

# **Assembly Instructions**

## **Mobile Crane Arm for 3 or 4 Axle Truck**

***By Retunga***

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## 2: Few Notes

**BEFORE YOU BEGIN:**

Look at the Assembly pictures if available. They show how to put the model together in the order that works best. Assembly should take at least twice as long as you think. If you build it faster (you can) you're rushing the build and your model will look better if you slow down. It always does. The best thing to do is read these instructions first then start building the model.

**SUPPLIES NEEDED:**

Sheets of cardstock ISO A4 (297mmx210mm) (>80 g/mm. bond) -- may be labelled as cover weight, cover stock, Cardstock, etc. It is readily available at any office supply store, and it runs through your computer printer without issue, however you should check your printer settings as it probably has a 'thick paper type' that will work better.

Sturdy ruler, Craft knife (e.g. X-Acto® or equivalent) and/or scissors, I prefer the break-away blade box cutter style. You always should work with a sharp blade.

White PVA glue, and use it very sparingly!!!! Always apply glue to paper with a toothpick or unrolled paper clip, never directly from the bottle.

Markers to colour the edges of your model. I use a grey mostly but you can colour match. Any extra tools to roll and form paper is also useful.

Please refer to the list of tools that should be a part of any paper modelling, in this model one may not use all of the tools shown in the tools document as a separate document with photos of the tools in question.

**NOTES:**

Avoid cutting out parts before you're ready to assemble that particular portion of the model -- whole sheets are harder to lose than little tiny parts.

Score along folding lines before cutting out shapes. To score parts run your craft knife VERY LIGHTLY over the line to be scored, one can also use scoring tools to help with a more consistent mark.

Cut out inner shapes (like the pass through holes for the solar array arms) before cutting the outer edge.

Remember there is no rush to complete the model you are the only one that can set the pace and how good you want the model to turn out.

**PRINTING AND GENERAL INSTRUCTIONS:**

Print out the model parts on cardstock.

Keep everything at the same scale, i.e., print at 100%, it is not recommended to print as 'shrink to fit' or the parts won't go together correctly.

Make sure the cardstock is compatible with your printer -- office supply stores may have several different types, depending on whether you are using a laser or inkjet printer.

If the printer won't accept the cardstock (paper jams or other mishaps during printing), print on regular paper and glue to cardstock or very thin cardboard -- spray glue is ideal for this, as other types may not hold correctly, and might cause the paper to buckle.

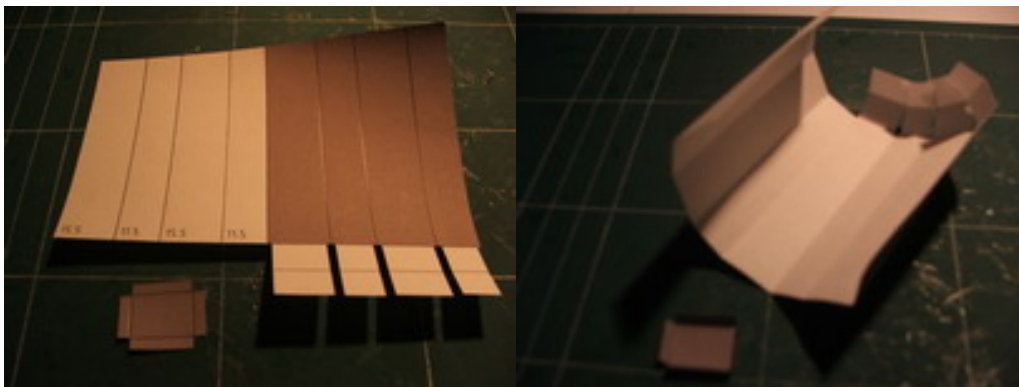
Score along all folding lines (centre of panels, interior lines on tabs, etc.)

Have fun with the model! Don't be afraid to try building the shape. In the worst case, you'll have to reprint the sheet and try again!

**SAFETY!!!!**

Be sure you're working with sharp knives, dull knives are unpredictable; Work on a flat, stable surface, and keep body parts out of the way of the knife!

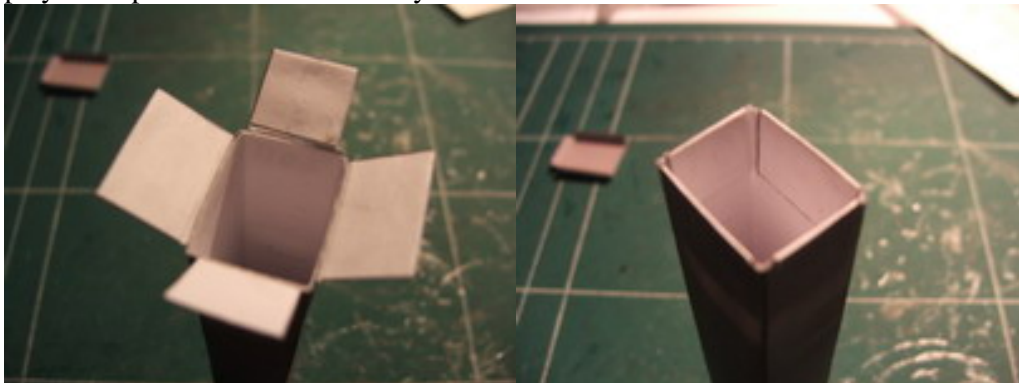
### 3: Rear Support Arms



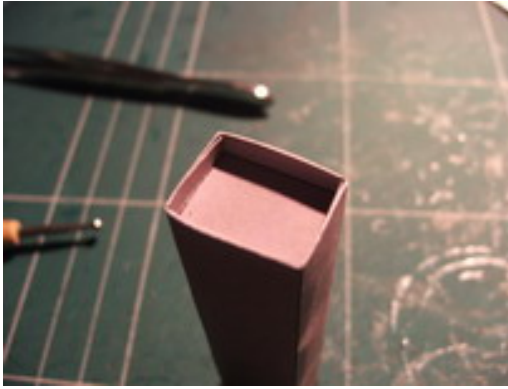
Cut and fold items 12 and 13 as above.



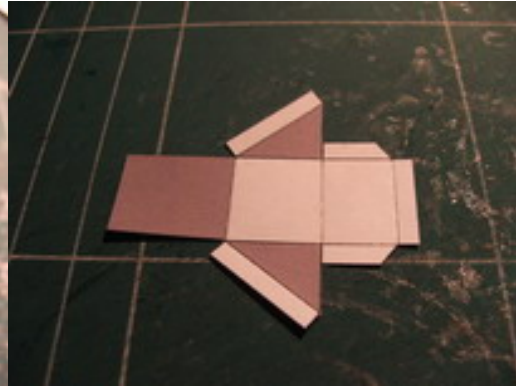
Glue item 12 as above, make sure that the part is very square and straight as this will play an important later in assembly.



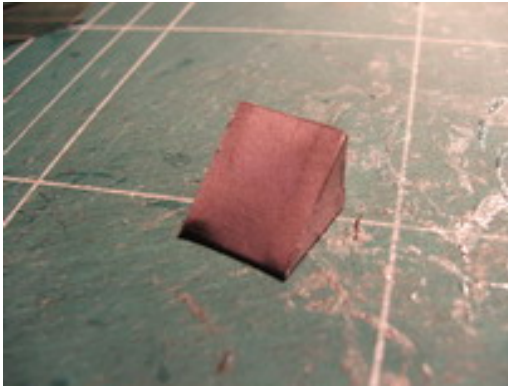
Glue the tags as above and then place and glue inside the tube.



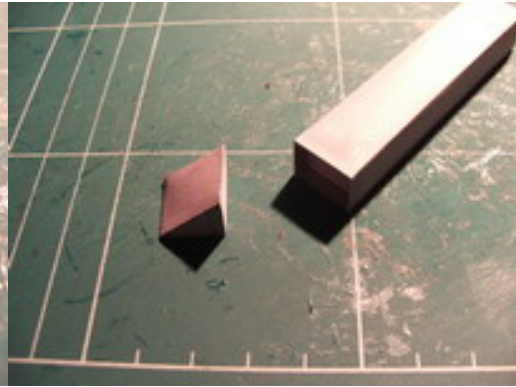
Glue Item 13 above.



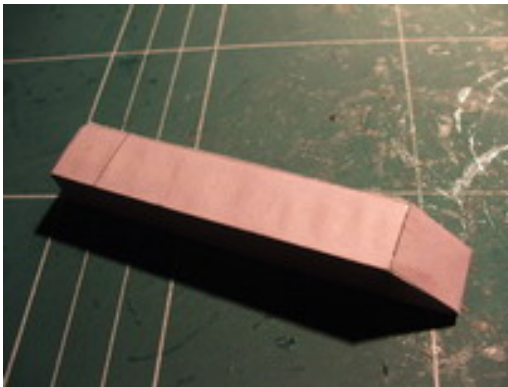
Cut and fold item 109.



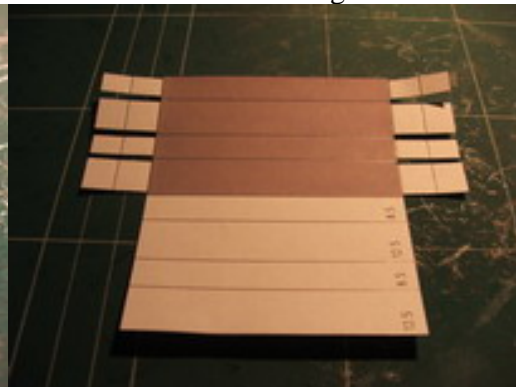
Glue item 109 as above.



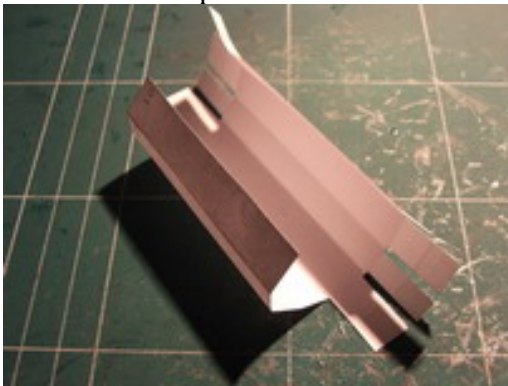
Glue item 12 and 109 together.



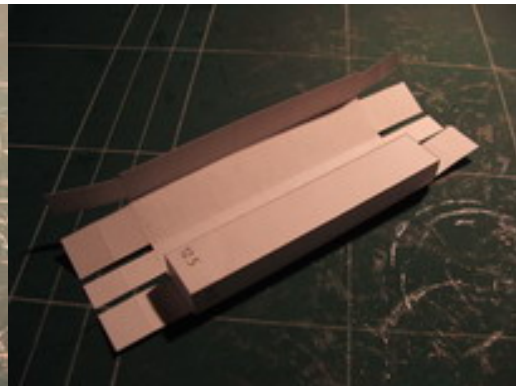
Be sure that the part is flush all round.



Cut item 14 as above.

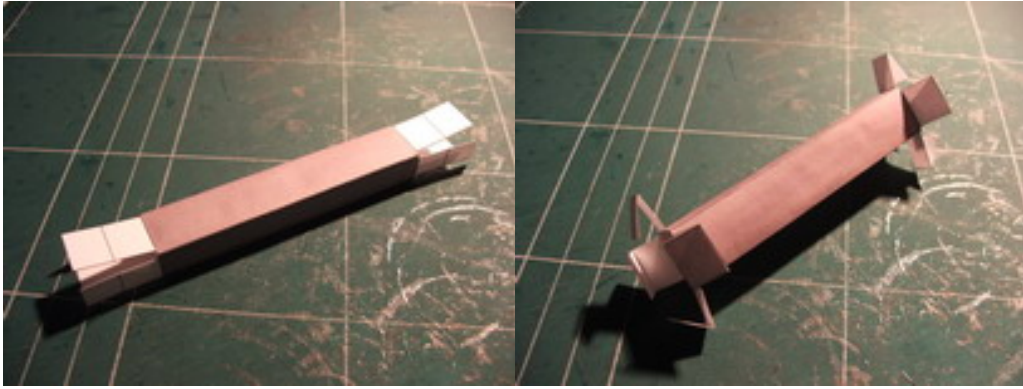


Fold Item 14 as above.

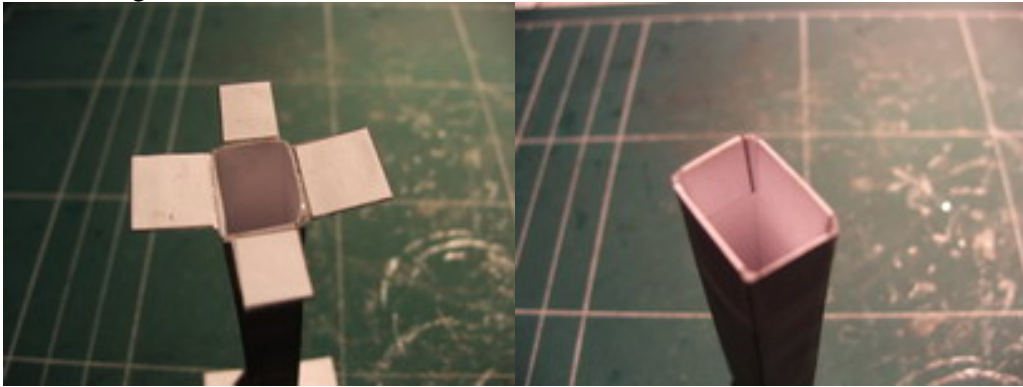


Glue item 14 as above again make sure it is square all round.



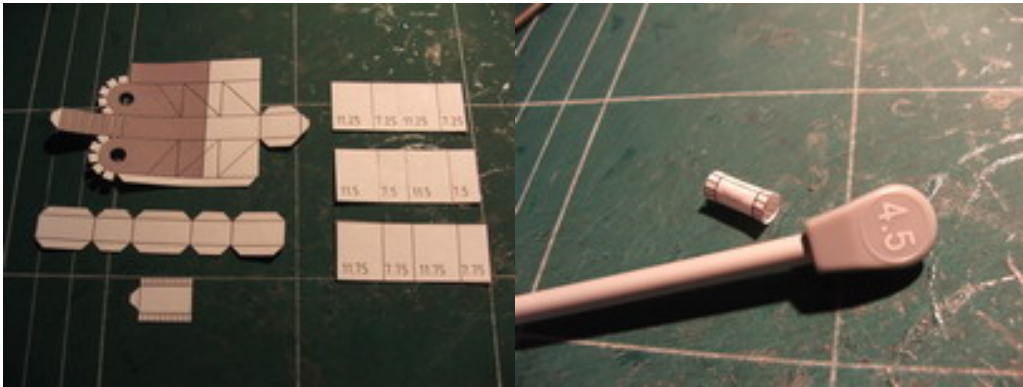


Fold the tags as above.



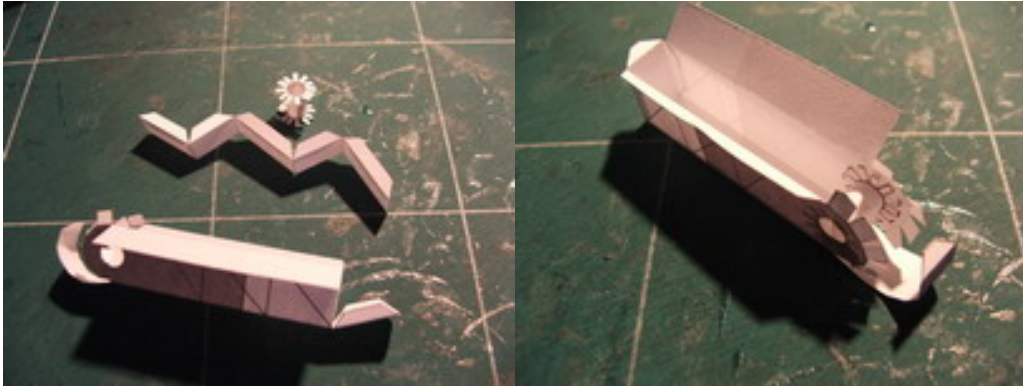
Glue the all 8 tags as above.

On the one side space the tags inside the tube, then glue other 4 tags on the outside of the tub.



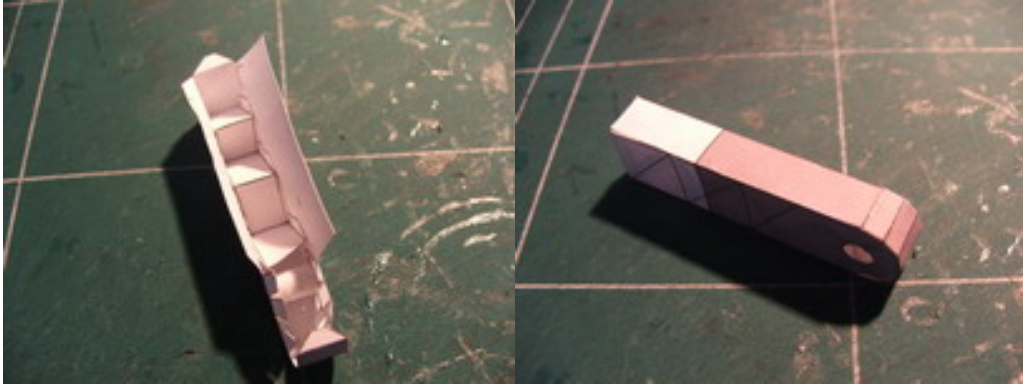
Cut items 15, 16, 17, 18, 19 and 20.

Roll and glue item 16 as above with a 4.5mm needle.

