

Toothpick Miniatures

by Alexandre Karadimas

Make your own 1:64 miniatures with common household tools and materials

Booklet 2 - GAZ-64 jeep - (Work in progress)

More information on this video:

<https://www.youtube.com/watch?v=6dWFTSrBLLo>



If you have this, you can start right away:

Pins



Pliers



Nail scissors



Nail pliers



Nail file



Utility knife



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Booklet 2 – GAZ-64 jeep Version 0.5 – December 2023

Required tools and materials

1. Tools

Commonly found at home

- 1 small segmented blade or "snap-off blade" utility knife. Cutting plastic will wear the cutter's edge quite rapidly.
- 1 pair of thin pliers with a wire-cutting capability.
- 1 cutting board, made of a piece of wood, MDF, thick plastic or any other suitable material. Have a Ø 4 mm (*meaning: of a diameter of 4mm*) hole drilled through it, to make piercing cardboard much easier.
- *If available*: another utility knife or hobby knife, to cut cardboard and paper, thus leaving the aforementioned segmented blade utility knife for heavier duties. In doing so you will not need to snap off a segment of the blade whenever you need a clean or precise cut.
- 1 pair of nail scissors (slim ends are preferable) for cutting thin paper and thin cardboard precisely.
- 1 nail clipper to cut thin wire precisely. (Note: this will slightly blunt the nail clipper's blade, so choose an old or inexpensive one).
- 1 hand drill with an Ø 1 mm drill bit. *Such a drill usually costs about 10 Euros or US Dollars, including the drill bits. If you can, choose a model with a swivel top so that the drill sits in your palm while you turn the rest of the drill's body.*

- 1 hole punch (common stationary item), the standard version punches Ø 6 mm holes.
- 1 pin Ø 0,6mm, common stationery item.
- 1 pin Ø 0,4mm, typically used to hold cloth while sewing or in newly bought shirts, to make more precise holes to start with.
- 1 permanent marker to mark metal parts prior to cutting.
- 1 mechanical pencil to precisely mark cardboard and paper.
- 1 ruler (thin translucent plastic rulers with markings at a right angle are ideal).
- stationery hinge clips to hold small parts together while the glue dries. *If you don't have these hinge clips, you can hold the pieces together between your fingers until they are glued together.*
- Household glue, in liquid or gel form, to assemble the parts together.

Recommended additional tooling

- 1 magnet (diameter 5mm to 10mm approximately) that can be part of a handle to assist in painting the miniature.
- 1 calliper (the very economical plastic variety is sufficient, costing about 3 Euros or US Dollars). *It is the best way to make measurements at this scale, for instance for assessing the thickness of your materials. It will also prove useful when you'll develop your own designs.*

Always cut downwards on the cutting board and never towards any part of your body.

Please don't cut yourself.

2. Materials

Commonly found for free or nearly free

- Thick cardboard (1,5mm thick, like in delivery pizza boxes) is used for the bases of the miniature cars.
- Thin cardboard (for instance, train or subway tickets). It is used for the car's hood, the rear seats, the gearbox and other items.
- Medium cardboard used in food packaging (some brown cardboard varieties are less porous and thus preferred).
- Paper from tea bags is the best choice to visually replicate canvas. It is like fabric and holds well to stress.
- Thin kraft paper found for instance in paper bags for fruit and vegetables is useful the "mudguard" parts. Thin paper like cigarette paper or paper that is folded inside new shirts

or shoes is a substitute for thin kraft paper.

- Toothpicks are used for the wheels axles, the spare wheel axle and the windshield hidden structural beams.
- Flat transparent plastic, typically found in food packaging, is necessary for the windshield.
- Some adhesive tape is necessary to mask the windshield from paint and thereby create the windshield's window panes.
- Ear cleaning swabs ("Q-tips") are necessary to create the headlights, the steering wheel column and also the underside of the front seats. The cheaper brands are easier to work with.
- Some thread and some paper are used for some parts.

Wire, which may be found at home or bought economically

- Ø 0,45 mm medium wire from plastic-wrapped "double-wire" metal clips (from now on designated under the acronym "DWC"), typically used to seal bread bags. The wire or its plastic sheath are used to make the steering wheels, the rods for the canvas top and smaller details.
- Ø 0,3 mm thin crafting wire (typically sold online or in supermarket "hobby" promotions) are used to fasten the axles to the body.
- Ø 0,25 mm thin plastic-wrapped "freezer" wire, used to seal bags for the freezer, can substitute for thin crafting wire.
- Scraps of wire (up to Ø 0,8mm) to insert into the base so the miniature can stick to a magnetic painting handle. This makes it easier to paint the miniature.

