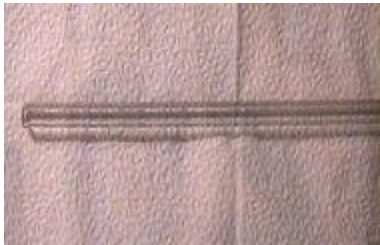


HOW TO MAKE 'ANGLE EYES' SIDE LIGHTS

ANGEL EYES? WHAT IS THAT? 'ANGEL EYES' IS A COOL HEADLIGHT FEATURE FOUND ON THE (2001+) BMW 5 SERIES. THE PROJECTOR HEADLAMP UNIT ON THE BMW 5 SERIES HAS A PAIR OF CIRCULAR-SHAPE RINGS THAT WHEN LIGHT UP, THEY PRODUCE A PAIR OF HALOS. BMW CALLS THEM 'ANGEL EYES'. THEY ARE ALSO REFERRED TO AS 'DEMON EYES'. THEY LOOK VERY NICE ON THE BMW 5 SERIES. THEY DON'T SERVE ANY PURPOSE OTHER THAN FOR THE NICE AND AGGRESSIVE LOOK, AND TO DISTINGUISH THE NEWER BMW 5 SERIES FROM OTHER BMW MODELS AT NIGHT.

CREATING A CUSTOM ANGEL EYE

INSTEAD OF A ROUND GLASS ROD USED BY BMW, I USED A CLEAR ACRYLIC ROD. I BOUGHT IT FOR £2.99 AT A DIY STORE, SUCH AS B&Q OR YOUR LOCAL BLIND & CURTAIN SHOP. THE ROD IS ACTUALLY MADE FOR YOUR WINDOW BLIND TO OPEN/CLOSE THE BLIND WHEN YOU TURN IT LEFT/RIGHT. IT IS ABOUT 3 FEET LONG, AND YOU CAN CREATE 2 TO 3 ANGEL EYES DEPENDING ON HOW BIG YOUR RING IS. THE ROD HAS A HEX-SHAPE STRUCTURE, NOT A ROUND SHAPE LIKE THE BMW, BUT IT WILL DO JUST FINE.



THE FIRST THING I DID WAS TO CREATE A CIRCULAR RING OUT OF IT. I MEASURED THE DIAMETER OF MY HIGH-BEAM PROJECTOR HOUSING, WHICH COMES OUT TO BE 4" LONG (OR 2" RADIUS). USING THE CIRCULAR FORMULA ($C=2\pi R$, WHERE $\pi=3.14$), YOU'LL HAVE TO CUT YOUR ROD ABOUT 12.5 INCHES LONG. I SUGGEST CUTTING IT 15" LONG, AND USE THE EXTRA INCHES AS HANDLES TO HELP IN THE MOULDING PROCESS.

NEXT, I FIND AN ALUMINIUM CAN OR JAR THAT HAS THE SAME DIAMETER AS THE RING OR CLOSE TO IT (I USED A PEANUT JAR). AFTER HEATING THE ROD IN THE OVEN FOR ABOUT 5-7 MINUTES AT 300°F, I HELD THE TWO ENDS OF THE ROD WITH A PAIR OF PLIERS, AND WRAPPED THE ROD AROUND THE GLASS JAR WITH ONE END CROSSING OVER THE OTHER END. THE FLEXIBLE ROD WILL HARDEN WITHIN A MINUTE. SO, YOU MAY HAVE TO REPEAT THIS STEP 1 MORE TIME TO MOULD IT INTO A PERFECT CIRCULAR RING. ONCE DONE, YOU CAN USE A DREMEL TOOL TO CUT THE EXTRA HANDLES THAT WERE USED DURING THE MOULDINGS PROCESS. YOU WILL END UP WITH ONE END ABOVE THE OTHER, AS SHOWN. DON'T WORRY, JUST SIMPLY PUT IT BACK IN THE OVEN ONE LAST TIME AND ALLOW THE END TO SOFTEN AND FLATTEN.



TO TEST OUT HOW IT LIGHTS UP, I PUT A SMALL HALOGEN BULB BETWEEN THE OPEN ENDS OF THE RING. "WAIT A MINUTE HERE, YOUNG MAN. IT DOESN'T LOOK LIKE 'ANGEL EYE'. NO HALO RING EFFECT."