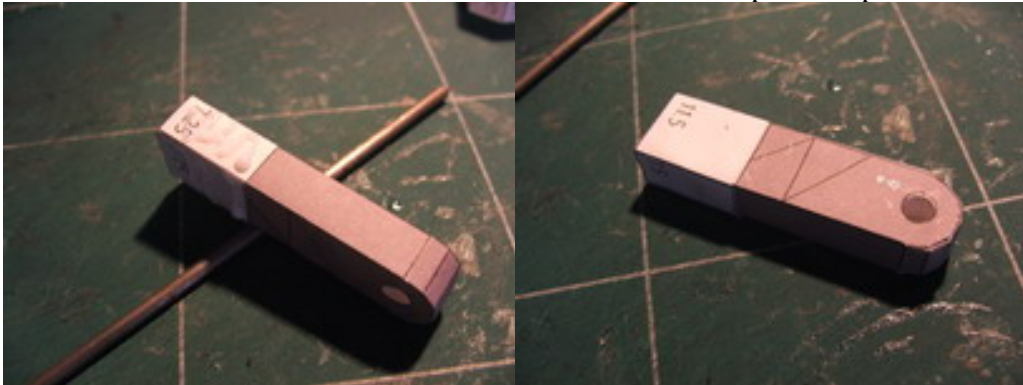


Bend and fold items 15, 20 as above.

Glue items 16 and 15 together as shown.

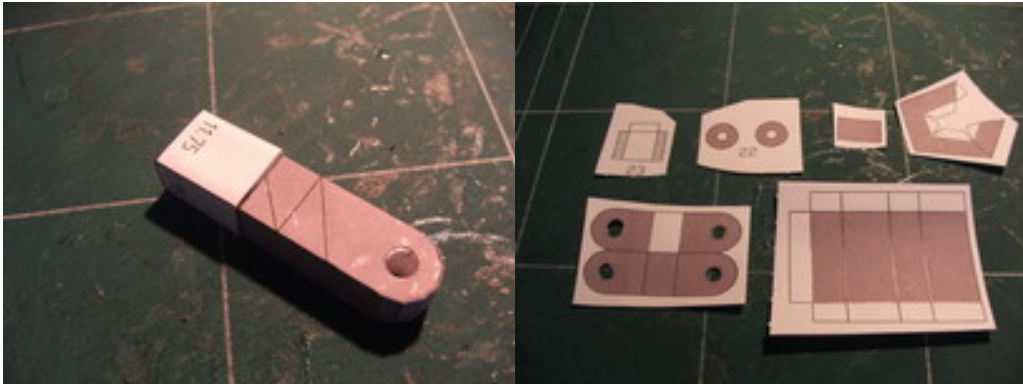


Glue item 20 into item 15 as above, then close item 15 to complete the part.



Glue item 17 onto item 15 as above.

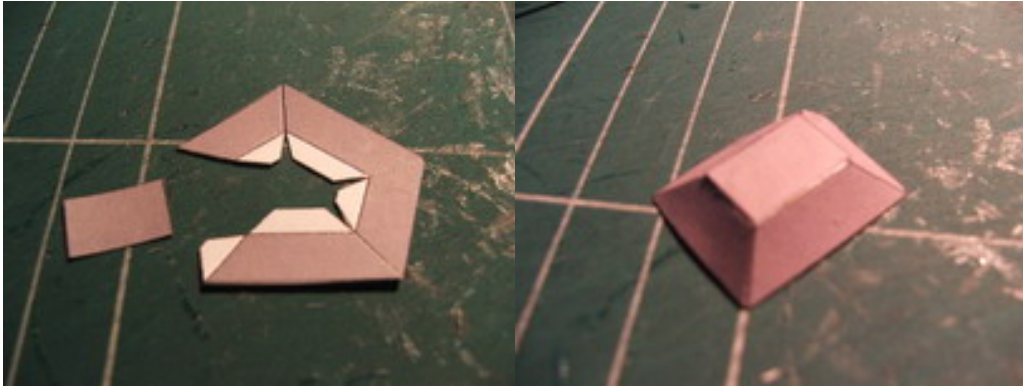
Glue 18 as above.



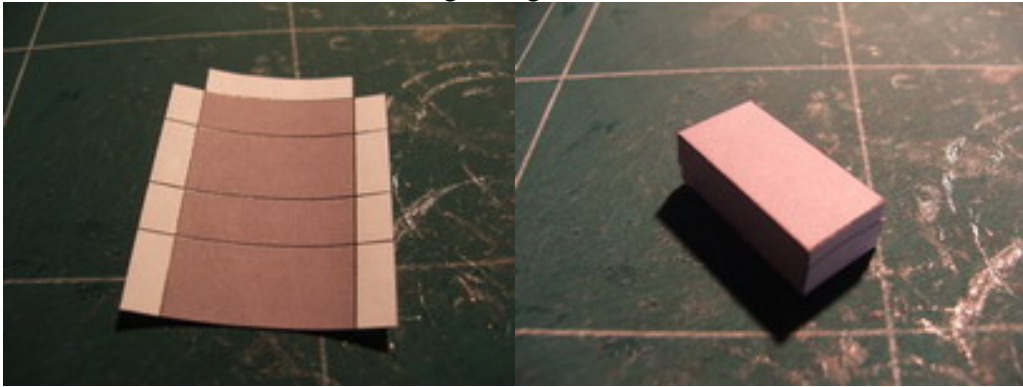
Glue item 19 above.

Cut items 21, 22, 23, 24, 25, and 26 out.

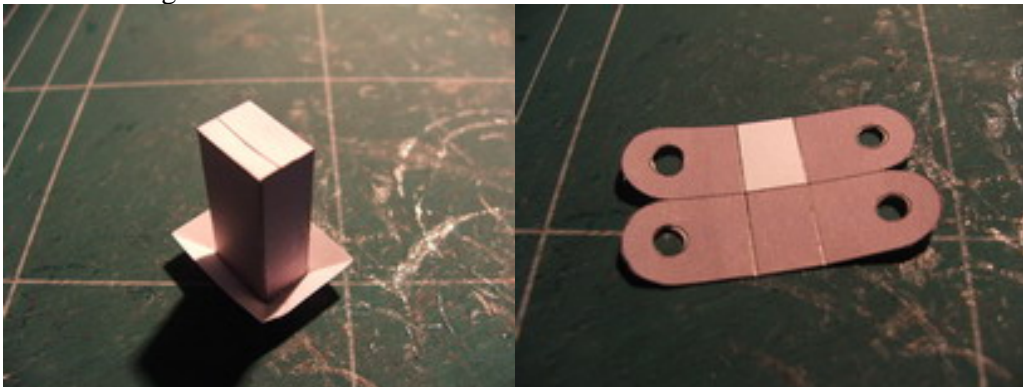




Trim items 25 and 26 and fold, then glue together as above.

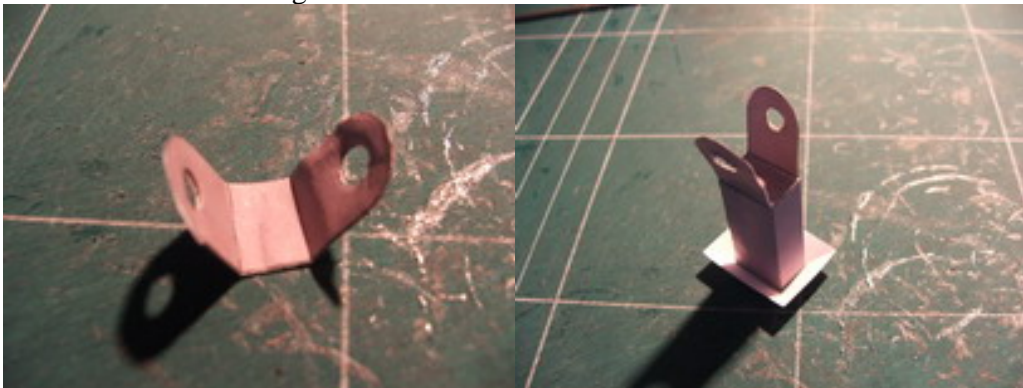


Cut fold and glue item 21 as above.



Glue items 25 and 21 together.

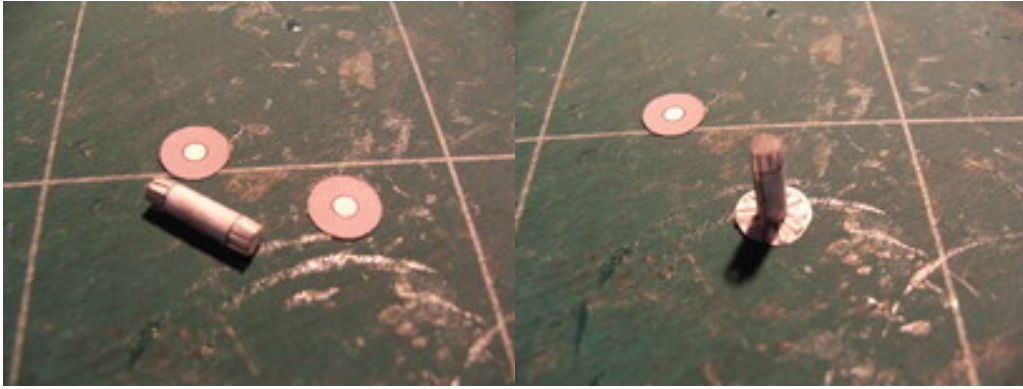
Cut and fold item 24 as shown.



Glue item 24 as above.

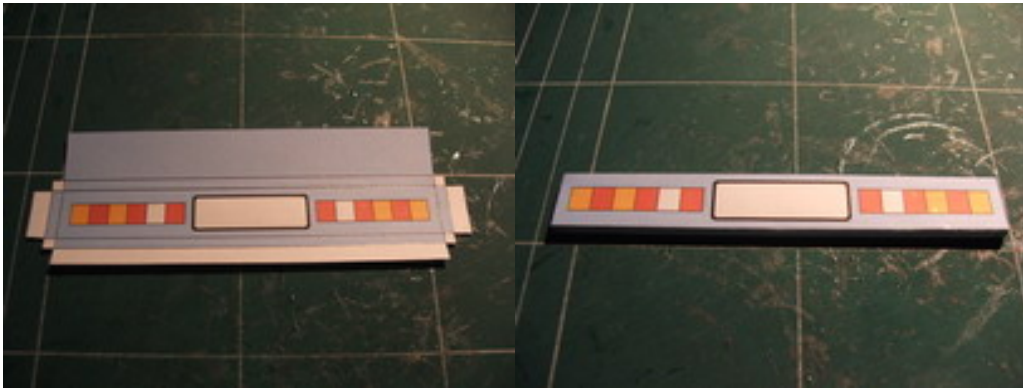
Glue item 24 to item 21 as shown.





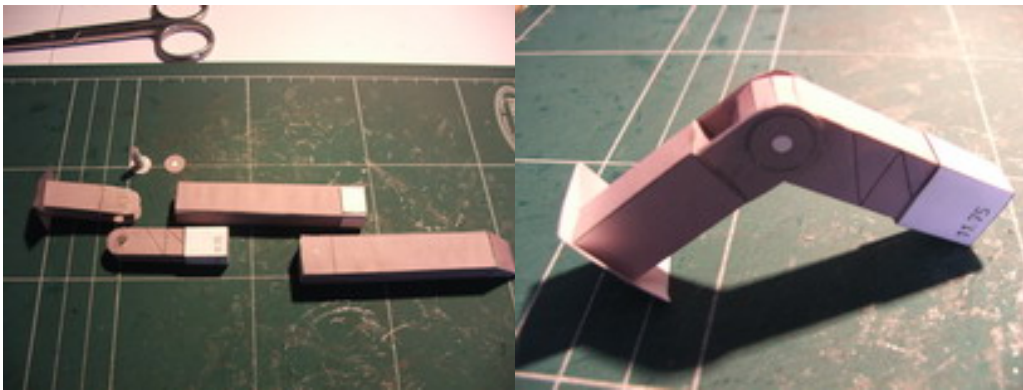
Cut as roll item 23 around a 3.5mm needle.

glue the one item 22 to item 23 as above.



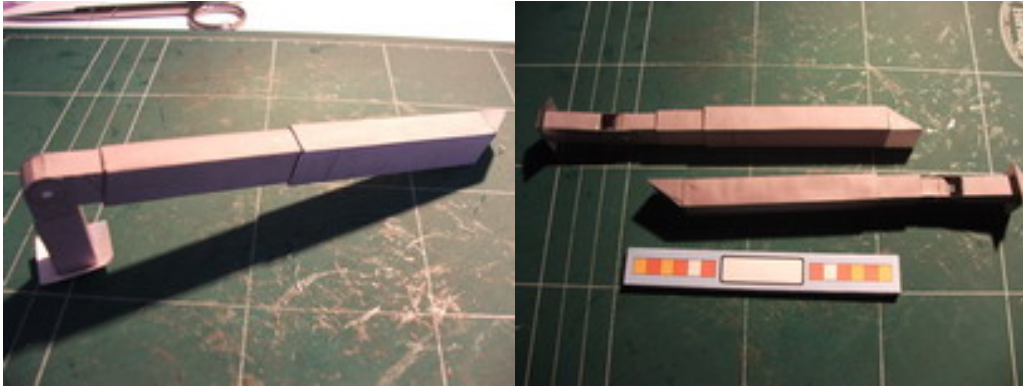
Cut, fold and glue item 54 as above.

#### 4: Rear Assembly

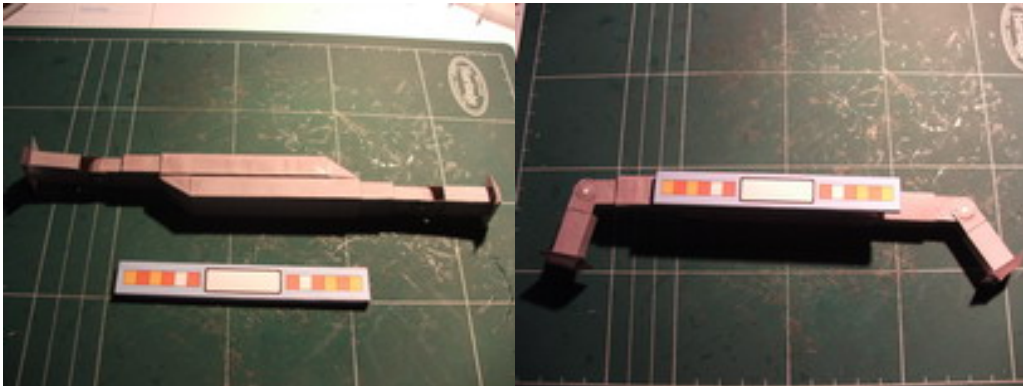


For the assembly of the arms two full sets are required.

attach items 21, 15 together using pin 23, Sure the glue is on the outside of pin 23 as to ensure the part moves freely.

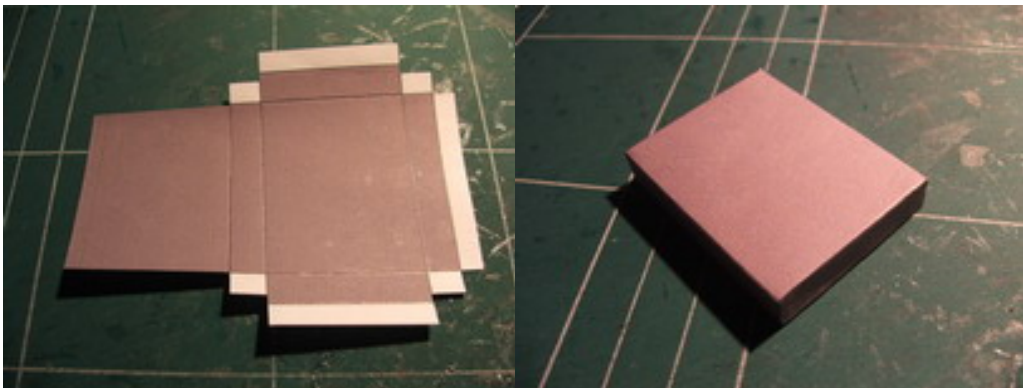


Clip items 12, 14 and 15 into one another. Line up the arm complete arm and item 54 as shown.

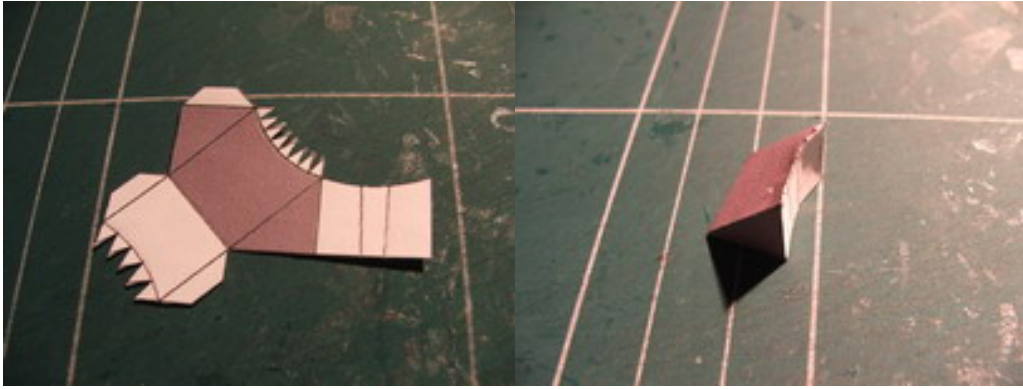


Glue the two arms together with the triangle Glue item 54 in the middle of the arm  
Parts been level with the outer of each tube assembly as above.  
as above.

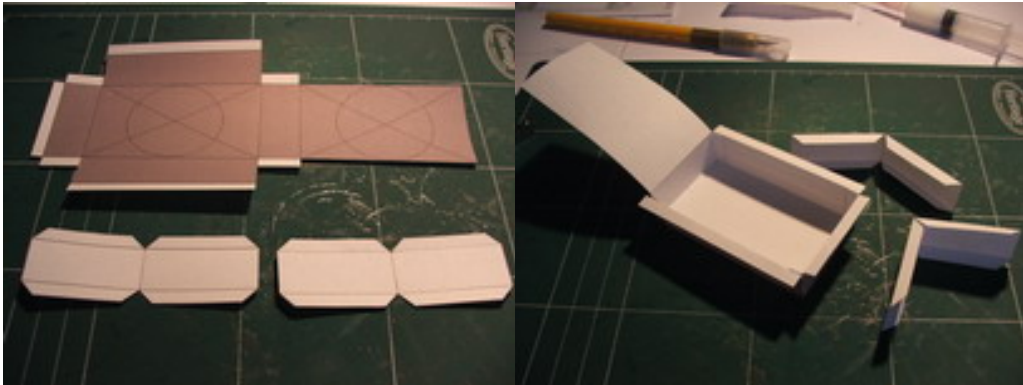
### 5: Swivel



Cut fold and bend item 45 as above.

