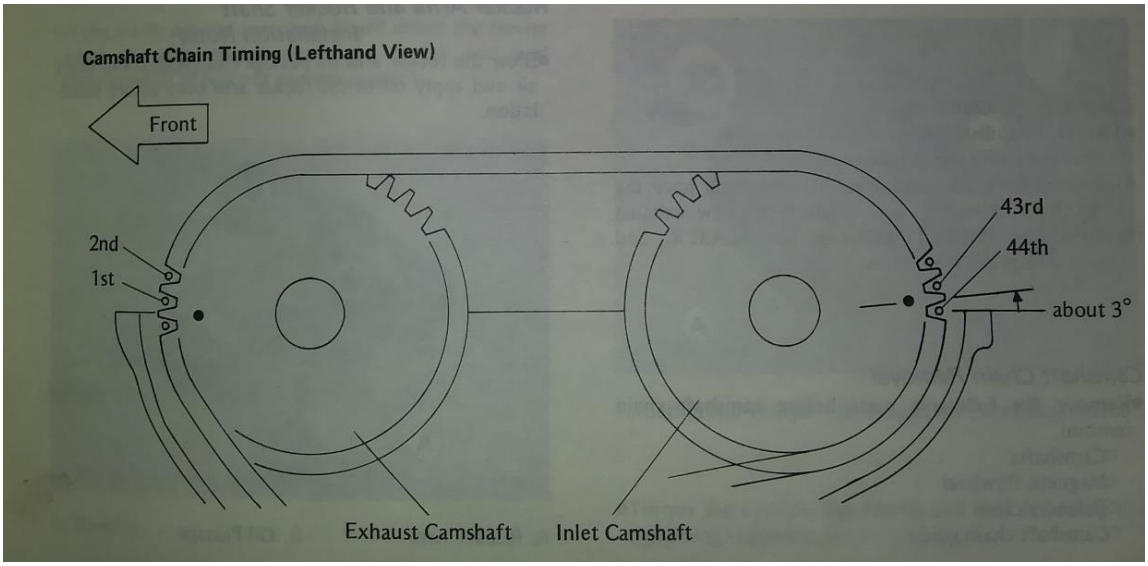
head cylinder bolts and wiggle off the valve cove out of the way… easy huh? Now removed inspection plugs for the crank and timing marks.

To check the timing you remove the valve cover and rotate the engine counter clock wise until the Top Dead Center (TDC) lazy T mark appears in the inspection window located in the lower part of the engine. Here is what the lazy T looks like.

With the engine at TDC the valve clearances were checked with the feeler gauge and all four intake and exhaust valves were still set at 0.009.

Here is a picture of the four valves with the feeler gauge inserted in one of the intake valves.

Now what? Time to pull out the service manual. The valves are to be adjusted with the piston at top dead center and cam sprockets dimples (dots) aligned at the 9 and 3 o'clock position.



Looking at the cam sprockets, the dimple marks were out of time about 30 degrees. So I removed cam shaft holding brackets and lifted out the intake camshaft. Then held the timing chain so it would not fall down into lower engine block. Now adjusted the cam sprockets to the correct position. It took three attempts to get this correct because as you tighten down on the sprocket shaft, it rotates the sprocket. This movement causes the timing mark dimple to shift and move. Once the dimples were set I counted the number of chain links. The manual states that the number of timing chain pin links should be 44. After re-assembling everything it was time to attempt to start the motor. On the fourth kick it popped, on the sixth kick it started. Now the fuel/air mixture jet and idle jet were adjusted. The engine sounded smooth after many years of being dormant.

Looking back there is a possible theory as to why the timing was that far out of adjustment. There are 3 timing marks on the stator (flywheel). A straight up and down "I" line mark, an "F" mark and a "lazy T mark". The "lazy T" mark is stamped at ninety degrees. I think the first mark "I" is a line to let you know that you are getting near the timing marks. The "F" mark is for ignition fire and the lazy "T" is for top dead center. Maybe when someone tried to adjust the valves they used that first line which is about 30 degrees prior to TDC. They tried starting the motor and it would not start. So they decided to adjust the cam sprockets to match this line mark. Another possibility is that the lazy "T" mark was on its side and it wasn't recognized as the traditional TDC mark.

