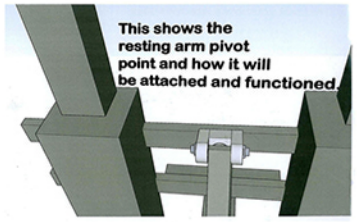
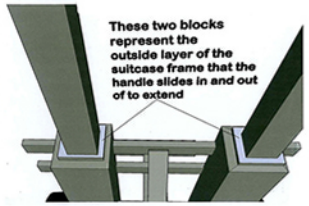
1

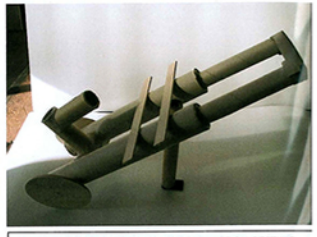
I would like to find a material that is fairly cost effective so I am able to spend a little more on things like better quality wheels. However my stakeholder has agreed that she is willing to pay a little over budget to get the required quality.
I want material that will be fairly light as well as strong. It will need to be able to be powder coated to make it weatherproof.
In consultation with my dad (an engineer), I have decided to use EWS light guage square steel tubing for most of my project as it is easier to weld than aluminium. And it will also cost less. One of my possible suppliers also confirmed this and helped me determine sizes.
My mum does most of her massaging on the beach. Because steel and iron corrodes with salt water (see my research below), I will need to paint it with rust proof paint.

2

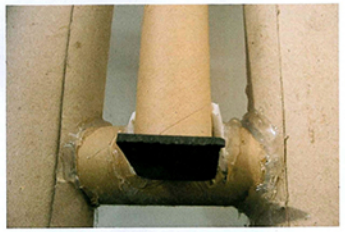




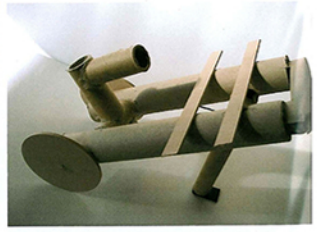
THE RESTING ARM WILL SWIVELL ON A BAR THAT WILL ACT AS THE PIVOT POINT.



WIDE SHOT OF THE PRODUCT IN FULL USE ON RESTING ARM AND THE CARRIER EWTENDED.



THE TWO WHITE PIECES OF PERSPECTS REPRESENT THE CLIP THAT THE RESTING ARM WILL CLIP INTO WHEN NOT IN USE.



WIDE SHOT OF THE CARRIER WITH THE ARM NOT EXTENDED AND IN ITS SMALLEST FORM.

When I cut out the shell, I found that the inside extendable arm was too weak and breakable to fit inside. I will now make my own stronger device.
I cut out all the materials and made sure they could slide without being too sloppy.
I was able to lathe the 19mm tube to fit tightly inside my wheel fitting (after a few tries where I made it too thin).
I cut out and lathed my handle to size but after welding the handle in place I found out that I had drawn the 2 bars too close to each other and they were no longer able to fit inside the casing. After 2 days the problem was solved and the handle is now perfectly in place.
I will now design a system that will stop the extension from coming all the way out.

Are there any changes you would like made to the model before I order materials and begin manufacturing? Yes - I see that you built the support leg facing up. I want it across to suit different sized tables. Also I think one support bar should be sufficient instead of the two shown - will cut down on materials and look aesthetically better.
I have placed two stub axels on either side for the wheels. Will this be alright or would you like one long axle? This is good as one day I may need to take off the wheels and I couldn't do that with a long axle. With the two stub axels I just need to unscrew a nut to take the wheels off.
I notice that when seen to scale, the holder where the massage table sits is too long and sticks out too much. I think it should be halved to cut down on size restrictions and it will still be strong enough to hold the massage table.