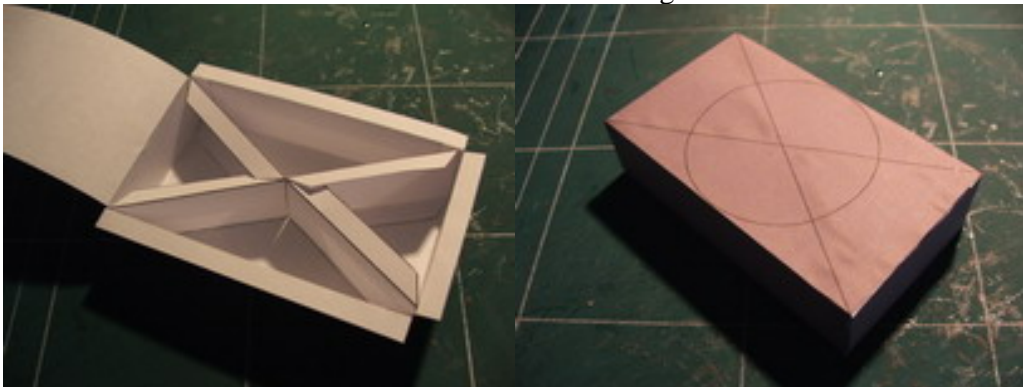


Cut, Fold and bend item 11 as above.



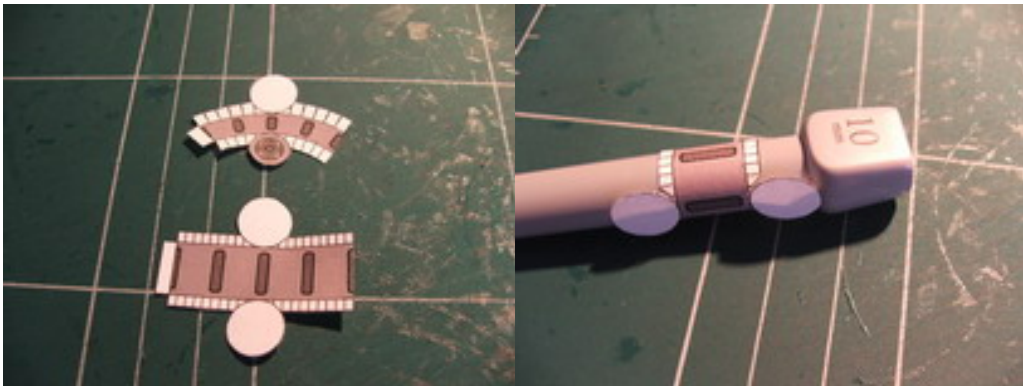
Cut items 43 and 44 and above.

Fold and glue item 43 and bend items 44



Glue items 44 into item 43.

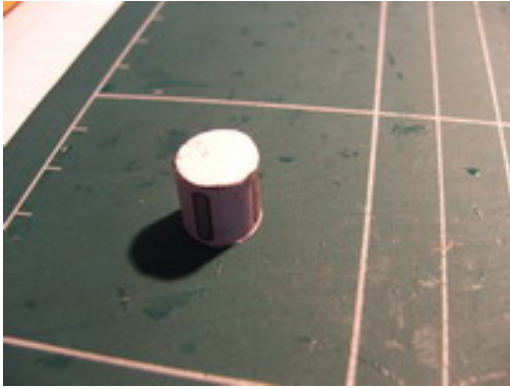
Glue closed item 43.



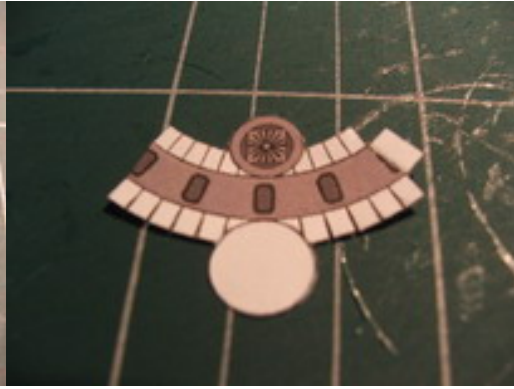
Cut items 103 and 104 as shown.

Roll and glue item 103 around a 10mm needle.

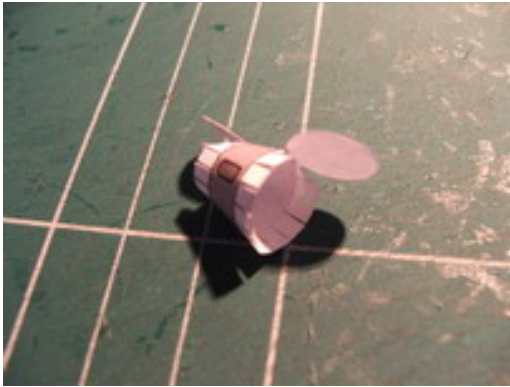




Glue closed item 103.



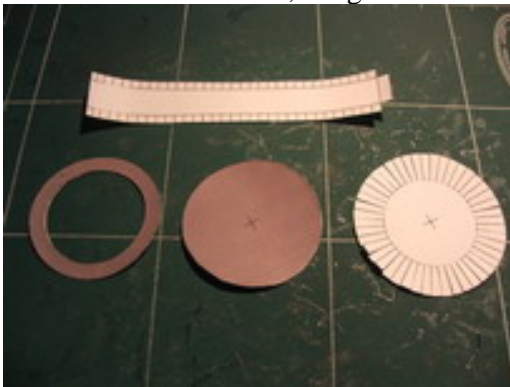
Cut item 104 as shown.



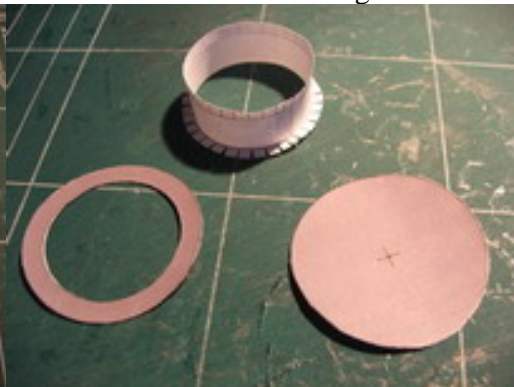
Glue item 104 as above, the glue closed.



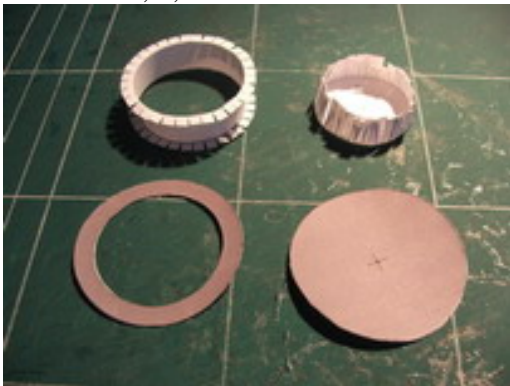
Glue items 103 and 104 together.



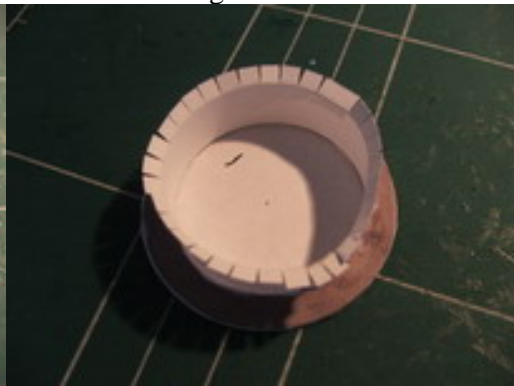
Cut items 1, 2, 3 and 10 out.



Glue item 3 together.

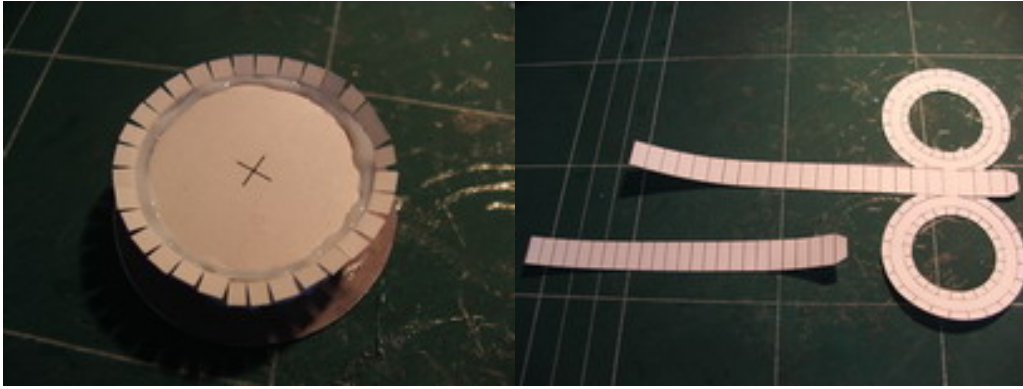


Fold items 3 and 10 as above.



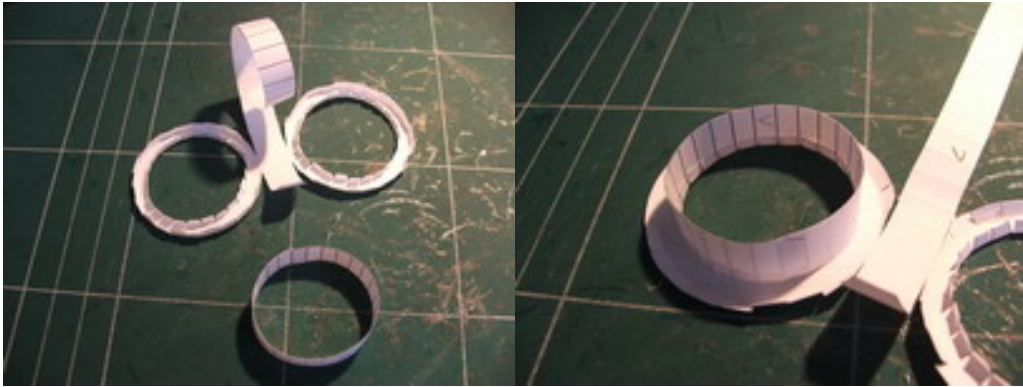
Glue item 1 to item 3 first, then glue 2 on Top of item 3 where items 1 and 3 Glued as above.





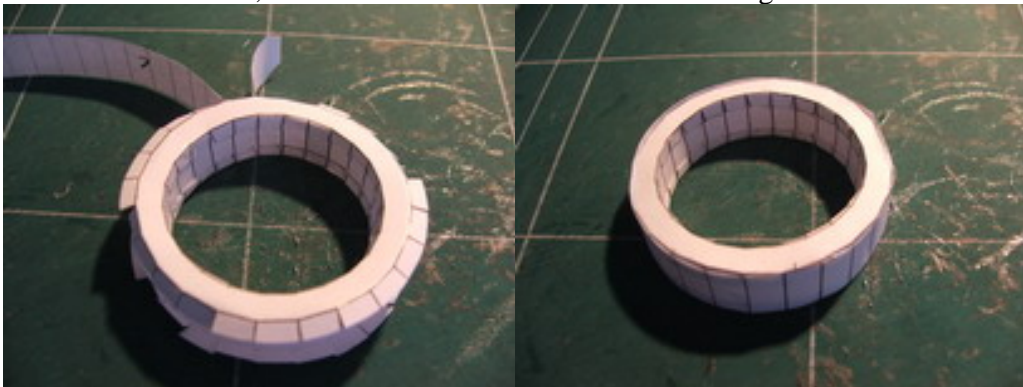
Glue item 10 inside item 3 as above.

Cut items 7 out as above.

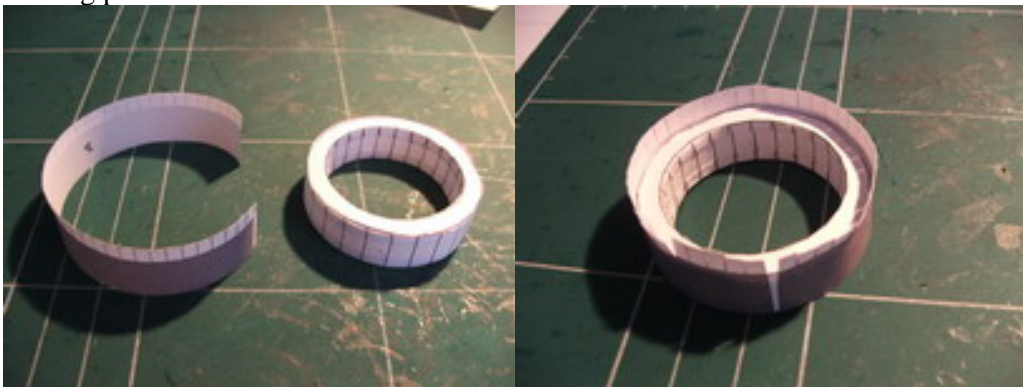


Fold item 7 as above, with care.

Glue the inner ring item 7 as above.



Wrap and glue item 7 together as above with lots of care as this part is one of the moving parts for the swivel.



Glue item 5 on the outside of item 7.



Now the most important part is to glue the two major parts together and make sure that it moves, if it does not, then re-do part as it is very important. Start by cutting out items 4, 6, 8 and 9 out.

Bring the two major parts together as above. NO GLUING.



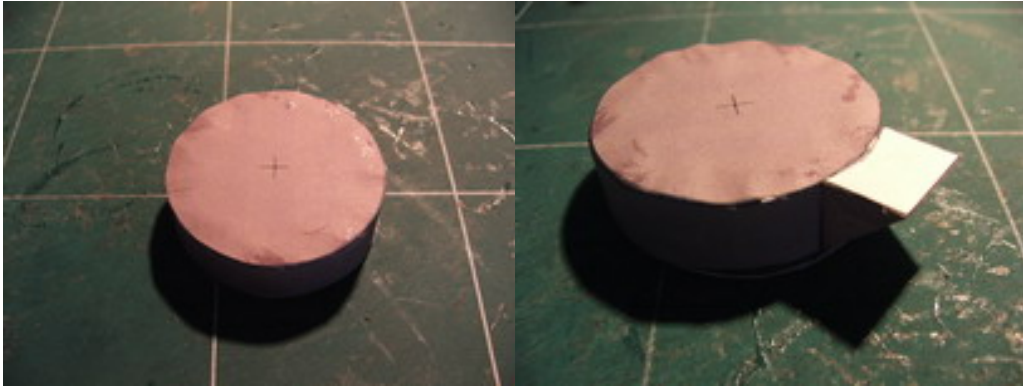
Place item 8 in the center as shown.

Glue the top of item 8 and then fold the tags of item 3 on top of the glue and then glue item 4 on top of the item 3 as shown



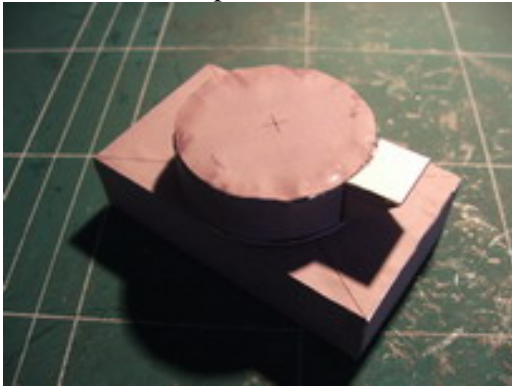
Place item 9 on top of item 7 as shown.

Glue item 7 and item 9 as shown.



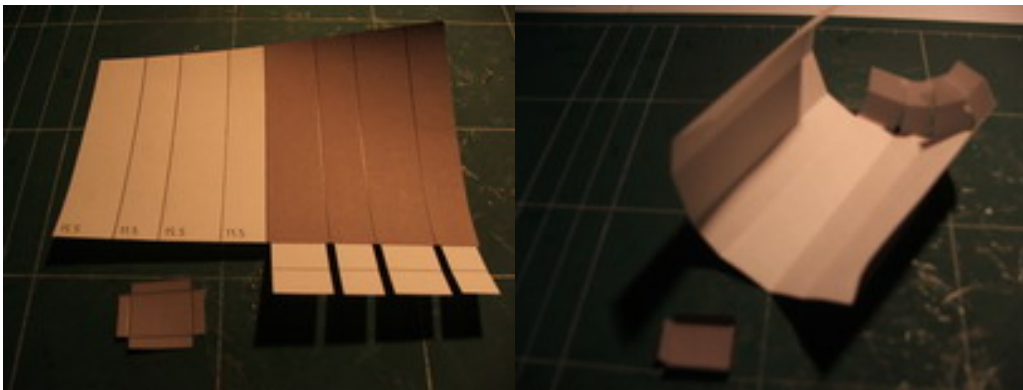
Glue item 6 on top of item 4 and 7.

Glue item 11 on the side of the assembly.



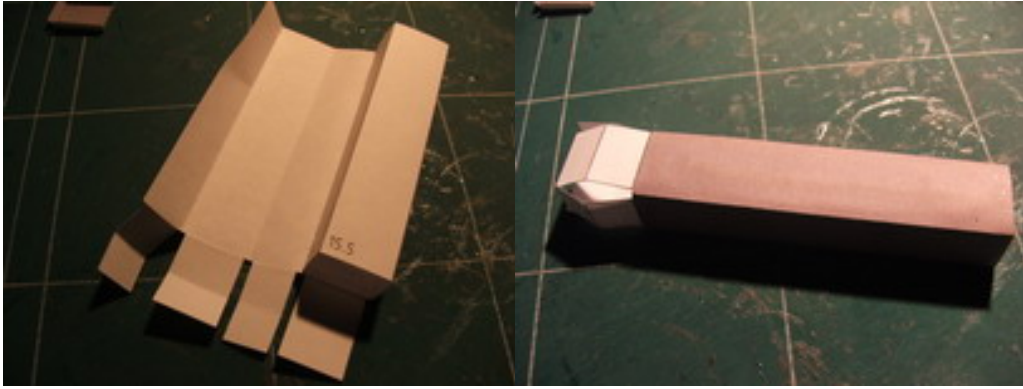
Glue item 43 and the swivel assembly together.  
Let it dry before testing the swivel.