YES, I KNOW. THAT IS BECAUSE LIGHT GOES IN STRAIGHT LINE, AND IT TAKES THE SHAPE OF WHATEVER OBJECT IT GOES THROUGH. IN THE CASE ABOVE, IT GOES THROUGH ONE END OF THE ROD AND OUT THE OTHER END, LIKE A FIBRE OPTIC CABLE. IN ORDER TO MAKE IT LIGHTS UP LIKE THE TRUE 'ANGEL EYE', I

HAD TO REFRACT THE LIGHT AS IT GOES THROUGH THE ROD BY MAKING MULTIPLE CUTS (SCRATCHES) ALONG THE ROD. I USED A DREMEL TOOL TO CREATE CUTS ALONG THE ROD. IF YOU DON'T HAVE A DREMEL TOOL, YOU CAN USE A SMALL SAW OR A BUTTER KNIFE. IT WILL TAKE YOU LONGER THOUGH.



CUTS ALONG THE BACK-SIDE OF THE ROD



HEX-SHAPE.

ON THE FRONT SIDE, THE CUTS ARE MULTIPLIED BY THE



MINUTES.

WITH A DREMEL TOOL, YOU CAN CREATE THE CUTS IN 3-5



FULL VIEW OF ANGEL EYE ROD.

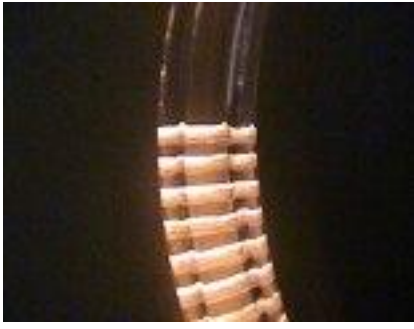
HERE ARE SOME SHOTS OF MY 'EAGLE EYES' AFTER CREATING THE CUTS (SCRATCH LINES) ALONG THE RING.



ANGEL EYE WITH SOME FOREGROUND LIGHT.



THE HALO RING EFFECT IS MORE NOTICEABLE AT NIGHT.



CLOSEUP SHOT OF LIGHT BEING REFRACTED THROUGH THE CUTS ALONG THE ROD.

INSTEAD OF USING HALOGEN LIGHT, I USED LED LIGHT FOR MY ANGEL EYE. HALOGEN BULB IS NOT ONLY VERY HOT AND INEFFICIENT, IT DOESN'T LAST VERY LONG. I DON'T WANT TO OPEN UP MY HEADLIGHT UNIT TO REPLACE THE BULB EVERY TIME IT BURNS OUT. LED IS A GREAT ALTERNATIVE. IT IS VERY VERY EFFICIENT, LASTS VERY VERY LONG, AND PRODUCES VERY LITTLE HEAT. THEY COST FROM AROUND £1.00 TO £3.99 EACH AT YOUR LOCAL MAPLINS. NOTE THAT LED BULBS ARE NOT LIKE ANY OTHER HALOGEN BULBS WHERE YOU CAN JUST CONNECT POSITIVE AND NEGATIVE WIRES TO THEM TO LIGHT THEM UP. YOU MUST USE A RESISTOR ON THE POSITIVE LEAD. THE PURPOSE OF THE RESISTOR IS TO LIMIT/RESIST HIGH CURRENT GOING THROUGH THE LED BULBS. LED BULBS REQUIRE ONLY A SMALL AMOUNT OF CURRENT TO LIGHT UP. HENCE THE EFFICIENCY. RESISTORS SHOULD COST FROM £0.50 TO £1.99 FOR A SET OF 5.



A WHITE LED BULB.



A 1100 VS A 2000 MCL LED BULBS.



A RESISTOR OF 220 OHMS.



RESISTOR CONNECTED TO POSITIVE LEAD.

LED LIGHT COMES IN MANY DIFFERENT COLOUR, RED, BLUE, ORANGE, YELLOW, GREEN, AND WHITE. RED IS REALLY NICE AND WILL DEFINITELY MAKE YOUR CAR STAND OUT, BUT I USED WHITE LED TO BE COMPLIANCE WITH STATE LAWS. THEY EVEN COME IN MULTI-BLINKING COLOURS TOO, AND I THINK COPS LOVE THEM. THEY'LL BE HAPPY TO TURN ON THEIR VERSION OF MULTI-BLINKING COLOUR LIGHT.



ANGEL EYE WITH YELLOW LED.



ANGEL EYE WITH BLUE LED.