Planning Guide

AFTER ANOTHER CONSULTATION WITH STEEL AND TUBE AS WELL AS MY STAKEHOLDER WE HAVE COME TO AN AGREEMENT THAT I WILL USE TWO PIECES OF 700mm IN LENGTH, 25.4mm IN WIDTH AND 12.7mm IN DEPTH EWR RECTANGULAR TUBE. AS WELL AS ONE PIECES OF 130mm IN LENGTH, 25.4mm IN WIDTH AND 12.7mm IN DEPTH AND ALSO TWO PIECES OF 130mm IN LENGTH, 51mm IN WIDTH AND 25.4mm IN DEPTH.

EVALUATION OF THIS ACTION: I WAS ABLE TO COMPLETE THE ORDERING OF MY MATERIALS AND THEY WERE DELIVERED ON MONDAY (WHEELS ON TUESDAY). I WAS ABLE TO CUT OUT THE SHELL HOWEVER I FOUND THAT THE INSIDE EXTENDABLE ARM IS TOO WEAK AND BREAKABLE TO FIT INSIDE DUE TO THIS COMPLICATION I WILL NOW SIMPLY MAKE MY OWN STRONGER DEVICE.

WHERE TO FROM HERE: NOW THAT I HAVE CONSULTED WITH MY STAKEHOLDER ABOUT MAKING MY OWN EXTENDABLE SHE SAID THAT SHE COULDN'T HAVE A WEAK PRODUCT DUE TO THAT I GOT THE GO AHEAD I WILL NOW ADD THIS TO A REVISED BRIEF AND START ON THE MANUFACTURE OF MY NEW EXTENDABLE ARM.

ACTION THAT I PLAN TO DO: THIS WEEK I PLAN TO START THE MANUFACTURE OF MY RETRACTABLE HANDLE. I PLAN TO CUT OUT THE SUITABLE LENGTHS FOR MY ARM. I THEN WILL CUT TWO PIECES OF 19mm SOLID STEEL PIPE AND PLUD WELD IT INTO THE SQUARE TUBE. I WILL THEN DRILL A HOLE THROUGH THE STEEL TUBE AND HALF WAY THROUGH THE SOLID PIPE ASWELL AS THE OUTSIDE CASES. I WILL PLACE A SMALL BALL BEARING INSIDE THAT WHEN I PULL THE HANDLE OUT THE BALL BEARING WILL SLIP INTO THE HOLE AND LOCK INTO PLACE.
RESOURCES/SPECIAL REQUIREMENTS THAT I REQUIRE: I WILL NEED TO ENSURE AGAIN THAT I HAVE ALL OF THE MACHINES SUCH AS THE M.I.G AND DRILL PRESS. I WILL ALSO NEED TO BE ABLE TO GET TWO SPRINGS AND BALL BEARINGS.

ESTIMATED TIME: I BELIEVE THAT WHOLE PROCESS OF MAKING THIS RETRACTABLE HANLD SHOULD TAKE ME AROUND A WEEK AND A HALF DUE TO THE COMPLEXITY OF THE SYSTEM.

EVALUATION OF THIS ACTION: I WAS ABLE TO START THE RETRACTABLE HANDLE. I CUT OUT ALL OF THE SUITED MATERIALS AND MADE SURE THAT TEY COULD SLID WITHOUT BEING TO SLOPPY. I CUT OUT TWO PIECES OF 40mm SOLID TUBE AND PLUG WELDED IT INTO MY INSIDE CASE. HOWEVER I WAS NOT ABLE TO GET TO BAY ENGINEERING TO PICK UP THE SPRING AND BALL BEARINGS TO FINISH THE HANDLE.

WHERE TO FROM HERE: I WILL GO DOWN TO BAY ENGIEERING AND PICK UP THE SPRINGS AND BALL BEARINGS ASWELL AS TWO CIRCLIPS FOR MY STUB AXELS TO HOLD ON MY WHEELS. UNTILL I GO TO BAY ENGINEERING I WILL MAKE TWO STUB AXELS FROM A 19mm PIECE OF STEEL TUBE. THAT I WILL LAITH TO 12.87mm TO FIT THROUGH THE BALL BEARING THAT WILL HAVE A SLEEVE AND THREAD AT EACH END TO BE BOLTED ON.