## 6: Main Support Arms



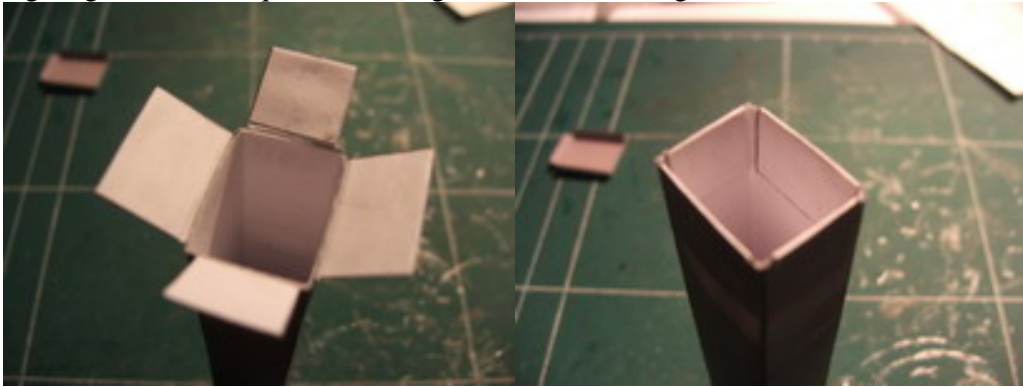
Cut and fold items 41 and 42 as above.



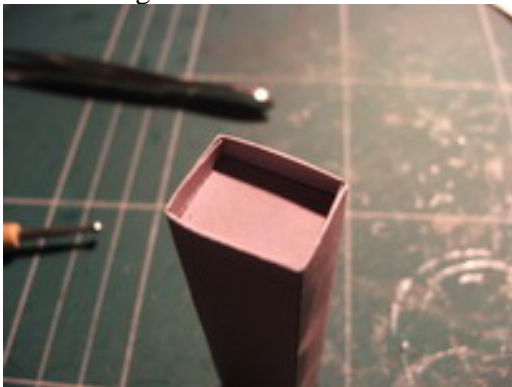


Again glue item 41 square and straight.

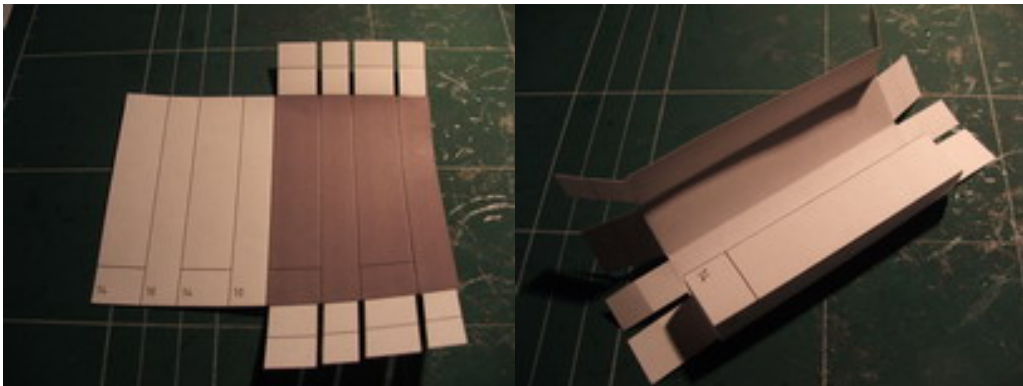
Fold the tags on the of item 41.



Glue the tags as above.

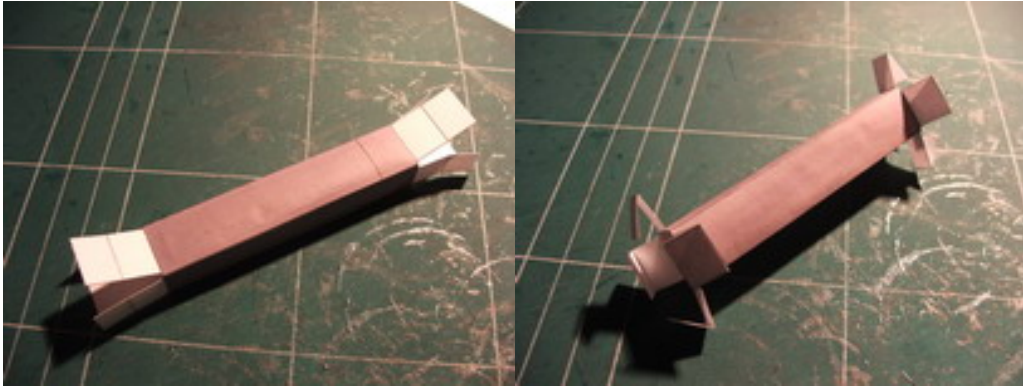


Glue item 42 into item 41.

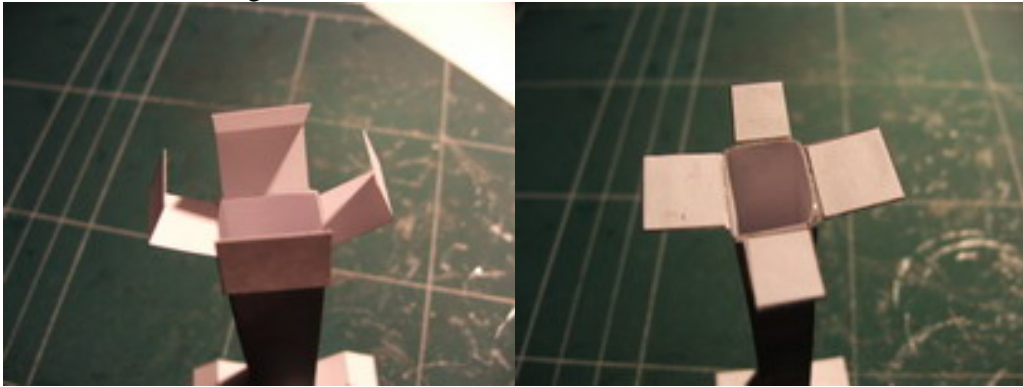


Clue item 27 and fold item 27 as above. again square...

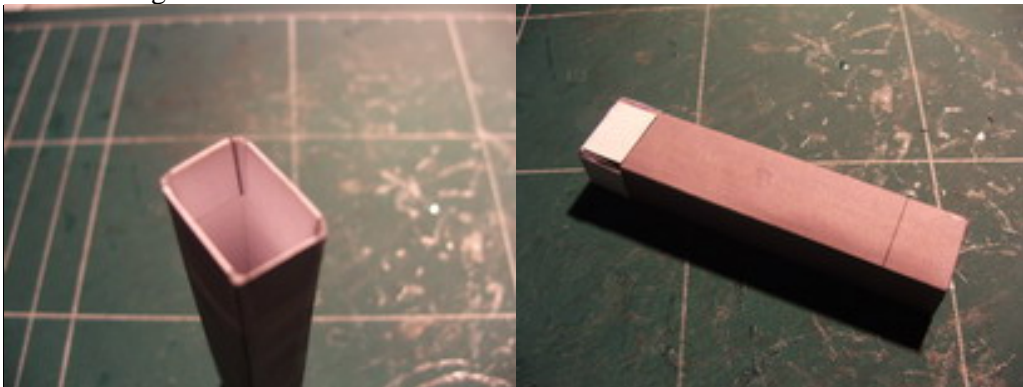




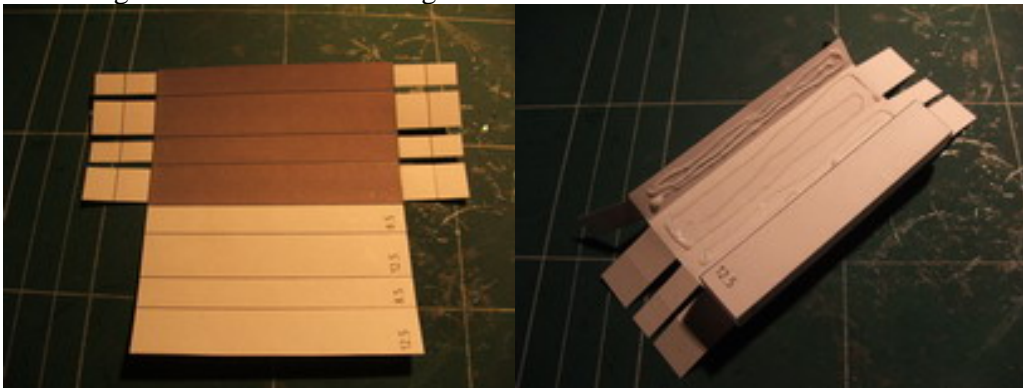
Bend and fold the tags on both sides of item 27.



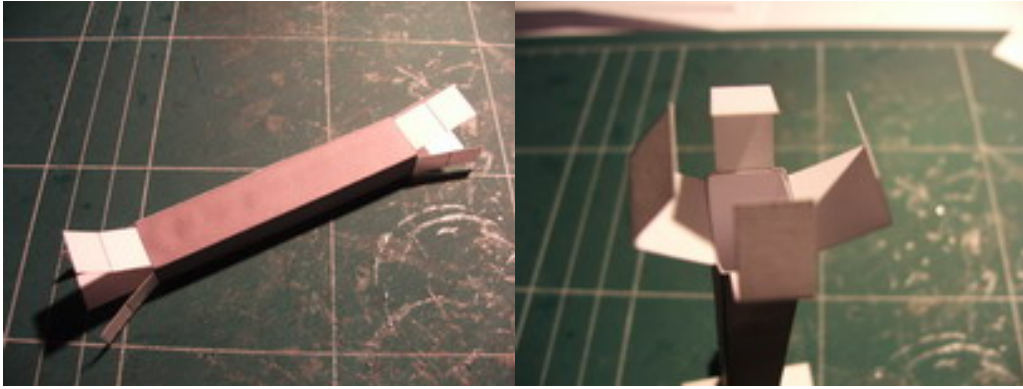
Glue all 8 tags as above.



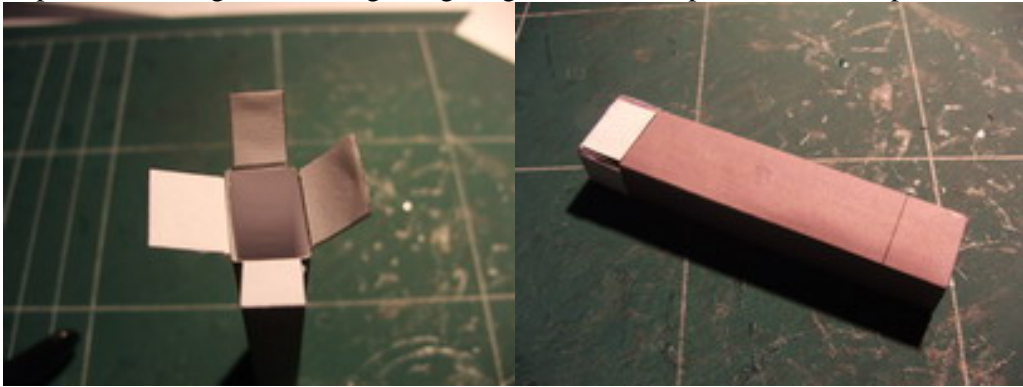
Glue 4 tags inside the arm and 4 tags on the outside as above.



Cut item 28 as above, glue item 28 above, again Square....



Repeat the folding and bending and gluing of item 28 as per last set of steps.



Cut items 29, 30, 31, 32, 33 and 34.

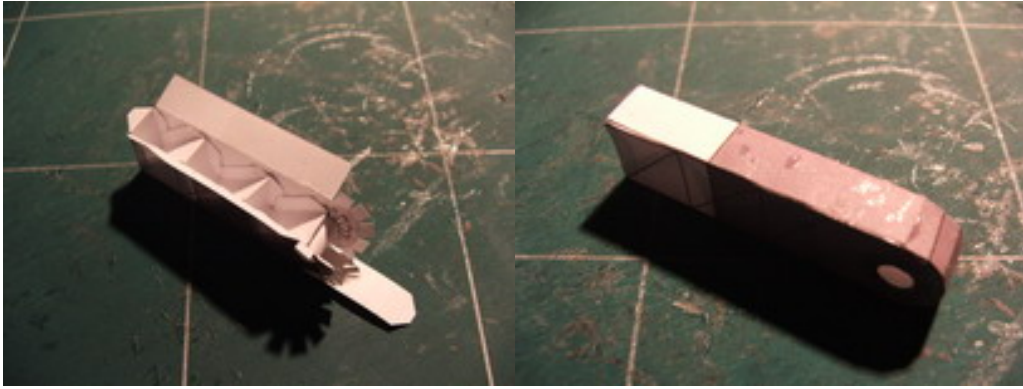
Fold and glue item 29 as above.



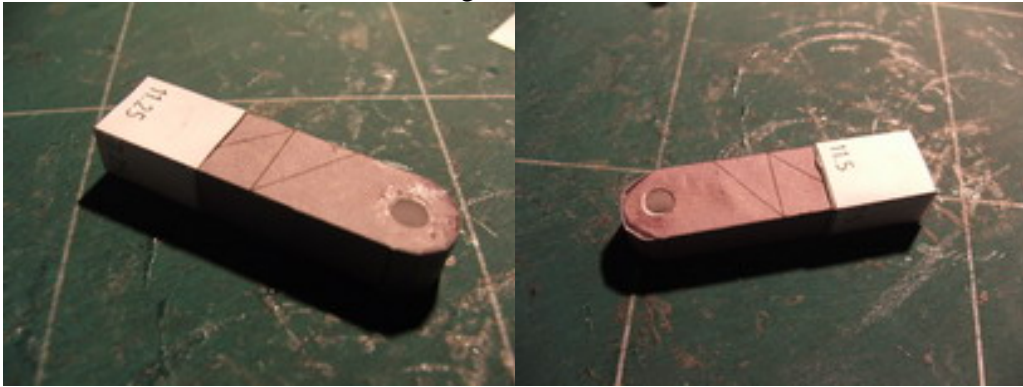
Roll and Glue item 30 around a 4.5mm needle.

Glue item 30 into item 29 as above.



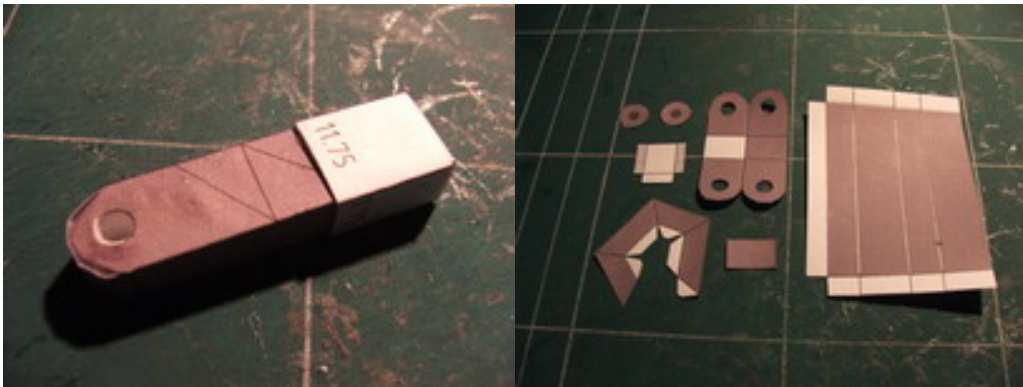


Glue item 34 into item 29 as shown, glue closed item 29.



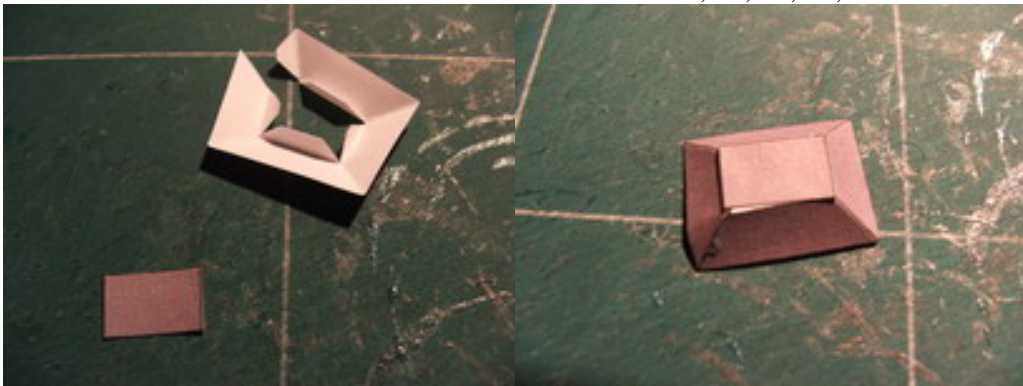
Glue item 33 as above.

Glue item 32 as above.

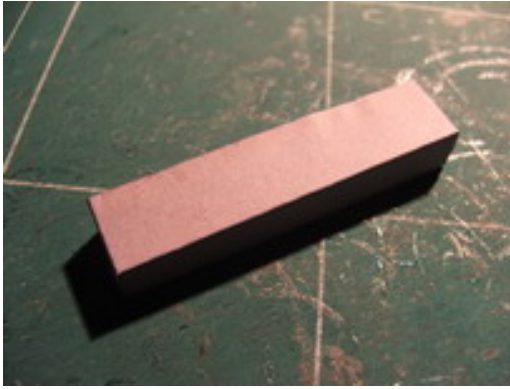


Glue item 31 as above.

Cut items 35, 36, 37, 38, 39 and 40.



Bend and fold items 36 and 37 and glue as above.