With the motorcycle now running it's time to check the clutch, transmission and brakes. I started the motorcycle, pulled in the clutch and popped it into 1st gear. The motorcycle jumped

and stalled with the clutch lever fully pulled in. Started the motorcycle again, same problem. Now the clutch cable and the connection at the engine were checked. Everything appeared normal. Stared it again and now the problem went away. It happened again on the next cold start a few days later. The reason this happened was because the KLR250 uses the same engine oil supply for both the engine and tranmission. This is called a wet clutch. The clutch plates in the basket were sticking after years of sitting and just needed lubrication. I changed the oil and filter again because the oil had changed to a dark color. This color change in the oil was from the stuck clutch plates. After changing the oil, the bike shifted smoothly through all six gears.

I rode it for about ten minutes but the temperature gauge on the front panel did not move. Checking the cylinder head temperature sensor, the electrical tab on the sensor broke off in my fingers. Replaced it with a new sensor and now after a short ride the temperature gauge needle just touched the red mark. The motorcycle had an overheating problem. I shut it down and a couple of minutes later the needle went into the red and cooling fan turned on. These motorcycles are water cooled and the system consists of two radiators, a water pump, cooling fan, two temperature sensors and a thermostat. The radiator sensor sending unit was removed and it showed some corrosion build up so it was replaced it with a new one.

Here is a photo of the old sensor.

It still ran hot so I checked the radiator with the cap off and there wasn't any water movement. This lack of movement could mean a stuck thermostat in the closed position, a faulty water pump, a bad impeller or air in the system. I could have pulled the thermostat and tested it by putting it in water but on a 19 year part it was decided just to replace it. With the new thermostat installed the motorcycle cools normally.

With this done it was time to tackle the seat height issue. The KLR250 seat height is 33.7 inches which is 1.3 inches lower than the taller klr650. The smaller bike is still tall but it is one hundred pounds lighter and has a lower center of gravity. This makes the motorcycle more manageable when it is stopped. In order to make the motorcycle more user friendly I opted to install a set of 2” lowering links.

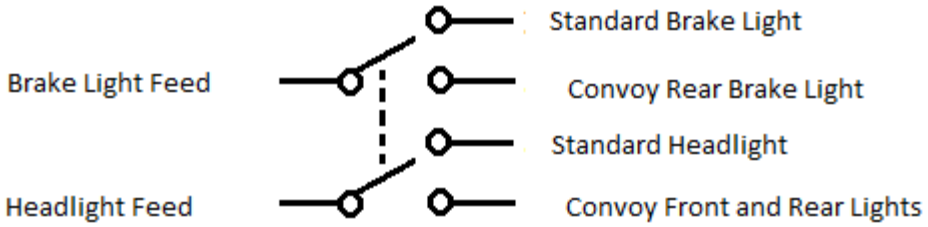
The black painted link is the original and the green is the new longer lowering link.

These links work by lowering the shock mount closer to the ground. When you install lowering links you need to also shorten the front fork length. This is done by loosening the triple fork clamps and then sliding the forks up until the bike is level. These modifications made the motorcycle comfortable. Then the rear shock spring was loosened which helped by letting the motorcycle drop while weight applied on the seat. The motorcycle is still not a flat footed bike like a Harley Davidson but it is very rideable.

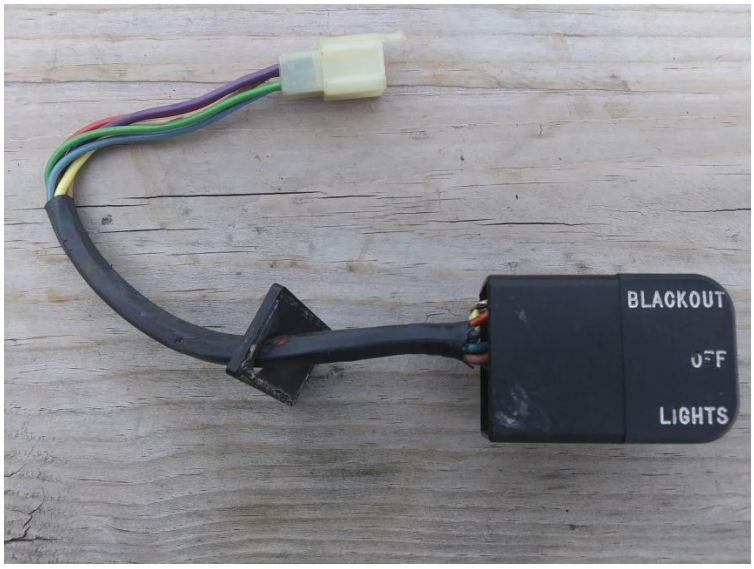
With the motorcycle now lowered, the kick stand was too long. So one and a quarter inches were cut off the bottom of the stand. The base plate piece was then ground flat and was re-welded it to the bottom of the stand leg.