Preliminary notes

Working on a small scale

The 1:64 scale is at the very limit of where one can operate visually and physically without optical help. The millimeter will be the unit of measurement here but it is often not practical to provide more precise values.

Below 0,5 millimeter, it is up to you to decide whether the result is satisfactory or not. Some practice will be required to cut the desired dimensions by eyesight alone.

The design incorporates some methods to bypass these size issues.

Glueing and fastening

Some materials used in this design, like wire and plastic, can't be glued reliably or directly to cardboard.

This is why the design makes use of wire loops, holes and other ways to assemble certain parts mechanically rather than glueing them.

Duration of the process

This booklet provides a duration for most

operations. It is only indicative, to help you plan ahead.

Setting up templates and jigs.

Some pieces have a simple design and are best drawn in batches, using a ruler. Illustrations will feature an example whenever it is the case.

replicate that pieces, and sometimes a way to position it precisely. Dimensions for the templates and photographic examples are provided in this guide. By using templates, you will be sure to have the same dimensions on all these pieces.

Other pieces have a complex design, which would be too time-consuming to draw every time you need that piece. In this case a template will have to be made, a piece of cardboard with all the markings needed to

Be sure to label each template and also mark the dimensions, as you will see in the illustrations. This will prevent confusion between templates.

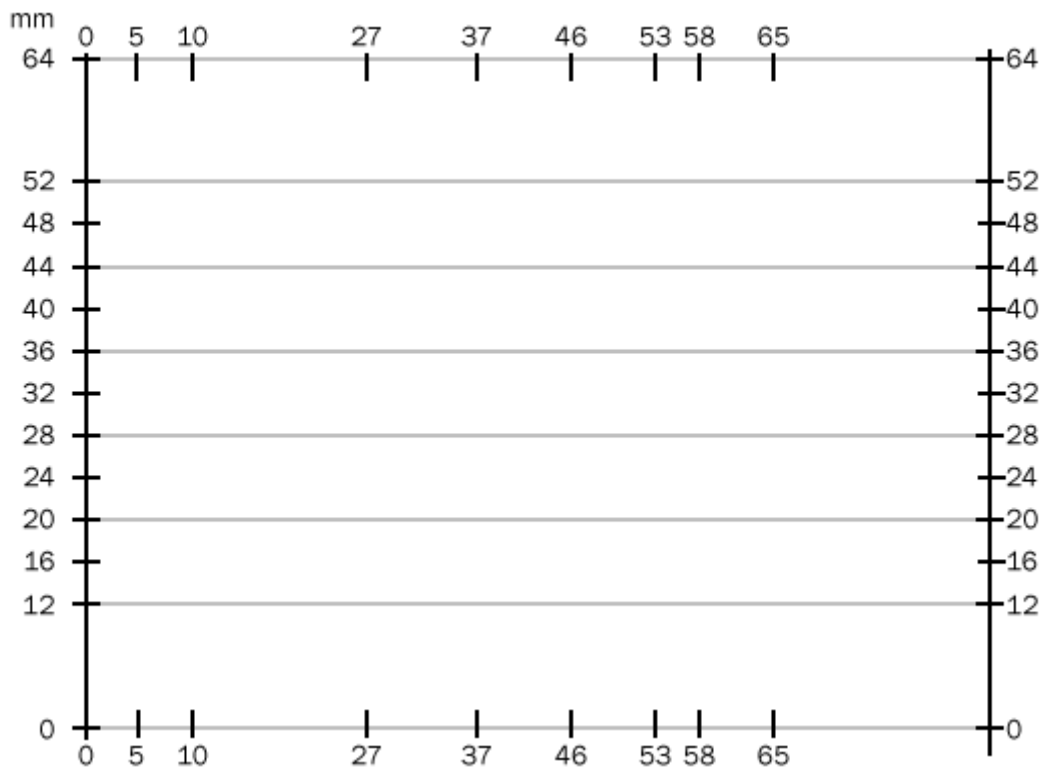
Part I : the template for the car's body

The main part of the design is the car's body.
The most efficient way to make this part is to
first create a template, that will allow us to
replicate the shape as well as where to cut,