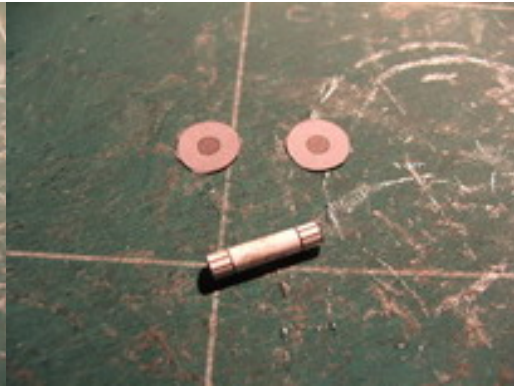
Bend, fold and glue item 35 as above.



Bend, Fold and Glue item 40 as above.



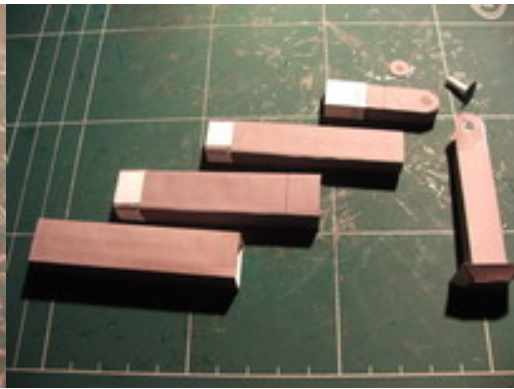
Glue items 35, 40 and 37 together.



Roll and glue item 38 around a 3.5mm needle.



Glue items 38 and 39 as above.



Place all the items as shown above.



Place item 38 into items 40 and 29 then glue again carefully as for movement.

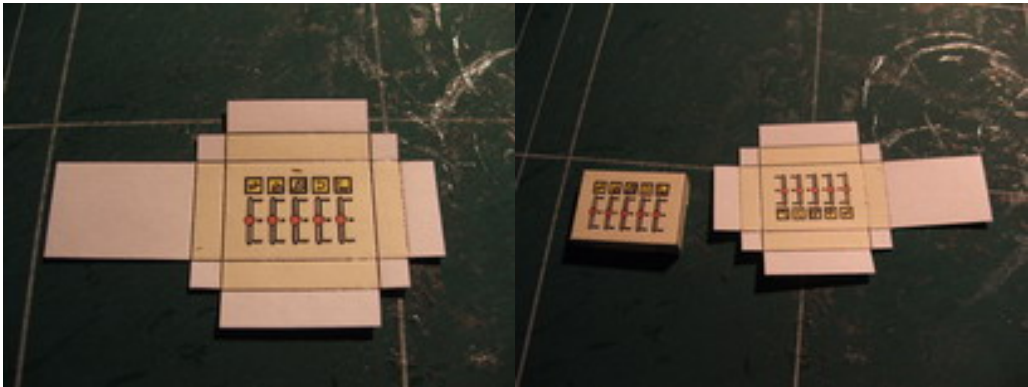




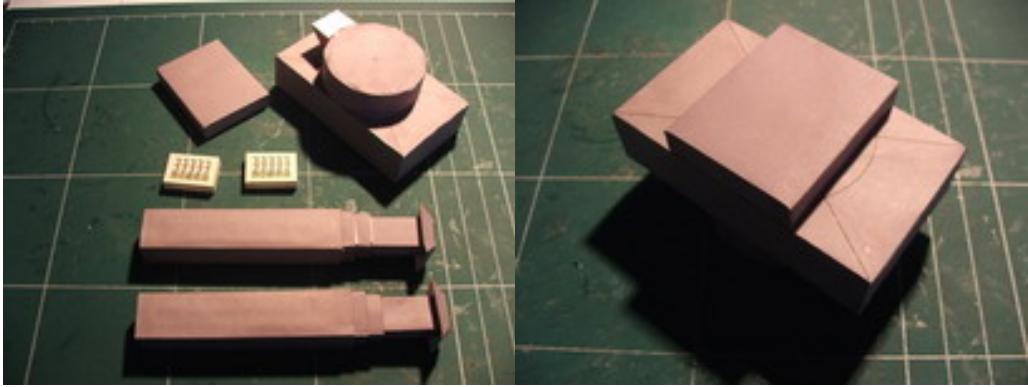


Clip items 41, 27, 28 and 29 all it together.

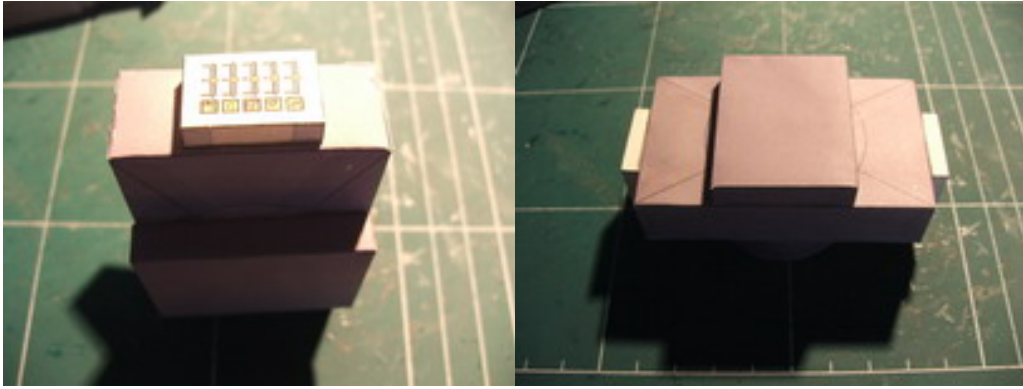
**7: Main Body Sub-Assembly**



Cut fold, bend item 102 together as above.



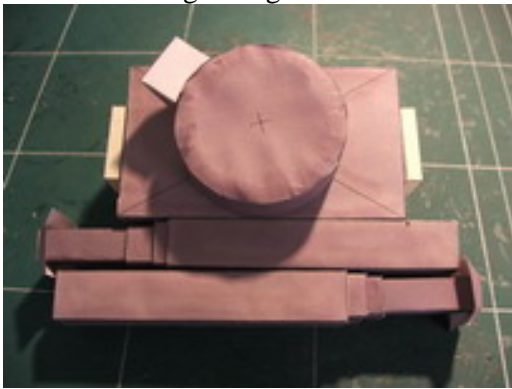
Place all of the above assemblies together. Glue item 45 to the main structure.



Glue item 102 to the sides of the main part.



Close the arms, then bring them together as to make sure that they are as compact, then mark and glue together as above.



Glue the arms to the main sub-assembly body as above.

## 8: Minor Arm Parts



Pre-cut Items 50, 51, 52 and 53 out



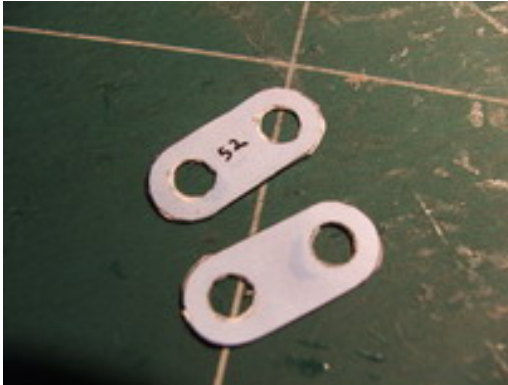
Cut and Glue item 50 as above, then mark afterwards.



Cut and Glue item 51 as above, then mark afterwards.



Cut and Glue item 53 as above then mark afterwards.



Cut and Glue item 50 as above, then mark afterwards.



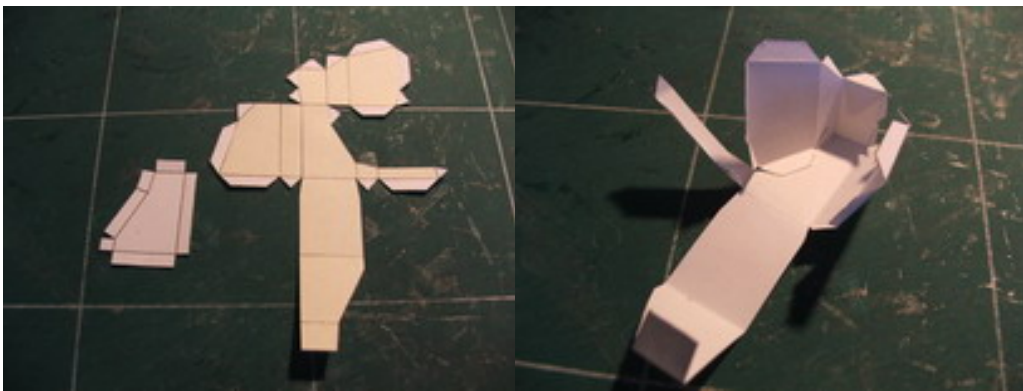
Cut and roll items 46, 47 and 48 around 4.5mm needle, mark 46 with 18, 48 with 17 and then 46 with 16.





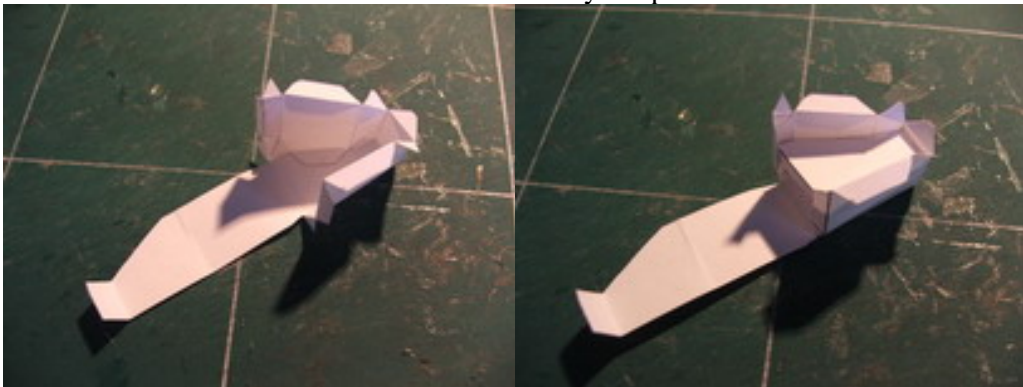
Cut and fold item 105 as above.

### 9: Arm 3



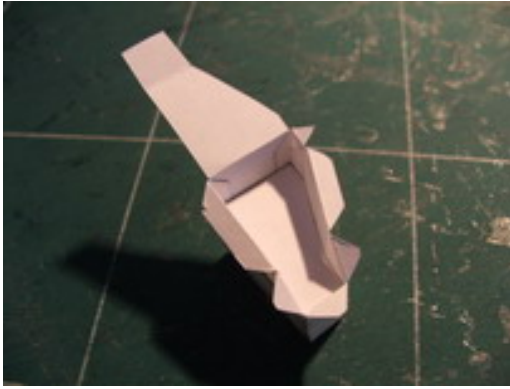
Cut items 57 and 58 as shown.

Fold and glue item 57 as shown, glue only the parts as above.



Glue the next part of item 57 as above.

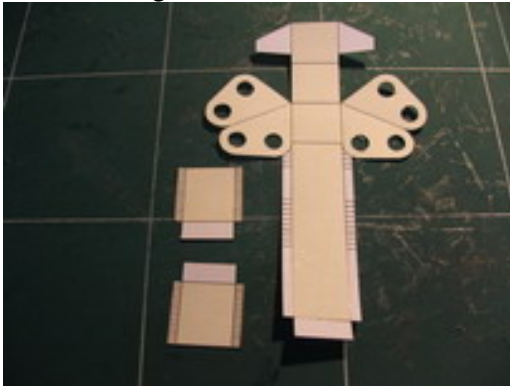
Bend and fold and glue item 58 as above.



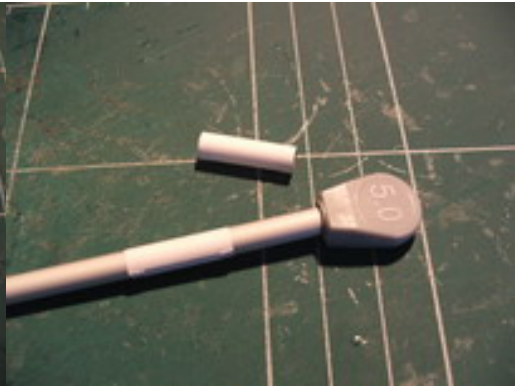
Continue to glue item 57 as above.



Glue closed Item 57 as above.



Cut items 55 and 56 as above.



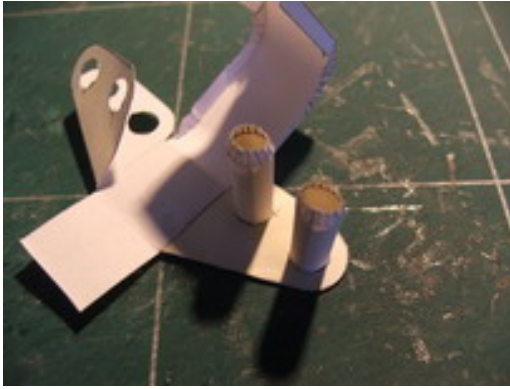
Roll and glue items 56 around a 5.0mm needle.



Fold item 55 as above.



Cut items 56 as above and glue it into item 55 as above.



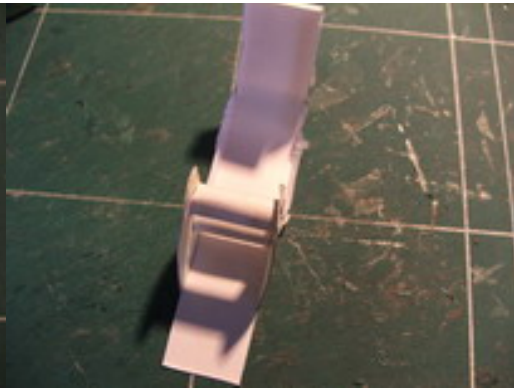
Glue the face closed as above.



Now cut the one face of the item 55 as above



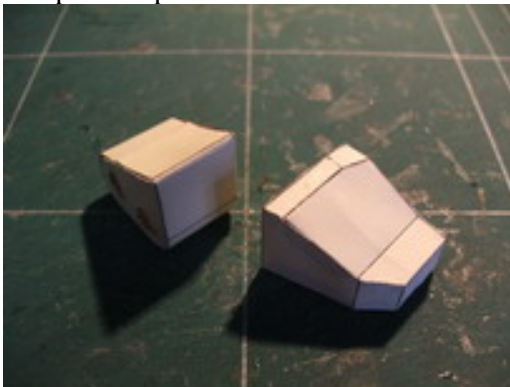
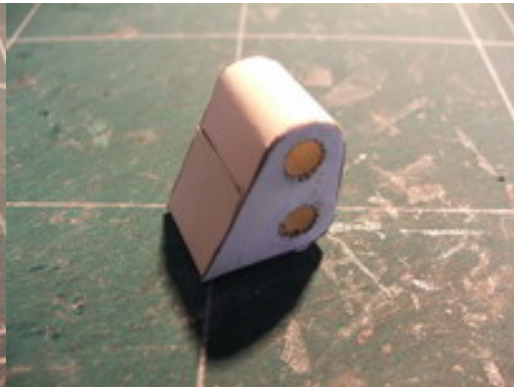
Glue the face of the cut part 55 as above.



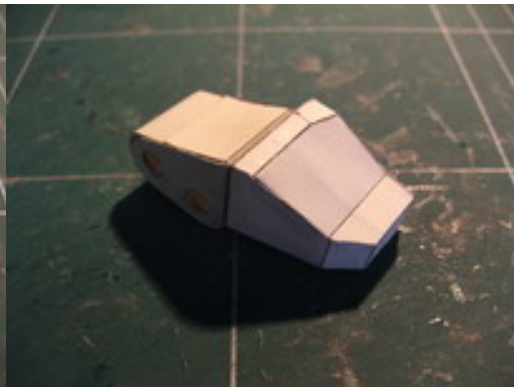
Re-connect item to the main item 55 As above.



Warp the flap of item 55 closed as above.



Take the assembled items 55 and 57 and glue them together as shown above.

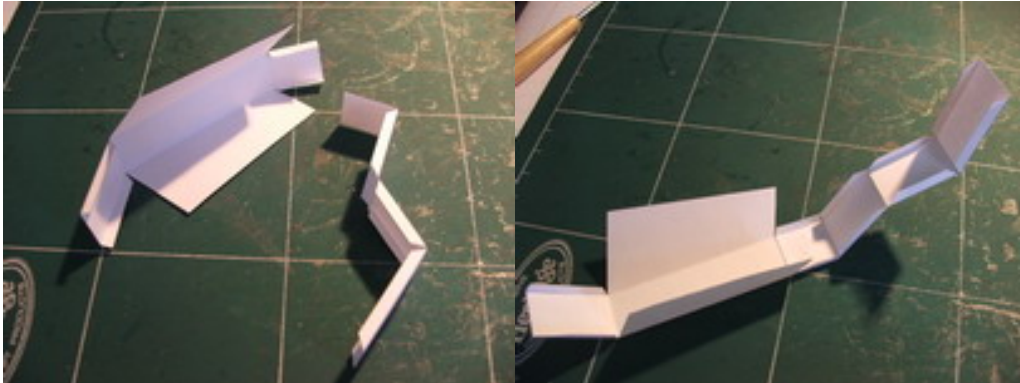




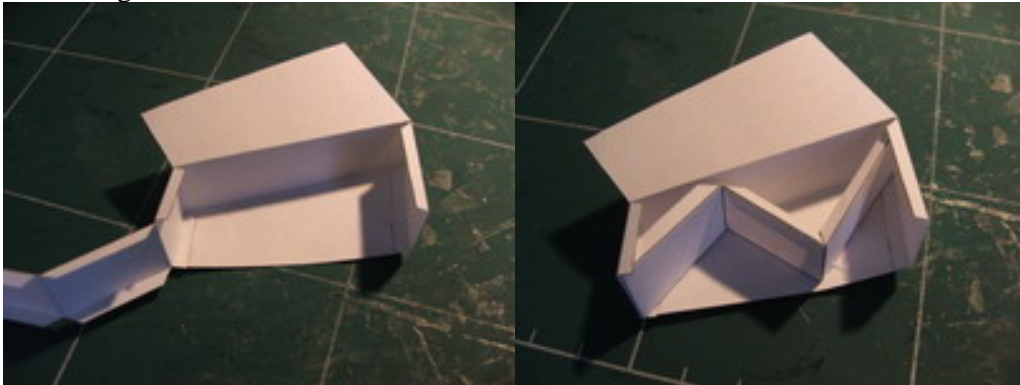
**10: Arm 1**



Cut items 59, 60, 61, 62, 63, 64, 65 & 66. Fold and bend items 62 and 64.