3

EVALUATION OF THIS ACTION: I WAS ABLE TO GET EVERYTHING I NEEDED FROM STEEL AND TUBE FOR MY PROJECT. DUE TO THE LAITHE EING USED, I FINISHED THE RETRACABLE HANDLE SO THAT BOTH BALL BEARING LOCK INTO PLACE AS THEY HIT THE HOLES. WITH THE LAITHE BEING FREED UP, I WAS ABLE TO LAITHE THE 19mm TUBE TO FIT TIGHTLY INSIDE MY WHEEL FITTING (AFTER A FEW TRIES MAKING IT TO THIN) AND ALSO LAITHE ONE SIDE DOWN TO 8mm FOR THE THREAD TO BE DONE. I WAS ALSO ABLE TO GET THE SUPPORT BAR WELDED ON.

WHERE TO FROM HERE: I WILL NOW USE THE HAND THREAD TOOL TO PUT A 24mm THREAD ON THE STUB AXELS. I WILL ALSO WELD TOGEATHER THE DEVICE FOR THE MASSAGE TABLE TO SIT ON AND WELD IT ONTO MY PRODUCT. LASTLY I WILL MAKE A HANDLE OUT OF 16mm ROUND TUBE.

RESOURCES/SPECIAL REQUIREMENTS THAT I REQUIRE: I WILL NEED TO ENSURE THAT I HAVE ACCESS TO A 8mm THREAD TOOL. I WILL ALSO NEED TO MAKE SURE THAT I HAVE THE HELP OF THE TEACHER TO BE ABLE TO ASSIST ME IN MAKING A TOOL FOR THE CIRCLIP RUTS. I WILL ALSO NEED TO HAVE ACCESS TO VARIOUS OTHER MACHINES SUCH AS THE MITER SAW, M.I.G WELDER AND LAITHE.

ESTIMATED TIME: ONE TO ONE-AND-A-HALF WEEKS

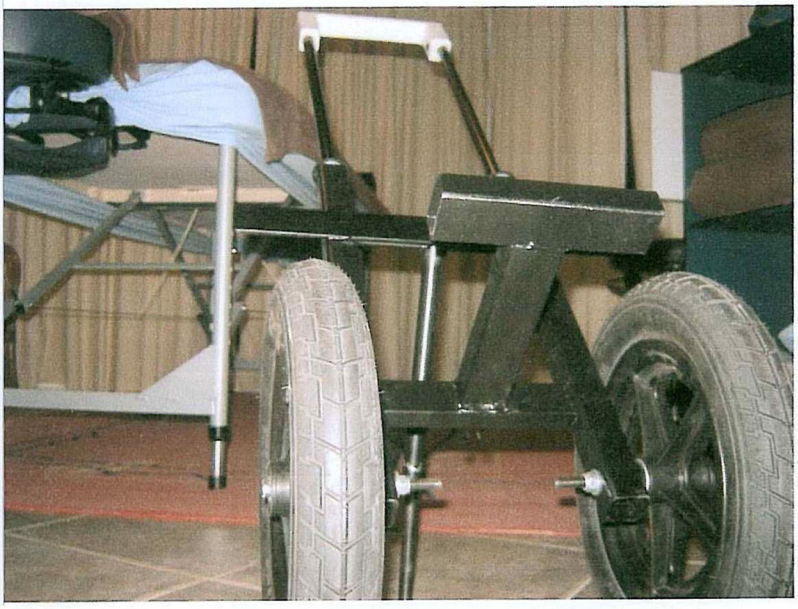
EVALUATION OF THIS ACTION: I WAS ABLE TO COMPLETE BOTH THE THREADS AND MAKE THE TOOL AND LAITHEING THE CIRCLIP RUTS ON THE STUB AXELS, I WAS ALSO ABLE TO FIND 8mm NUTS THAT I USED TO ATTACH THE WHEELS TO THE FRAME. I WAS ABLE TO WELD ON THE RESTER ON WHICH THE MASSAGE TABLE SITS. LASTLY I WAS ABLE TO CUT OUT AND LAITHE MY HANDLE TO SIZE BUT AFTER WELDING THE HANDLE IN PLACE I FOUND OUT THAT I DREW THE INSIDE BARS TO CLOSE TO EACHOTHER AND THEY WERE NO LONGER ABLE FIT INSIDE OF THE CASEING. AFTER ANOTHER TWO DAYS THE PROBLEM WAS RESOLVED AND THE HANDLE IS NOW PERFECTLY IN PLACE.