ANGEL EYE WITH RED LED.



ANGEL EYE WITH WHITE LED.

AFTER TESTING THEM OUT, IT WAS TIME FOR ME TO PUT THEM INTO MY HID PROJECTOR HEADLIGHT UNIT. FIRST, I HAD TO OPEN APART MY HEADLIGHT UNIT. HEATING IT IN A COOKING OVEN FOR ABOUT 10-15 MINUTES AT 350°F OR UNTIL THE GLUE LOOSEN DOES THIS. I HAD TO REMOVE ANY ACCESS COMPONENTS THAT MAY MELT, INCLUDING MY 8000K-HID BULB AND ANY ATTACHED WIRES. BE VERY CAREFUL WHEN SEPARATING YOUR PROJECTOR UNIT BECAUSE THE GLUE WILL STICK TO ANYTHING IT CAN GET A HOLD OF. THINK OF HOT MELTED CHEESE ON A SLICE OF PIZZA WHEN YOU PULL IT APART.

HERE'S MY RECOMMENDATION: AS YOU PULL APART THE FRONT COVER FROM THE HEADLIGHT UNIT, CUT/TRIM THE CHEESY WEB-LIKE GLUE. REMEMBER, PULL A LITTLE AND THEN TRIM A LITTLE, AND REPEAT THIS STEP. TAKE YOUR TIME AND DO IT SLOWLY. YOU HAVE ABOUT 20 MINUTES BEFORE THE GLUE HARDEN. PLENTY OF TIME. AS YOU TRIM, THE GLUE WILL RETRACT, AND YOU CAN REUSE THE GLUE LATER WHEN RE-ATTACHING THE HEADLIGHT BACK TOGETHER.

TO SECURE THE LED BULBS INTO MY ANGEL EYE RING, I DRILLED A HOLE IN BOTH ENDS OF THE RING. I USED TWO WHITE LED BULBS AND PAIRED THEM TOGETHER. WITH A RESISTOR AND WIRES SOLDERED TO THE LED BULBS, I INSERTED THE BULBS INSIDE THE HOLES OF THE RING. I WRAPPED BLACK ELECTRIC TAPE AROUND IT TO HIDE TO LED BULBS. I RAN THE WIRES THROUGH THE WATER DRAINAGE OPENING ON THE HEADLIGHT UNIT. I THEN GLUED THE RINGS TO THE OUTER FRAME OF MY HIGH-BEAM HOUSING, USING CLEAR SILICON ADHESIVE. I APPLIED ONLY A SMALL AMOUNT OF GLUE TO THE UN-SCRATCH/UN-CUT PART OF THE RING.



TWO LED BULBS PARALLEL PAIRED.



LED BULBS SOLDERED & THEN GLUED TOGETHER.



RESISTOR CAN BE CONNECTED AT END OF WIRES.

NEXT, IT WAS TIME FOR ME TO RE-ATTACH THE FRONT COVER BACK ONTO THE HEADLIGHT UNIT, USING THE SAME GLUE. JUST REHEAT THEM IN THE OVEN UNTIL THE GLUE MELT AGAIN AND RE-ATTACH THE TWO PARTS TOGETHER. REMEMBER TO APPLY PRESSURE TO GET AN AIRTIGHT HOLD. I HAD TO SIT ON IT TO GET THIS DONE. FINALLY, I PUT THE HEADLIGHT UNIT BACK ONTO MY CAR, AND CONNECTED THE WIRES TO MY SIDELIGHTS. *(PLEASE NOTE ALL CARS ARE DIFFERENT SO IF IN DOUBT, GET SOMEONE ELSE TO DO IT!!!)*



HIGH-BEAM HOUSING WITHOUT ANGEL EYE.



HIGH-BEAM HOUSING WITH ANGEL EYE.



ANGEL EYE AT WORK WITH HALOGEN BULB.



CLOSE-UP SHOT.

AND THAT'S ALL THERE IS TO IT!!!

I AM NOT RESPONSIBLE FOR ANY WORK THAT YOU PERFORM ON YOUR CAR, I AM NOT A QUALIFIED TECHNICIAN OR MECHANIC, THIS IS JUST HOW I WOULD PERSONALLY APPROACH DOING THIS ON MY CAR. PLEASE UNDERSTAND THAT ATTEMPTING THIS IS AT YOUR OWN RISK IF SOMETHING GOES WRONG.