Fold and glue items 62 and 64 as above.

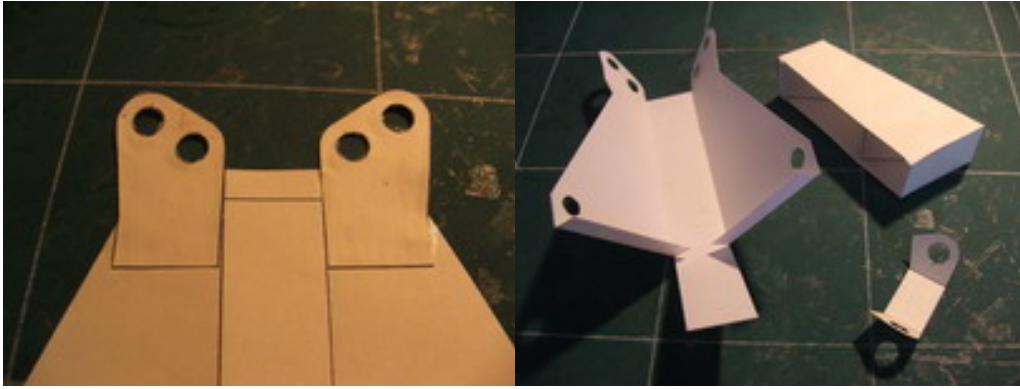


Continue the glue items 62 and 64 as above.



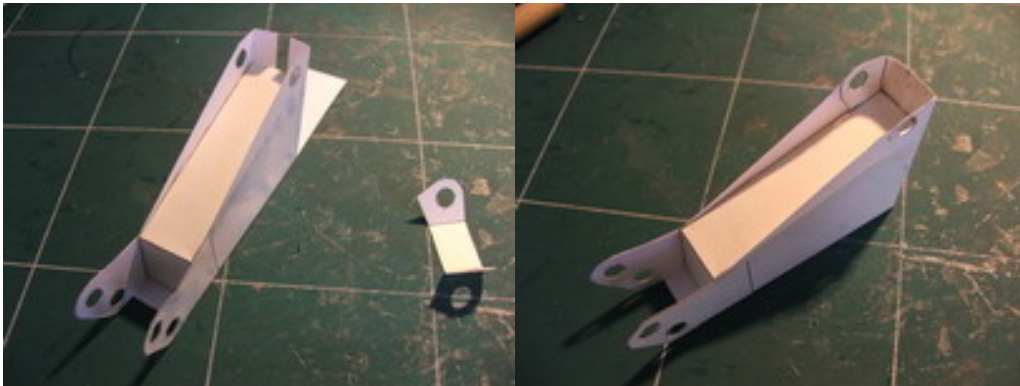
Close item 62 as above.

Bend and fold items 63, 65 and 66.



Glue items 65 and 66 on top of item 63  
As above.

Fold item 63 as above and bend 60 as  
above.



Glue item 62 into item 63 as above.

Glue item 60 in item 63 as above.



Cut and bend items 59 and 61 as above.

Roll items 61 around a 5.0mm needle.

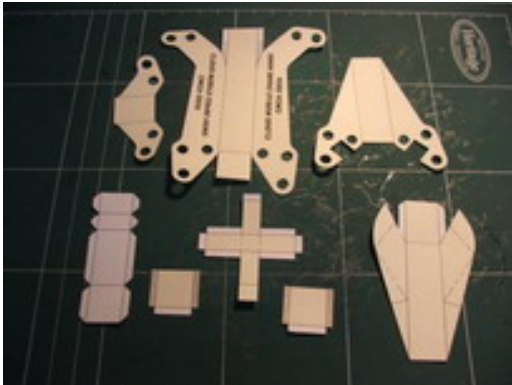


Cut and bend and glue items 59 and 61 as above.

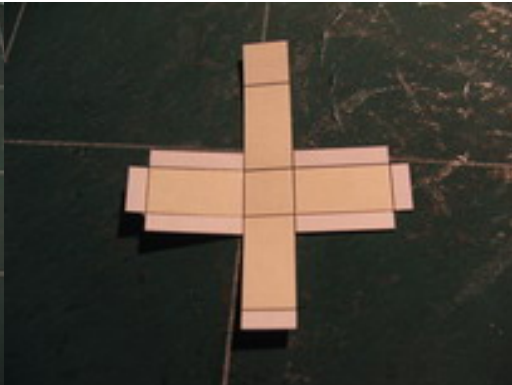


Glue item 59 into item 63 to complete the assembly.

### 11: Arm 2



Cut out items 67, 68, 69, 70, 71, 72 & 73



Bend and fold item 70

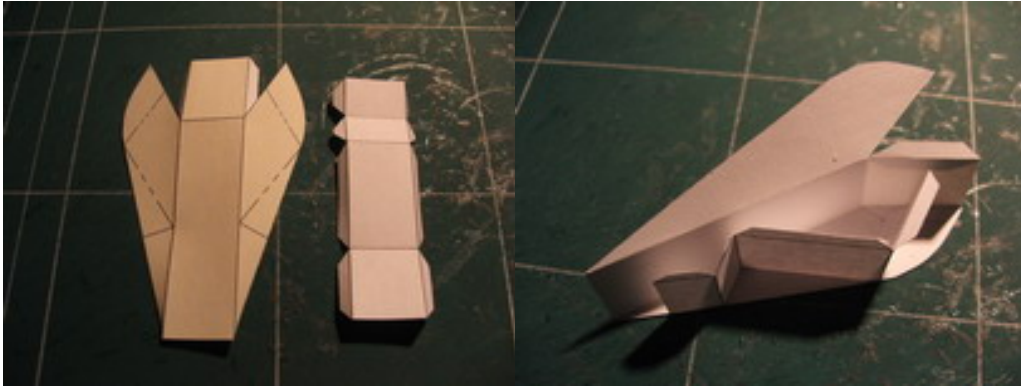


Glue item 70 as above.

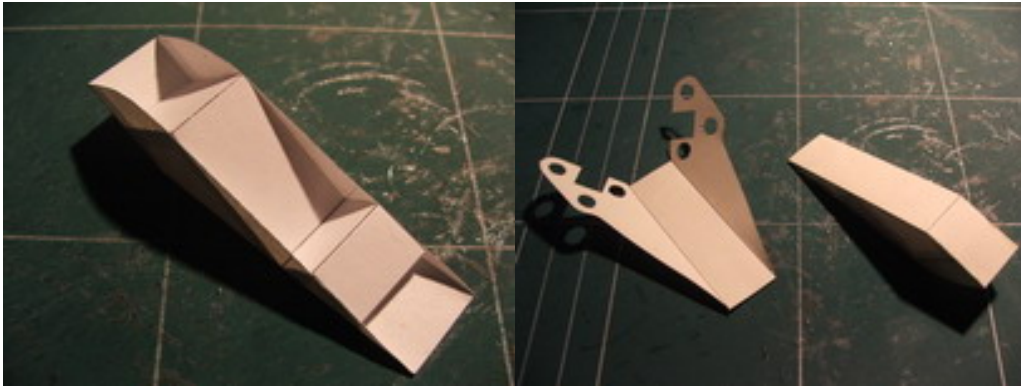


Roll and glue items 69 around a 5.00mm needle as above.





Bend and fold items 71 and 72 as above.      Glue item 71 into item 72 as above.



Glue closed item 72 as above.      Bend and fold item 67 as above.



Glue item 67 on top of item 72 as shown.      Cut and trim item 69 as above.



Glue item 69 into item 67 as above.      Bend and fold item 68 as above.



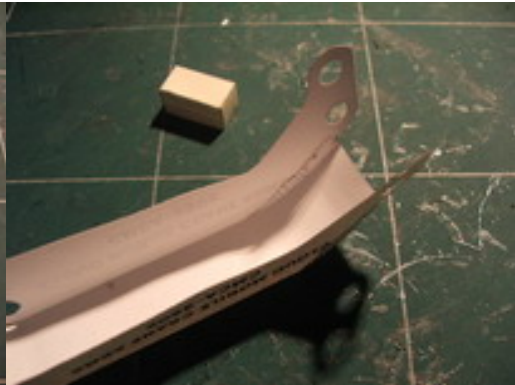
Glue item 68 to item 72 as shown.



Glue item 69 as shown above to item 68.



Bend, roll and fold item 73 as shown.



Glue item 73 as above.



Glue Item 70 into item 73, make sure that the part item flush on the end.



Now glue the two assemblies as above together, make sure that they all line up.



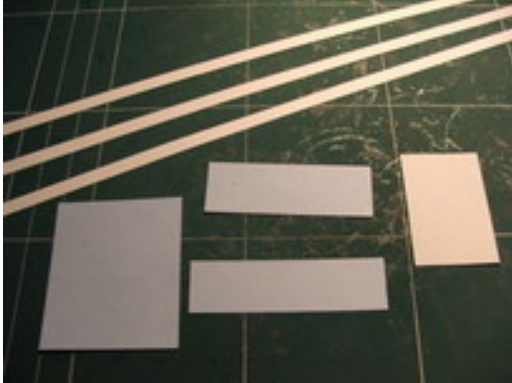
Completed arm 2.



## 12: Main Hydro Cylinders

For the main lift hydro cylinders, two are needed, the following parts are the same, but need to be assembled with there respective cylinder assemblies:

E=N, A=H, B=K, F=J, D=L, G=I and C=M .the notes will be written as to make complete cylinder.



Cut items A,B,C,D,E,F & G out very Carefully



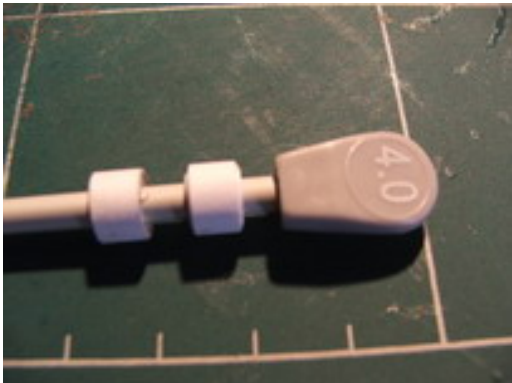
pre roll all items, look carefully at the roll direction for a and e.



Roll and glue items C and G around a 5.5mm needle.



Roll and Glue item F around a 4.5mm needle.



Roll and glue items B and D around a 4.0mm needle.

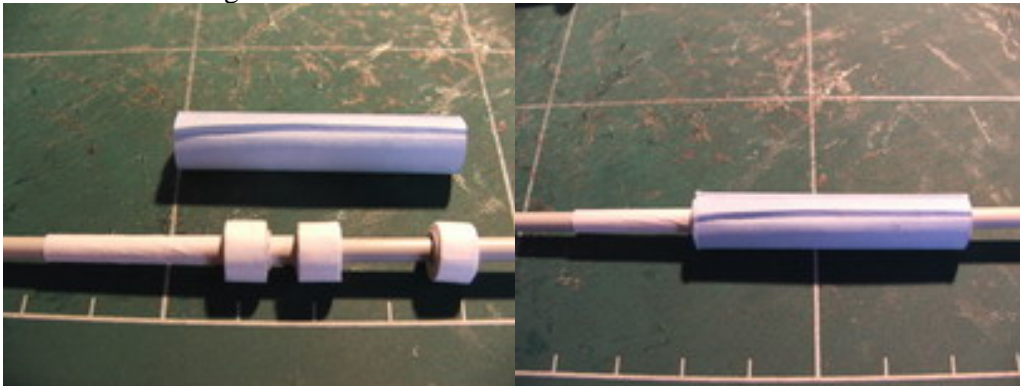


Roll and Glue item A around a 3.25mm needle.

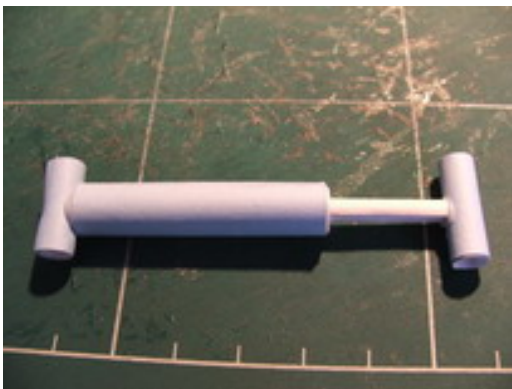




For item E, one needs to measure the outer Diameter of items D and F first. Glue item A and B together as above.  
Based on that measurement make use of The 7.0 or 7.5 or 8.0mm needle to roll and Glue the item E together.

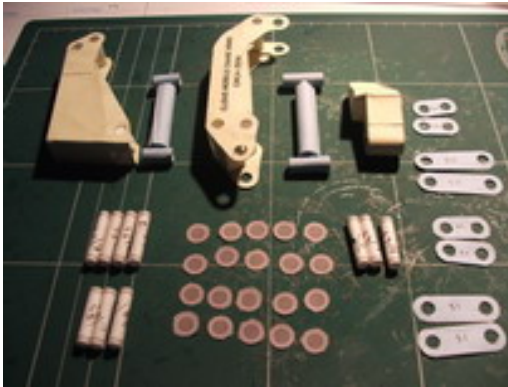


Line up items A/B, F and E as above. Glue items F, D and E together in a way That item A/B is free to move inside Item E.



Glue Items G on item A/B and C on item E.

### 13: Arm Sub-Assembly



Bring all of the above parts together as above for the sub-assembly of the arm.



Start with Arm and Cylinder K/J/L and place pin 47 in the whole of arm 1 as shown above, then glue pin 47 to suite.



Glue items 49 on both ends of the pin 47. Make sure that the cylinder is able to move around the hinge point.



Bring Arm 2 Cylinder A/B/C and pin 47 together.



Place pin 47 and glue again items 49 on pin 47, again make sure that there is movement of the pin.



Bring all 3 arms together along with pins 48 for the top left and pin 47 for the top right.



Again use items 49 to pin the pins in place. For the first cylinder connection, bring items 50, 53, 2x pin 46 and 1x 48.



Glue item 49 on one side of pin 46 as above.



Glue item 49 and 46 together as above.

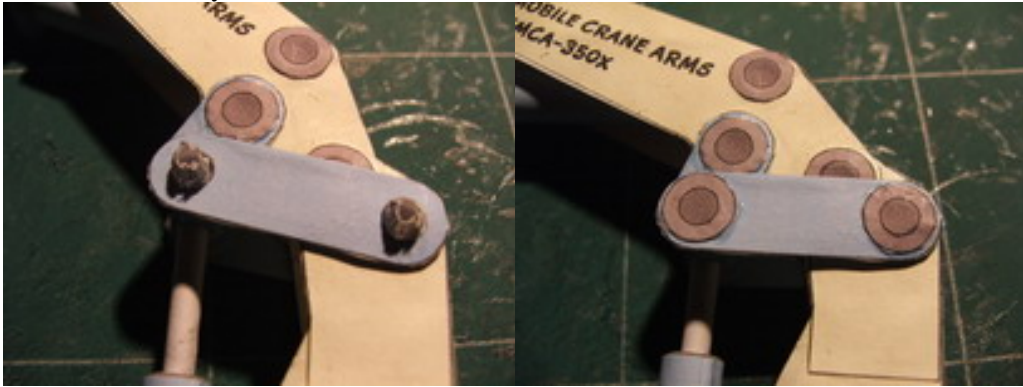
Insert the arms as above, use pin 48 to insert into arm 2.



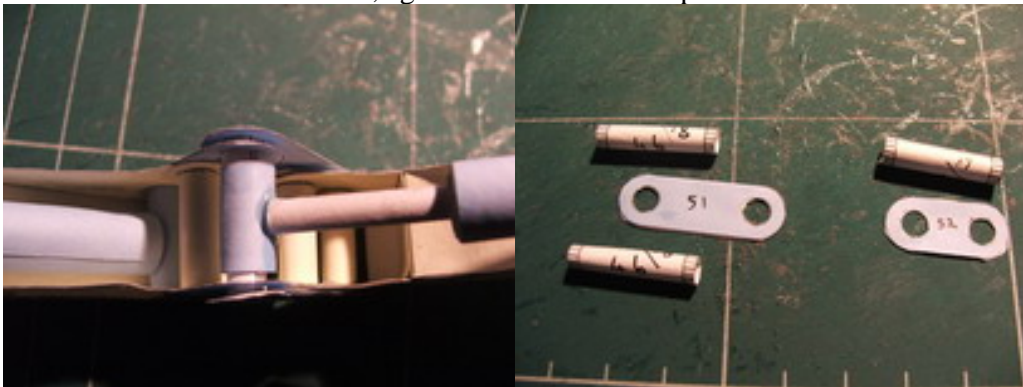


Turn the assembly over.

Insert item 53 and 49 as above.



Insert item 50 and 49 as above, again make sure that all parts move.



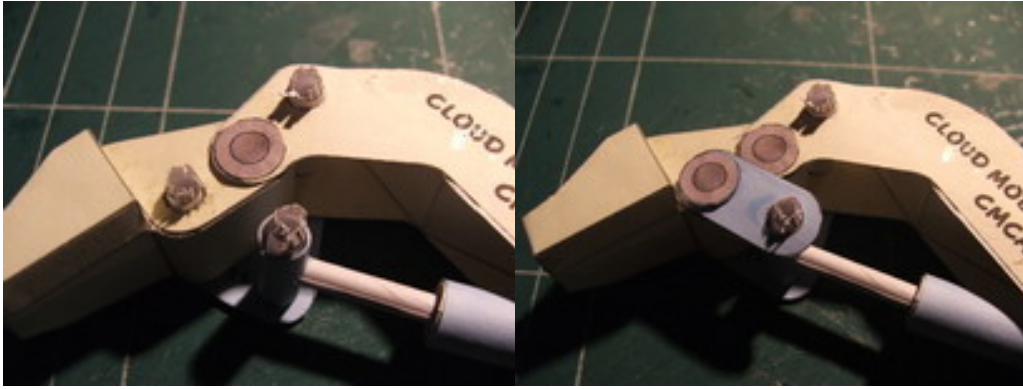
Trim if needed should the arm not move.