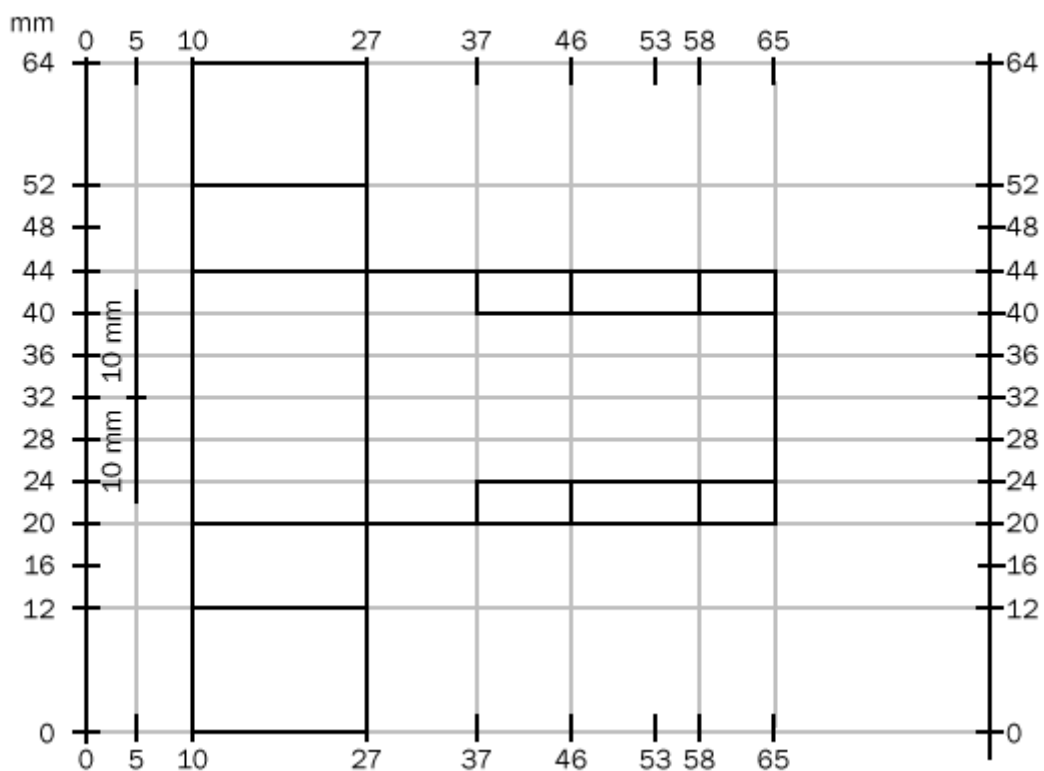
fold and pierce.

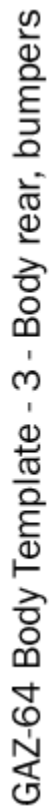
The process is described below in a step-to-
step fashion.