WHERE TO FROM HERE: I NOW HAVE THE SCHOOL HOLIDAYS, HOWEVER A DAY HAS BEEN ORGANISED WHERE WE ARE ABLE TO COME INTO CLASS AND FINISH OFF OR GET FURTHER AHEAD IN OUR PROJECTS, I WILL BE USING THIS OPPORTUNITY TO COME IN AND MAKE THE RESTING ARM THAT THE PROJECT WILL SIT ON WHEN IT IS NOT IN USE. I WILL DRILL A 400mm PIECE OF ALUMINIUM PIPE TOAND SLIDE IT ON A 160mm IN LENGTH,6mm IN DIAMMETER STEEL PIPE THAT I WILL THEN WILD TO MY PRODUCT. TO ENSURE THAT THE ARM IS FREE TO ROTATE I WILL PUT A WASHER AND DRILL A HOLE FOR A SPLIT PIN ON EITHER SIDE. I WILL THEN RIVET A CLIP FOR THE RESTING ARM TO CLIP INTO WHEN NOT IN USE.

EVALUATION OF THIS ACTION: I WAS ABLE TO COMPLETE THE RESTING ARM AND IT SEEMED TO WORK PERFECTLY, HOWEVER I FORGOT TO GET THE CLIP TO RIVET ON SO I MADE A TRIP TO MITER 10 MEGA WHERE I NOT ONLY GOT THE CLIP BUT ALSO SOME SPRAY PAINT AS I WOULD HAVE EXTRA TIME. WHEN I GOT BACK RIVETED THE CLIP ON AND THE ARM CLIPPED IN AND OUT OF IT VERY WELL. I WAS THEN ABLE TO GIVE MY PRODUCT ITS FIRST TWO COATS OF BLACK PAINT AND LEAVE IT UNTILL I GOT BACK FROM HOLIDAYS.

WHERE TO FROM HERE: I WILL NOW GO BACK TO MY FOLDERS AND CHANGE OR ADD ANYTHING THAT NEEDS TO BE DONE. WHEN I GET BACK FROM HOLIDAYS I WILL GIVE MY PRODUCT ANOTHER 2 COATS OF PAINT AND THEN SPRAY PAINT IN BLUE THE COMPANY NAME AND LOGO. I WILL ALSO NEED TO RETURN TO BAY ENGINEERING BECAUSE I LOST A BALL BEARING.

Material	Quantity	Length	Width	Depth	Wall Thickness	Code	Price
EWR rectangular Tube	2x	700mm	25.4mm	16mm	1.6mm	3181616R	$40.00(5.5m)
EWR rectangular Tube	1x	142mm	25.4mm	16mm	1.6mm	3181616R	
EWR rectangular Tube	2x	240mm	38mm	25.4	1.6mm	3825416R	$60.00(5.5m)
Steel Plate	2x	500mm	30mm		3mm	12122(mm)P	$85.00(per sheet)
Steel Plate	1x	40mm	40mm		3mm	12122(mm)P	
EWR Round Tube	1x	600mm	16mm OD		1.2mm	1612T	$20.009(5.5m)
Wheels	2x	200mm Diameter	25mm tread width	Ball Bearing		GC200BB	$44.00 Total



THE CARRIER AT FULL EXTENSION WITH HANDLE UP AND THE RESTING ARM EXTENDED.

4