Part 4 - Electrical

With the motorcycle now starting, shifting and braking it was time to start restoring the electrical system. First step was to go through the convoy light wiring. Hayes modified the electrical wiring on the M1030's for the installation of the military blackout driving and stop lights. This was done by using a three position double throw double pole, center off toggle switch (DPST). This switch was then connected to both the front and rear blackout convoy lights. Hayes cut the original Kawasaki wiring loom open in several spots. Then added extra wires for the convoy lights and control switch. Here is a wiring diagram of the convoy light control switch.



Hayes used specially made switch housing that was zipped tied for the convoy lights.

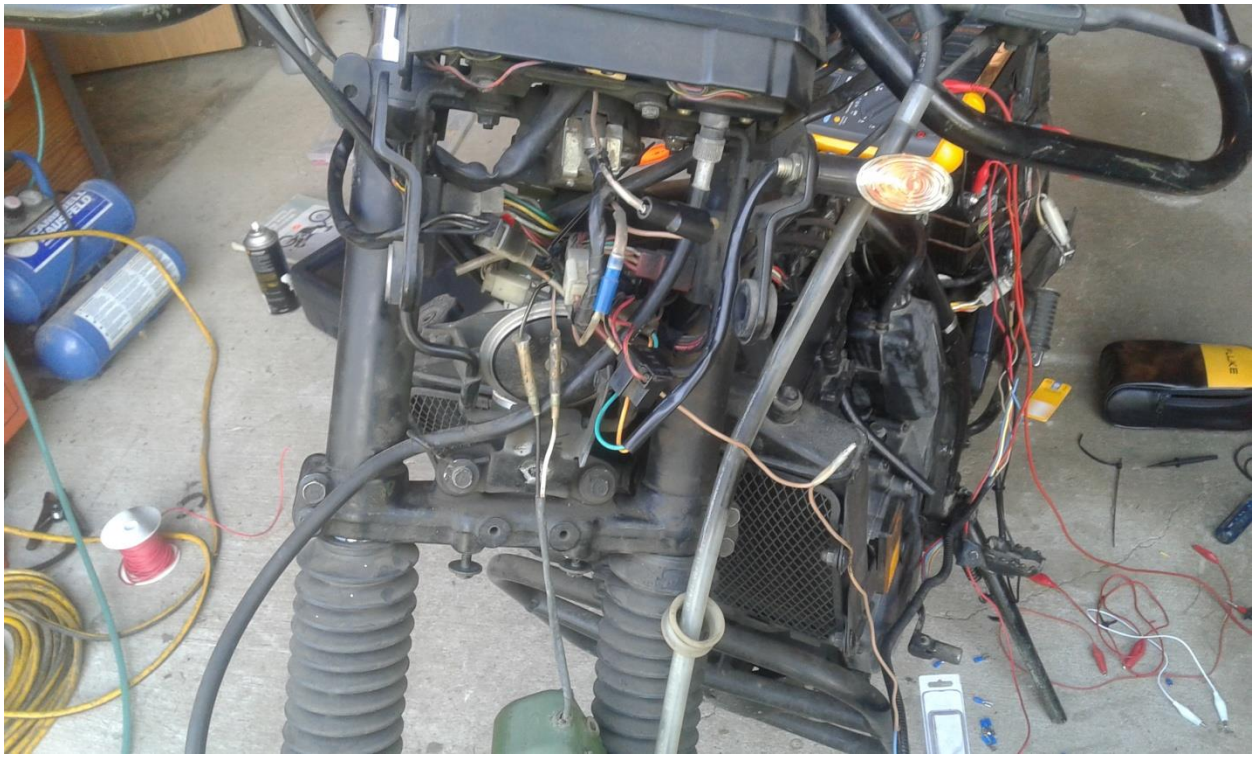


Here is a photo of the blackout control switch from a donor M1030B1 motorcycle.