GAZ-64 Body Template - 1 - drawing a grid

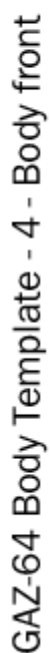


GAZ-64 Body Template - 2

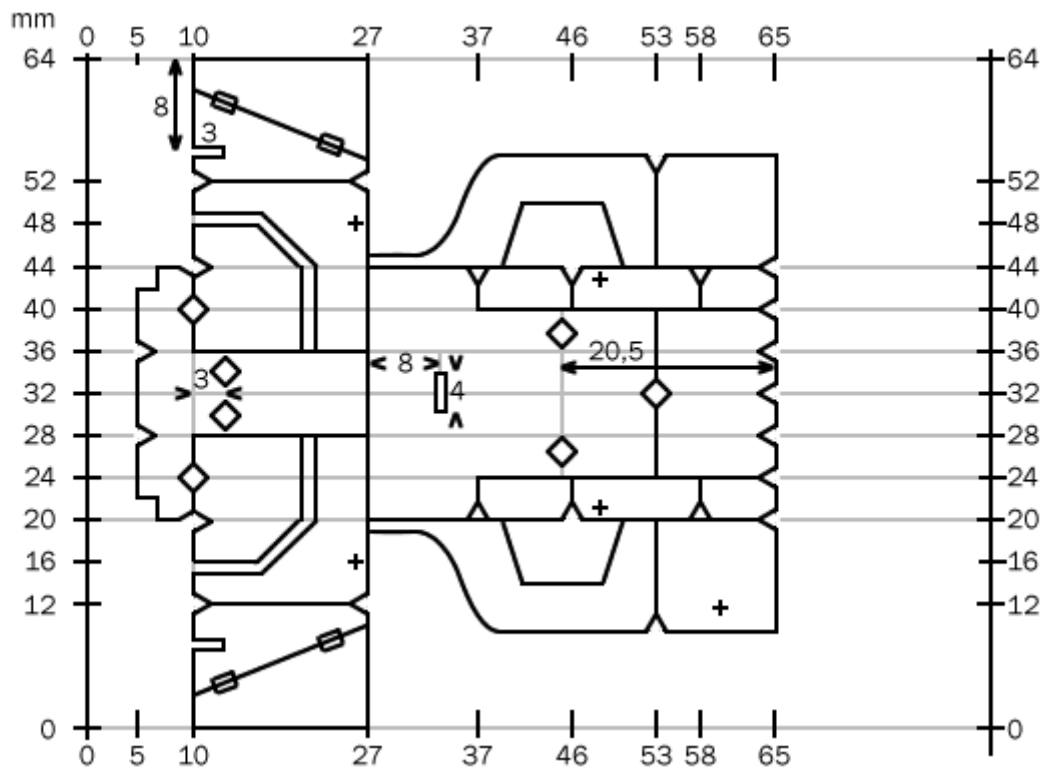




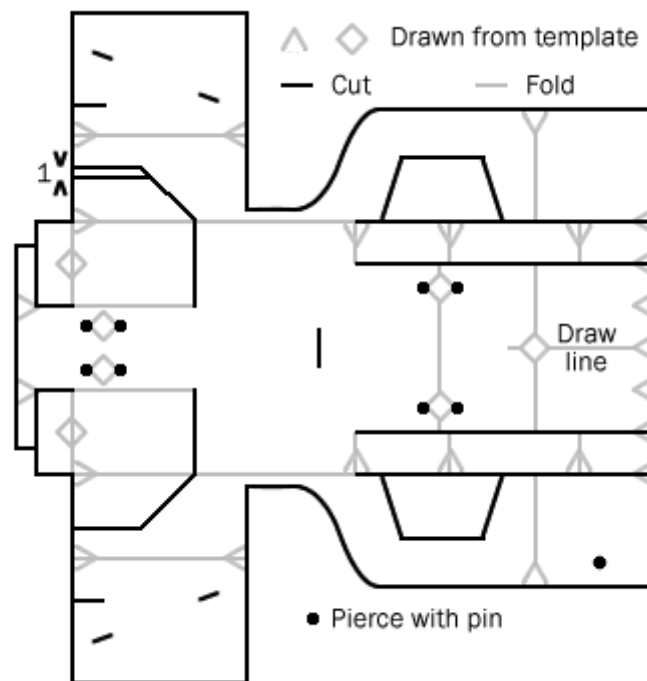
Draw several curves until you find the best one.



GAZ-64 Body Template - 5 - Marking holes



GAZ-64 Body - Folding lines and cutting



Note: the side where the marks are made is the bottom side of the body.

You can use a roller pen to draw on the folding lines, this will make folding easier and more precise.

Drawing template lines and markings: 32 minutes.
Cutting it from the cardboard and cutting all holes takes about 14 minutes.

Transposition on cardboard : 3 minutes
Drawing lines & points on new cardboard: 4 minutes
Drawing folding lines: 80 seconds
Folding lines and folding: 4 minutes

1. Installing the axle-fastening wire loops

Once the car's body has been cut to shape, The next step is to put the **thin wire loops** that are later going to fasten the wheel axles to the car's body.

This has to be done at that stage because these areas are going to be difficult or impossible to access afterwards.

Cut 80mm of thin wire, fold in two, cut, then again fold in two and cut, to obtain four

pieces of thin wire 20mm long

Fold each piece in two and insert the strands through the holes pierced on the car's body. Once the piece is fully inserted, fold each strand to the side, so it can't escape.

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Cutting and folding take about 120 s, installing all four loops takes 120 s.

2. Gearbox

On a piece of thin cardboard, draw a grid at the dimensions shown in the illustration below. Cut the sides at the 8mm mark.

This piece has three sections: a tab which will be inserted in a slot on the vehicle's bottom, a middle section that will be angled, and a long section that will be the most visible part of the assembly.

Pierce two holes, one in the middle section and one in the long section, as shown in the illustration. The hole in the long section can

be slightly widened with the tip of a toothpick.

On a piece of medium cardboard, draw 18 x 5 mm pieces, preferably by pairs as shown in the illustration. Cut two 18 x 5 mm pieces and glue them together.