Bring items 51, 52, 2x pin 46 and 1x47



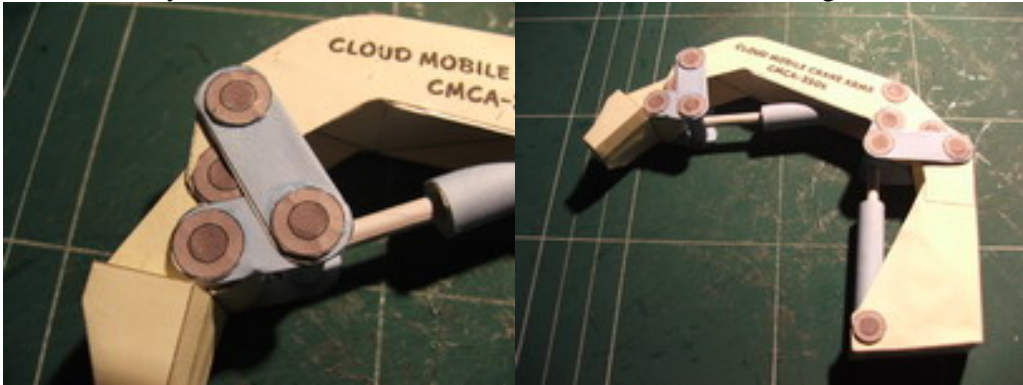
Glue items 51, and 46 together with items 49, on left and 52 and 47 with item 49 on right.

Insert parts as above.



Turn assembly over.

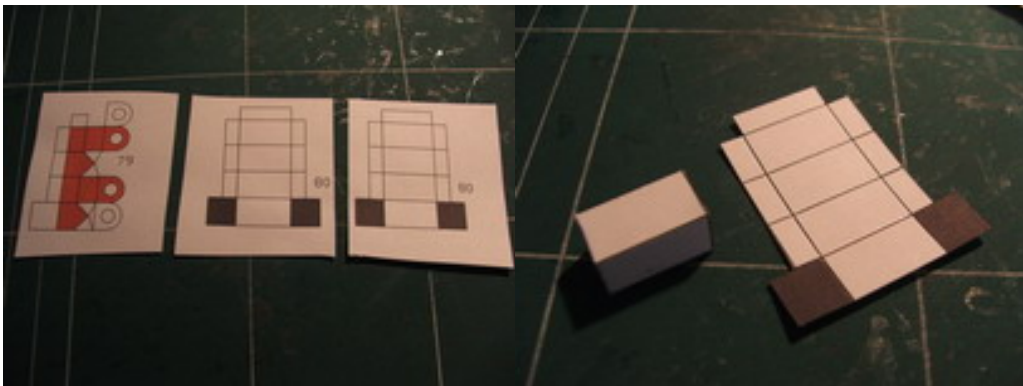
Glue item 52 and 49 together.



Glue item 51 and 49 together.  
Again make sure that all parts move freely.

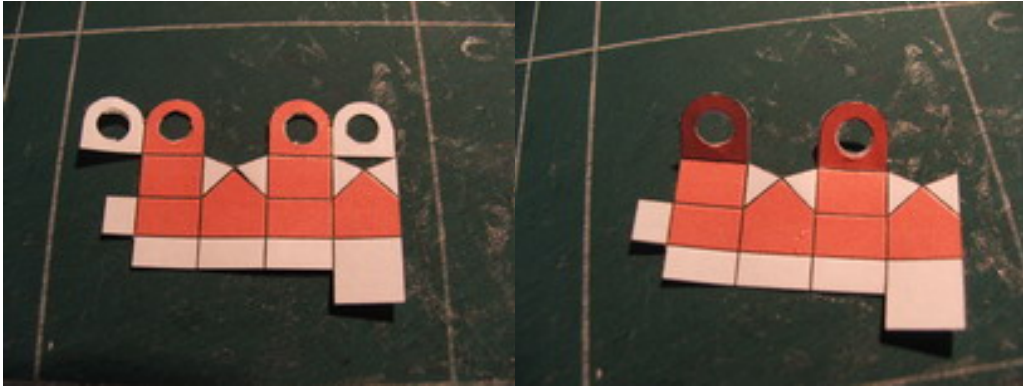
Completed arm assembly, test for movement.

#### 14: Extender Arm Minor Parts



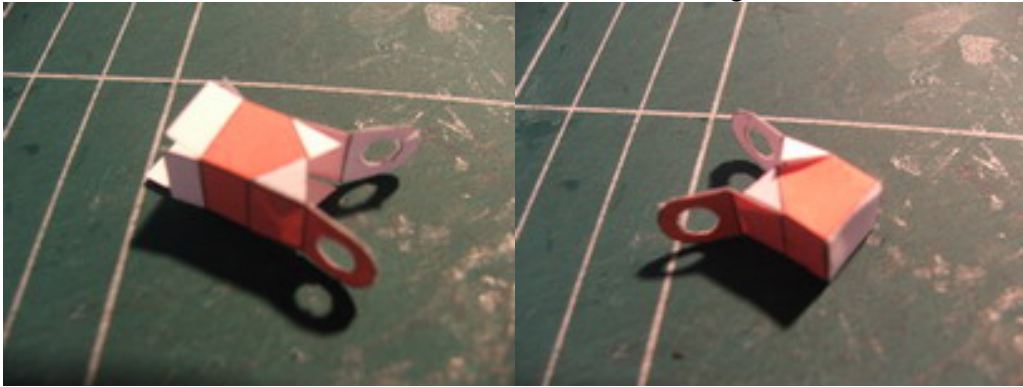
Pre cut items 79 and 80 out.

Cut, Fold and glue items 80 together.



Cut, Fold and Bend item 79 as above.

Glue the two tags as above.



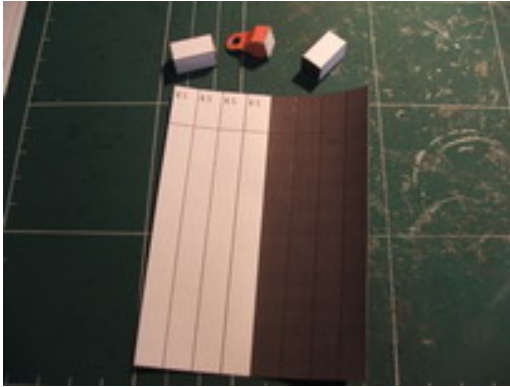
Glue item 79 as above.



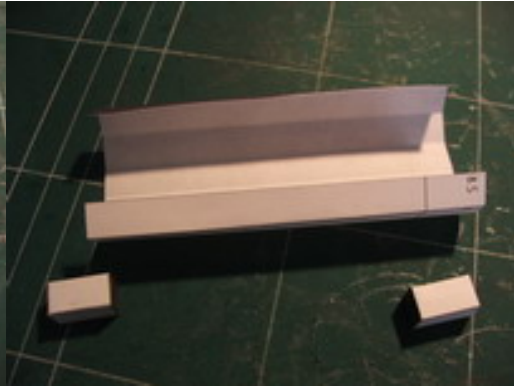
Glue the two tags together to close item 79.



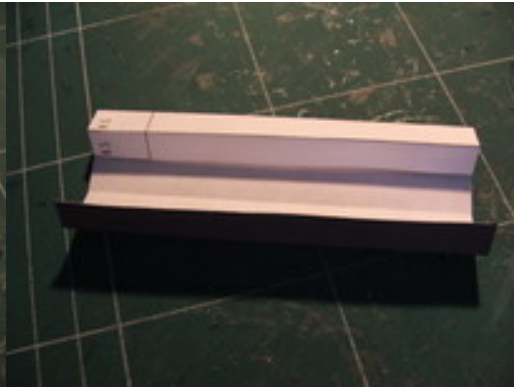
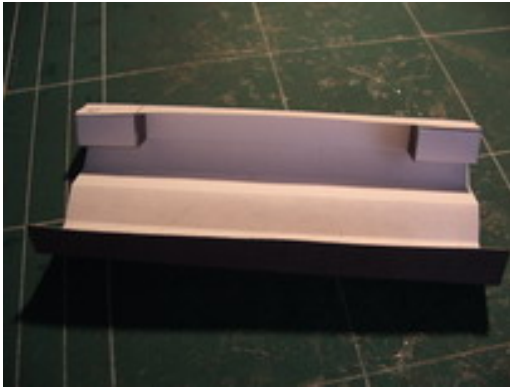
### 15: Extender Arm



Cut item 81 out very carefully.



Fold item 81 square then glue items 80 on both ends on item 81 as above.



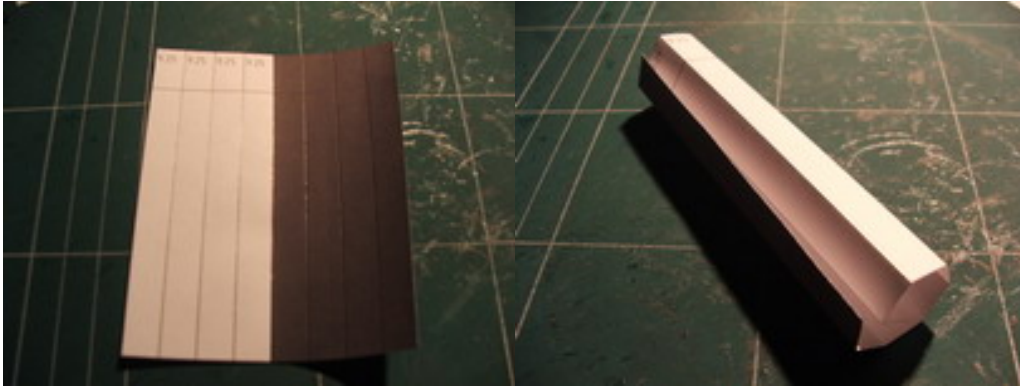
Glue item 81 closed as neat as possible as this part is the bench mark for all parts to follow.



Completed item 81.

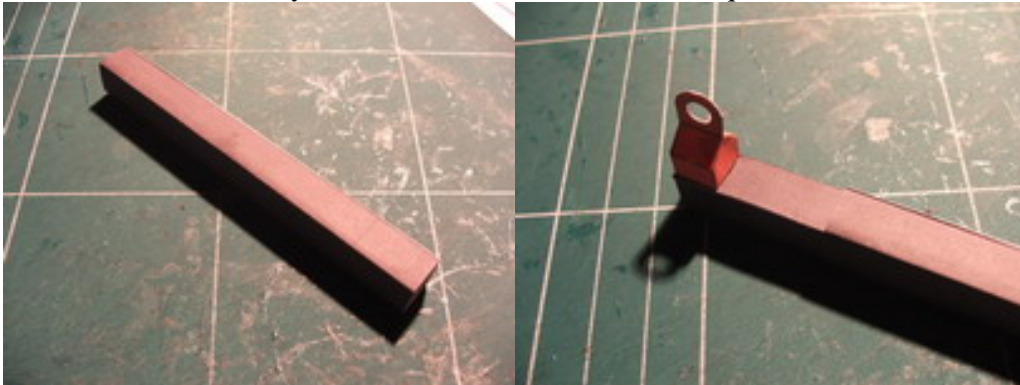


Glue item 79 on end of item 81.



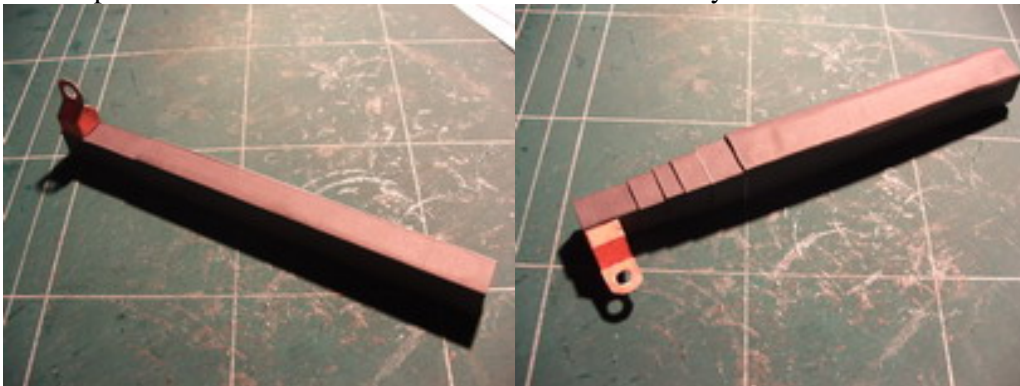
Cut item 74 out carefully.

Fold Item 74 square.



Glue item 74 into a tube, again do it neat as possible.

insert item 74 over item 81, make sure it moves freely.

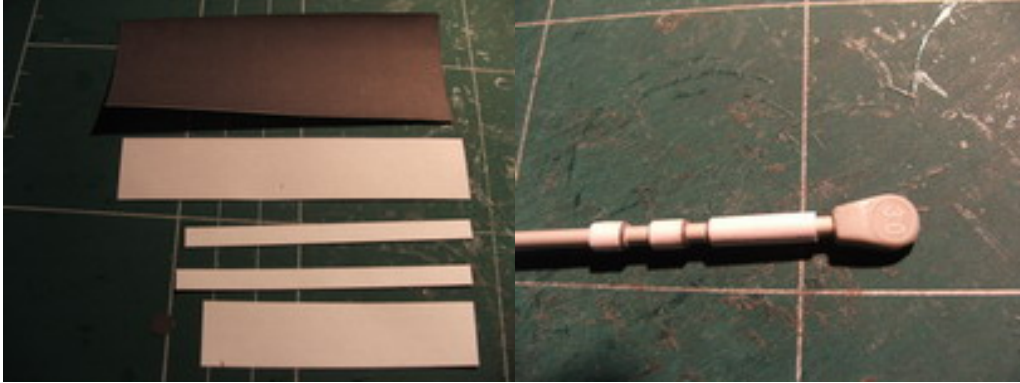


Should the part not move freely re-do.

Repeat the same steps for items 91, 82, 97 and 92, once complete again make Sure that the parts move freely.

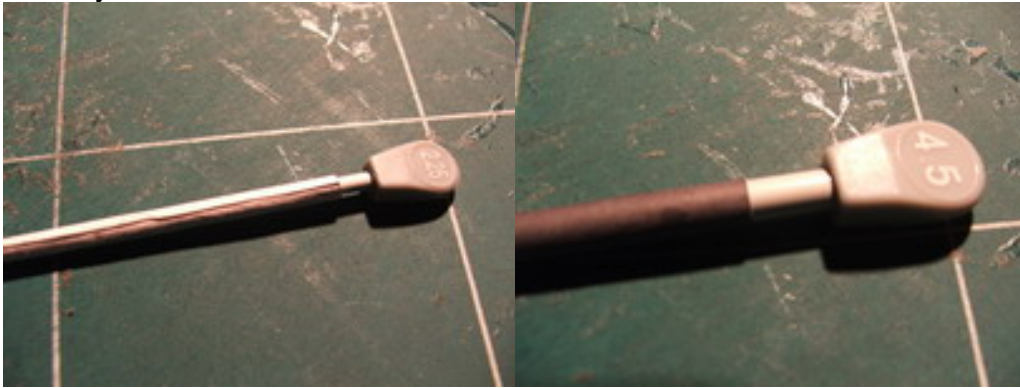
## 16: Extender Arm Cylinders

For the extender arm cylinders, 5 sets are needed for the arm.



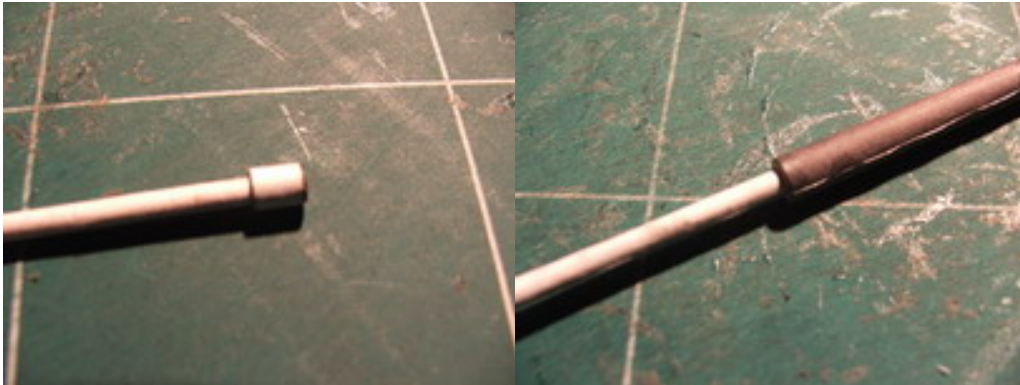
Cut items P, Q, R, S, T & U out very carefully.

Roll items Q, S & U around a 3.00mm needle.



Roll item P around a 2.25mm Needle.

Roll item T around a 4.5mm Needle.



Glue items P and Q as shown.

Insert item U on item P and glue item U To the inside of item T, make sure that the parts are able to move freely.





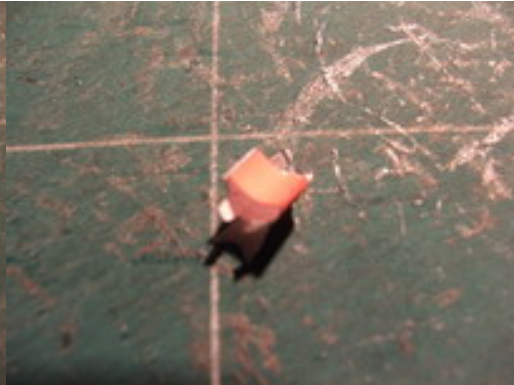
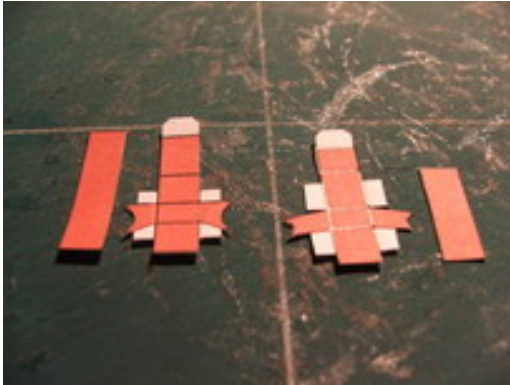
Glue item S on the opposite end of the cylinder as above.