When the motorcycle was purchased from California it was missing both the front and rear blackout convoy lights along with the toggle operating switch. Convoy lights and control switch are impossible to find because they are made of that rare element Unitanium (sic). Luckily I had a couple of spare M1030B1's that I could raid for this project. The M1030B1 has the same small convoy lights and control switch as the late model M1030 so they were a match.

Looking at the maze of cut wires, connectors and spices it was discovered that the CHP had cut the Hayes wiring. There were many spliced wires, disconnected connectors and cut wires. The brake light, parking and high beam lights along with the turn signals didn't work. But the horn did work, yippy.

The procedure was started by cutting and removing anything that looked suspicious. I got thrown for a loop as there were added spice and crimp connectors. The shop manual electrical diagram became a must. After tracing the wires I found the following problems. The front stop light lever micro switch had 12 volts feeding from both sides of the switch. The tail light wire inside the light socket was bad.



The negative wire at the battery terminal was nearly broken off inside the connector. After replacing the front turn signals they would not flash. The reason was that the flasher unit needs the resistance of multiple bulbs to activate the flasher. After installing the rear turn signals the blinkers worked. Some connectors where plugged together that should not have been connected. This accounted for the problem of having power to both sides of the front brake switch. Now I added the extra wires with new crimp connectors and multi pin connector plugs for the convoy lights. The used blackout toggle switch was corroded so it was replaced with a new DPDT switch and a protective rubber cap. The wires were soldered to the switch and then assembled and sealed using black silicone. Then a new 6 pin connector was installed.

The new loom was taped, and zip tied to the appropriate locations. This completed the wiring aspect of the project.

Part 5 - Paint

With the wiring completed the next step was paint. As I had mentioned early, the motorcycle had been painted using black and white imron epoxy paint. In the 1992 model year, the Kawasaki colors consisted of a silver frame with a white gas tank, radiator side panels and both fenders. The side covers were molded green and paint with a white accent. I started by removing, disassembling, bagging and labeling all the small parts off the motorcycle. This is a pretty straight forward procedure. Once all the fasteners and parts had been removed they were inspected for any damage. Each small part was inspected, cleaned and re-bagged. The larger components needed to have the paint stripped off of them. Hayes did not remove the engine, front forks or swing arm so they were left in place. The motorcycle has low miles and I was not concerned about the bearing grease at this time. Those components still felt lubricated and there was no play or wiggle. With most of the parts removed the engine was prepped and painted.

Here is a photograph of the painted engine. Notice the shiny black imron paint to the left of the frame.

With the engine painted the next step was to strip the paint off the frame, swing arm, sub frame, wheels, plastic parts, fenders and gas tank. The stripping of the plastic parts took about 12 hours and a variety of stripping products were used. The plastic parts stripped included the fenders, side covers, radiator panels, front cowling and the gas tank. The removal of the paint

was a slow process. It took repeated applications being careful not to damage or melt the plastic parts.

Plastic parts stripped waiting for primer and paint.

While stripping the white paint off the gas tank the USMC markings were found.

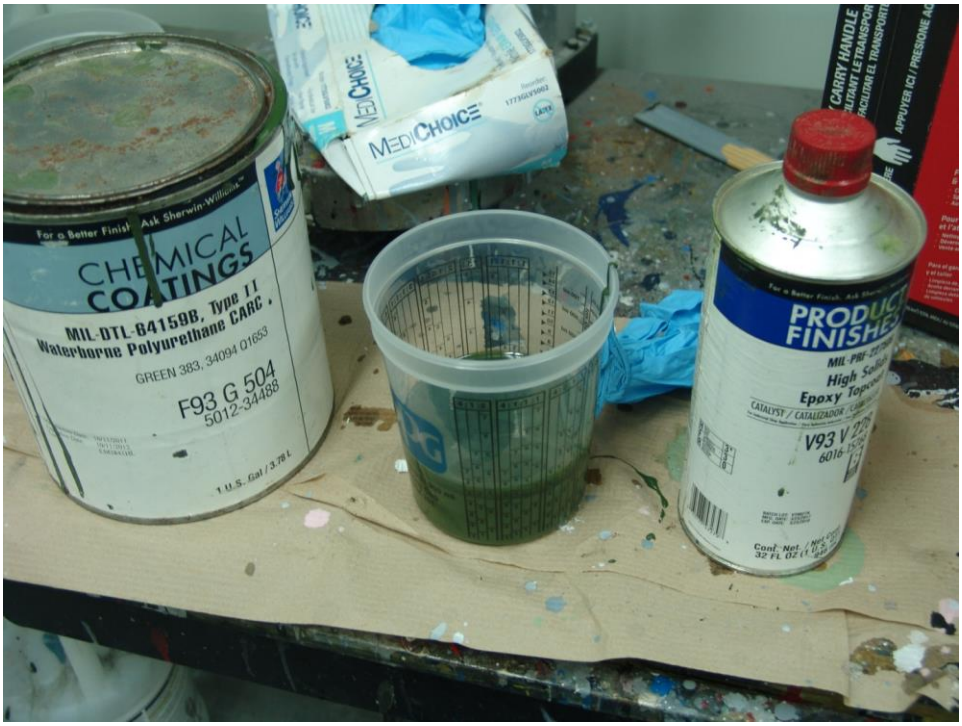
The markings are “1342” and “22nd MEU”. The 22nd MEU stencil indicates the USMC 22nd Marine Expeditionary Unit and I believe the number “1343” is the vehicle number. After stripping the paint from the plastic gas tank it had a dull green finish from UV damage. It was filled with water and a heat gun was used to carefully re-melt the plastic. After the plastic cooled it returned to close of the original shade of green.

Hayes changed out the fuel tanks on the later M1030’s to a larger capacity plastic fuel tank. The Kawasaki stock fuel tank was made of steel and held 2.9 gallons. Hayes purchased their plastic polyethylene fuel tanks from a company who specializes in motorcycle racing plastic fuel tanks. That company is called IMS Products and the replacement fuel tank is rated at 3.2 gallons.

With all the parts stripped of paint it was now time to prep and mask.

All surfaces were stripped, sanded and now primed.

Next step was the mixing of the CARC base and epoxy hardener. The CARC and epoxy activator were manufactured by the Sherwin Williams Company. They are a military supplier of CARC.



Now the easy part, spaying color onto the parts.

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Painting the main assembly

With the painting potion of the project completed, the parts were set aside for reassembly.

Part 6 - Reassembly

The first items to replace were the dry rotted tires and rusted drive chain. A set of new Dunlop D606 tires were fitted and a new chain installed.

Now the radiators, hoses, carburetor, carburetor cable and choke, air box, clutch cable and engine guards were installed. The front fender, brake caliper and speedometer cable were attached. With that done the front electrical connections were buttoned up, installed front headlight housing, blackout light and front turn signals.

The rear sub assembly installed and work being done on the rear electrical and brake switch.

All the bolts and screws were coated using blue lock tight thread sealant. This will prevent the fasteners from vibrating loose. There are several grades of thread locker with the “blue” being able to loosen using hand tools.

The front buffalo handlebar guard, rear taillight assembly, turn signals and wiring.

Part 7 - Completion

With a majority of the parts assembled the finishing touches were completed. These items included the goggle pouch, gas tank, side covers, seat and rear foot pegs.

Tire pressure, fuel warning and unit marking stencils were applied using oil board stencils. The USMC and front headlight cover markings were vinyl decals. The gas tank warning stencil is MOGAS ONLY. MOGAS is the military term for motorized gasoline. Motorized gas is just regular gasoline. In the future I may modify the headlight to a ranger double headlight and IR light. Other options may include a rifle rack and larger rear carrier.

The restoration was done as a motor pool level restoration it took just over two months to complete. The work was performed working an average of 3-10 hours a week. The motorcycle is easy to ride and now my quest for a military motorcycle is completed. For now…….


1343
22ND MEU
USMC


USMC

Data Plate

Front Black Out Driving Light

Rear Convoy Rear Light and Brake Light (Above License Plate Mount) and Rear Carrier

Front Goggle Ponch

Black Out Toggle Switch


USMC


USMC