Cut and glue item R on the end of the cylinder as shown.



Once the cylinder is complete in assembly make sure that the cylinder is very loose in movement.



With every cylinder a set of mounts are needed to attach the cylinders to the arms.

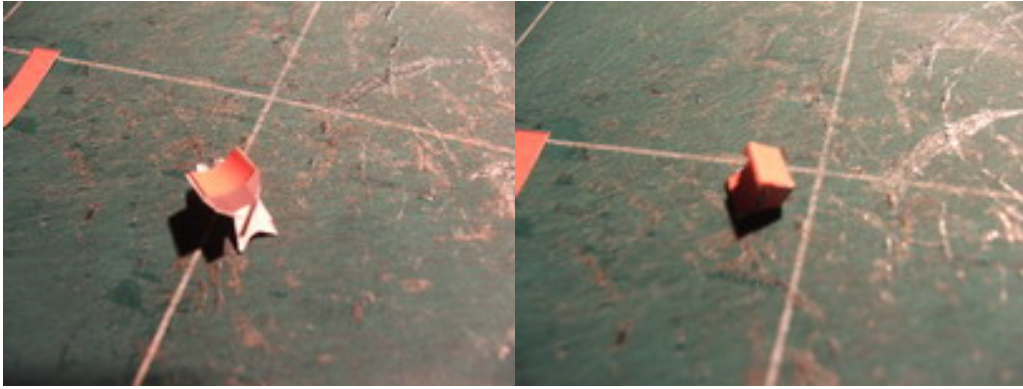
For arm 81 to 74 parts – 75 to 78 are used for this sub-assembly.(Smallest arm)

For arm 74 to 82 parts – 83 to 86 are used for the sub-assembly.

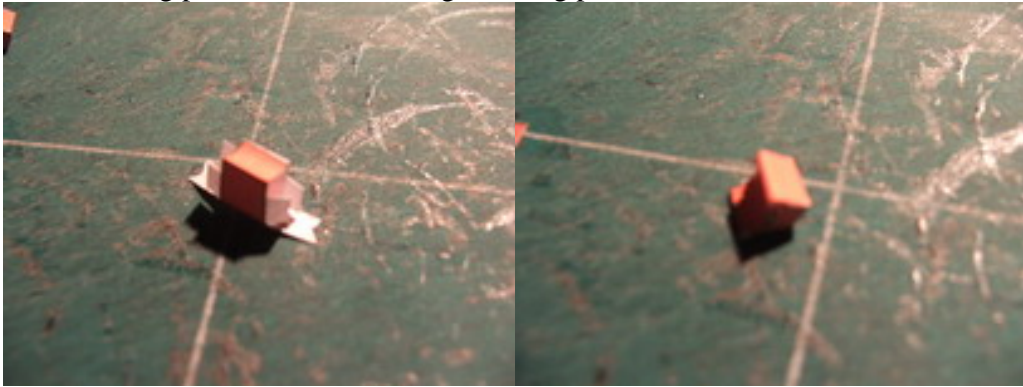
For arm 82 to 91 parts – 87 to 90 are used for the sub-assembly.

For arm 91 to 97 parts – 98 to 101 are used for the sub-assembly.

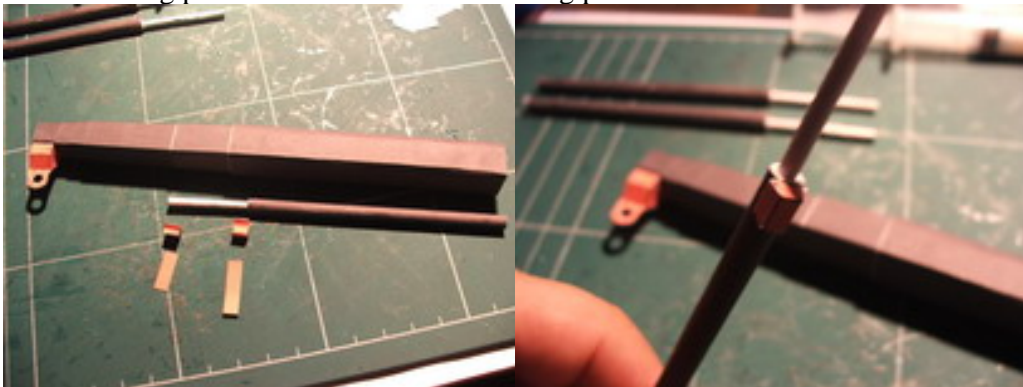
For the 97 to 92 parts – 93 to 96 are used for the sub-assembly. (Largest arm)



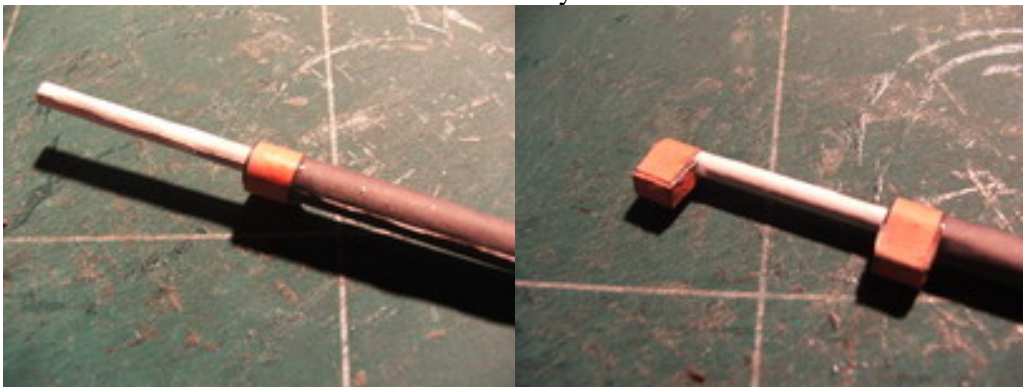
The following parts items are the large holding point as above.



The following parts items are the small holding point as above.



Glue the large support to the outer cylinder shell.



Then use the block to secure the support in place.

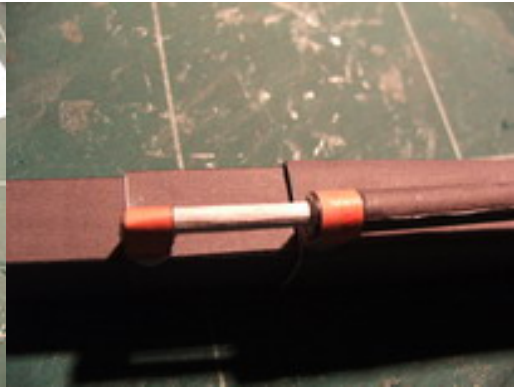
The same is to be done for the small support with the block.



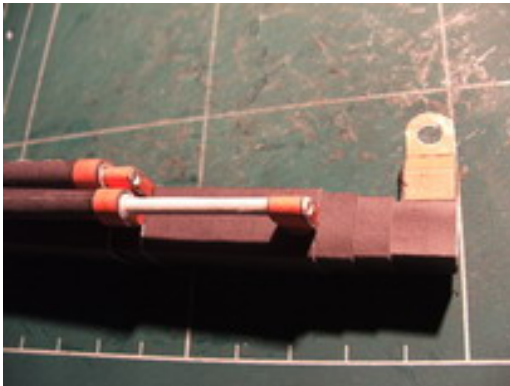
### 17: Extender Arm Sub-Assembly



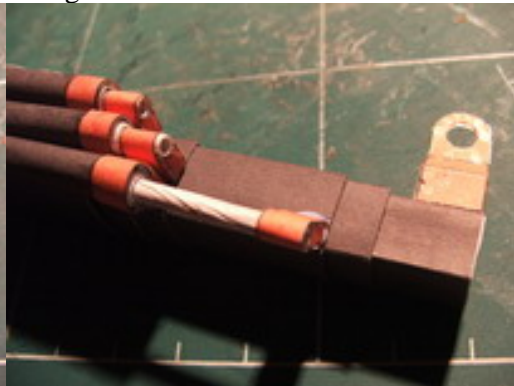
One starts the assembly from the large End to the smallest end.



Glue the first cylinder as above, on the edge.



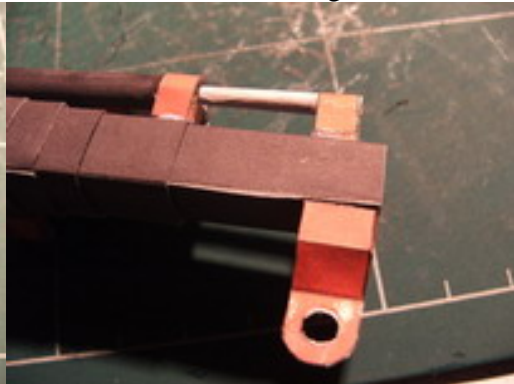
Glue the 2<sup>nd</sup> set in the middle.



Glue the 3<sup>rd</sup> set on the right of the arm.

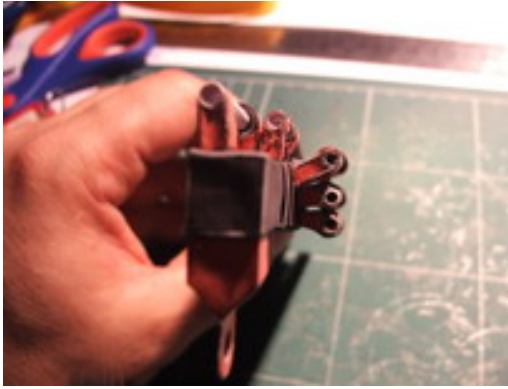


Turn the arm 90 degrees and glue the 4<sup>th</sup> set on the left side as above.



Glue the 5<sup>th</sup> set on the right side as above.

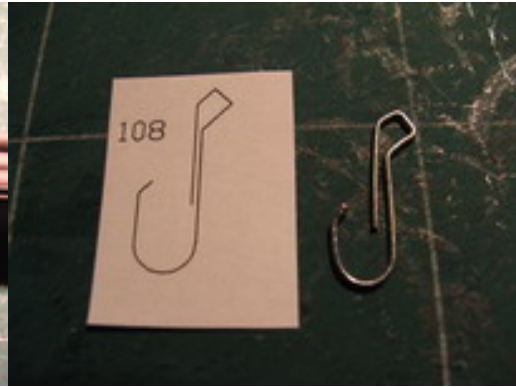




A side view of the completed arm.



Make sure that the arm has lots of free Movement.

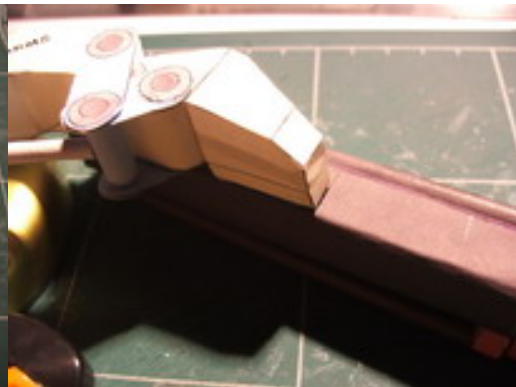


Use a paper clip to make the hook as per template 108.

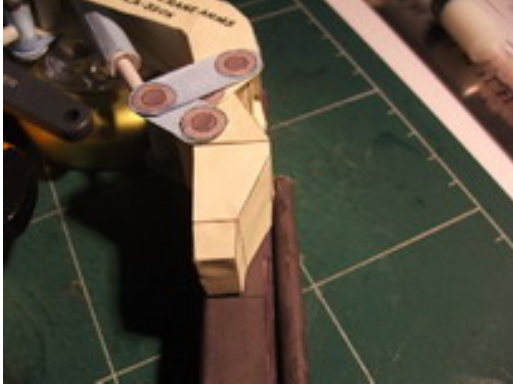
### 18: Assembly of Arm Sub-Assembly to Extender Arm



Bring extender arm and arm together.



Glue the extender arm in the marked out area which is about the middle in length.



Make sure that it glue securely.

### 19: Assembly of Arm/Extender to Main Body



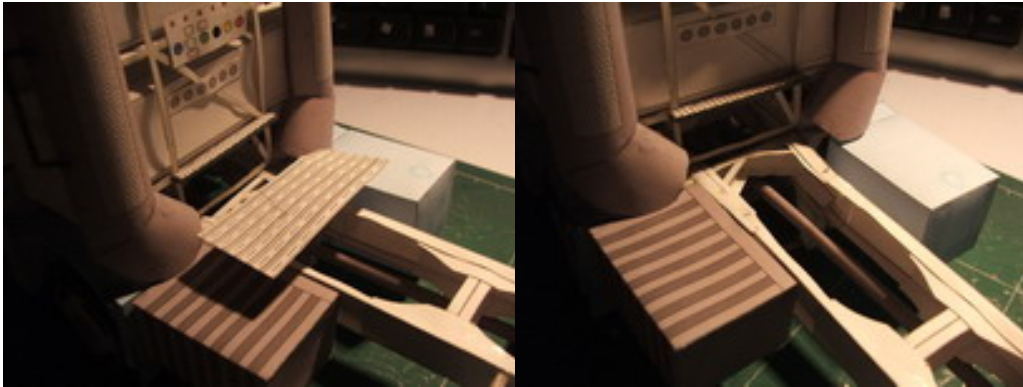
Once the Arm assembly is dry glue the arm the body and also glue hydro motor as shown above.



Put the hook on the end of the arm.

Cut items 106 and 107 out.

## 20: Final Assembly to Truck



On the truck there is a walk way cut the walk off very carefully.



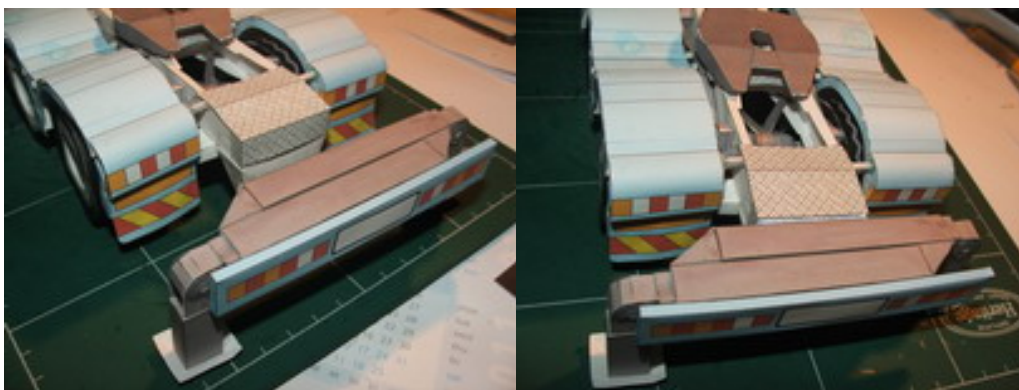
Pre place the arm on the truck, make sure the arm does not bump into any external truck parts. Work on about 12mm from the end of the exhaust of the truck as start point.



Glue the arm to the truck securely.

Glue item 105 to the exhaust as above.





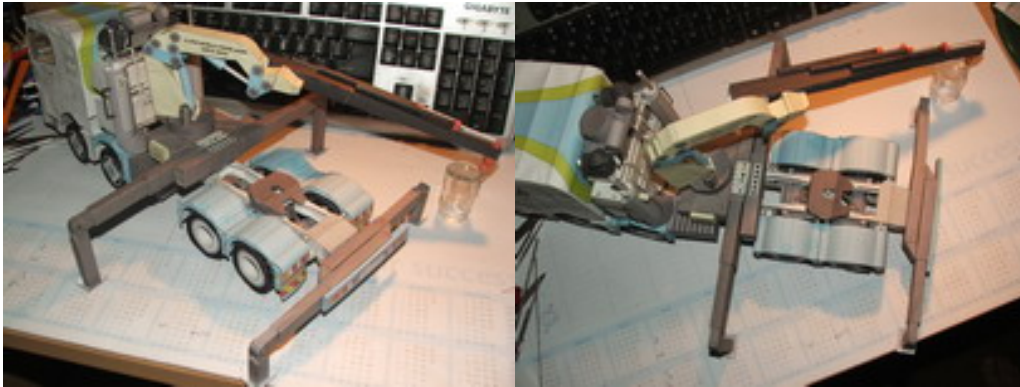
To fit the rear arm to the truck open the Arm as above to get the arm level with the Ground.

glue the arm to the ear of the truck as shown above with the arms still open.



Glue items 106 and 107 to the arm body As above.

## 21: Finished Model



## 22: Version Details

0.10	- 25 August 2010	- Project started, research begins.
0.11	- 14 January 2011	- First CAD design Started.
0.12	- 18 March 2011	- First CAD design Completed
0.20	- 27 March 2011	- Development work started, first model started.
0.21	- 9 April 2011	- First complete working model done.
0.30	- 27 March 2011	- Revised design started.
0.31	- 9 April 2011	- Revised design complete.
0.40	- 22 April 2011	- First render work started
0.41	- 22 April 2011	- Render work complete.
0.50	- 26 December 2011	- Final development model started.
0.51	- 26 December 2011	- Final development changes started.
0.52	- 10 January 2012	- Final development changes completed.
0.53	- 10 January 2012	- Final development model complete.
0.60	- 22 January 2012	- Lock down render work started.
0.61	- 22 January 2012	- Lock down render work complete.
0.70	- 22 January 2012	- First written instructions started.
0.71	- 25 January 2012	- First written instructions complete.
0.80	- 25 January 2012	- Instruction proof reading started.
0.81	- 25 January 2012	- Instruction proof reading complete.
0.90	- 25 January 2012	- Project complete.
1.00	- 25 January 2012	- Build Instructions Released and Locked Down. Design Released and Locked Down.
1.10	- 21 February 2012	- Minor Updates.