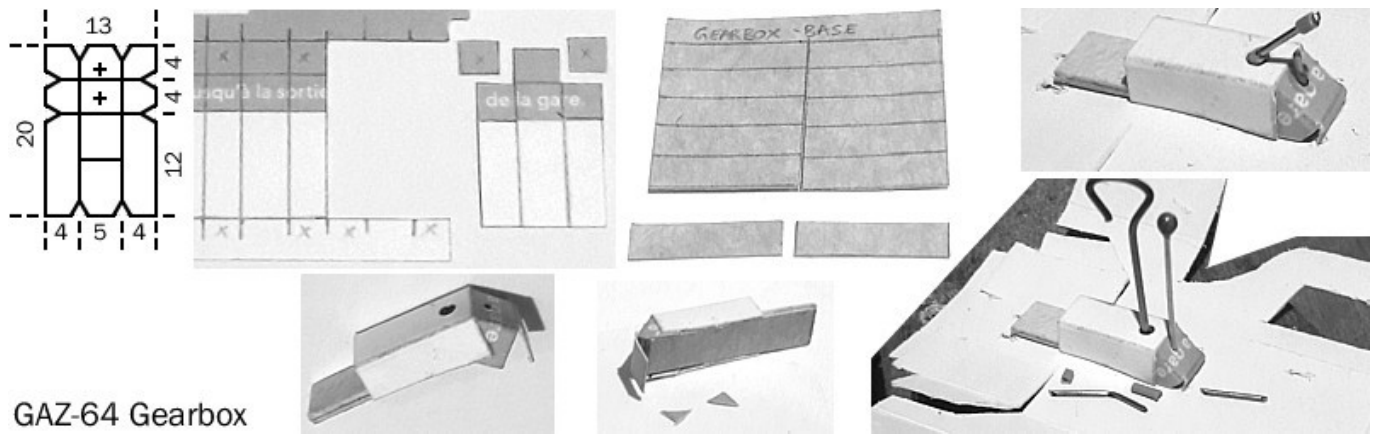
Main stick : 10mm medium wire, bottom sheath 3mm, pummel 1mm sheath

Bend not too much, approximately 30°, at the 4mm-6mm position.

Widen the sheath parts with a thin pin, then slide them further than their final position to ensure they will not fall off.

Secondary stick: 6mm

Perforate through the support strip at 90° (i.e. vertically) with a thin pin then a medium pin, so that the two levers have physical support in addition to the glue. The tip of the pin has to protrude from the bottom of the car.



GAZ-64 Gearbox

Glueing phase I: 4 min

Glueing phase II:

Engine : 7x6x7 x 10

Cut a strip of medium carboard 10mm wide and 20mm long, with folds at 7mm and

13mm. Fold it in a upside-down U-shape. When you fold up the two wings of the front body, glue their sides to that "engine" part and the "top" flaps to its top. *(picture pending)*

Folding the rear part

Forward mudguards Cut two strips of thin kraft paper 7,5 mm wide and 20mm long. Glue one end below the top (horizontal) part of the car body, wait until the glue hardens, then glue the other part under the car's body. *(picture pending)*

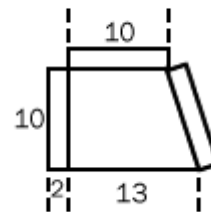
Measuring and cutting two front mudflaps: 100 s

Glueing one end of both front mudguards: 60 s

Glueing the other end for both: 40 s

Lateral rear fender covers Cut two parts of thin kraft paper accoridng to the schematics below.

GAZ-64 Rear fender cover



(assembly picture pending)

Marking two rear fender covers: 50s

Making folding lines on both rear mudflaps: 60s

Cutting out both rear mudflaps: 70s

Folding and glueing both rear mudflaps: 240 s

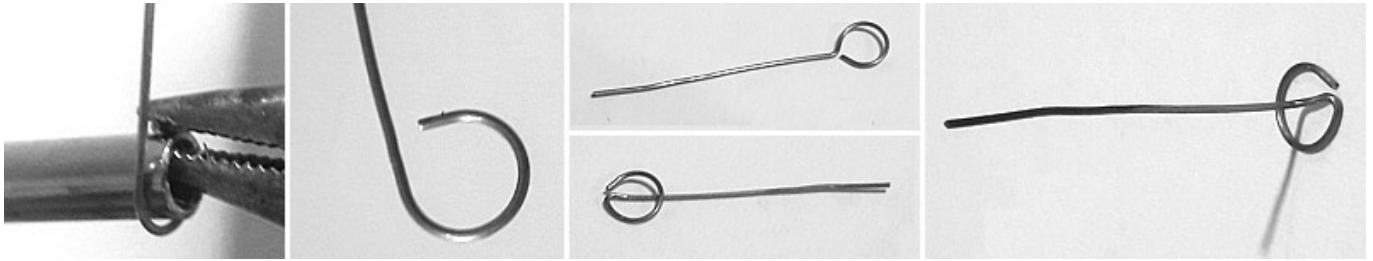
Part II – The windshield subassembly

Steering wheel

One bit of medium wire (50mm) can yield two wheels but longer shafts are easier to use in the assembly phase.

7mm of q-tip cut 45°

Cut 8 mm of the wheel shaft, the rest can be turned into the backseat top piece.



Windshield

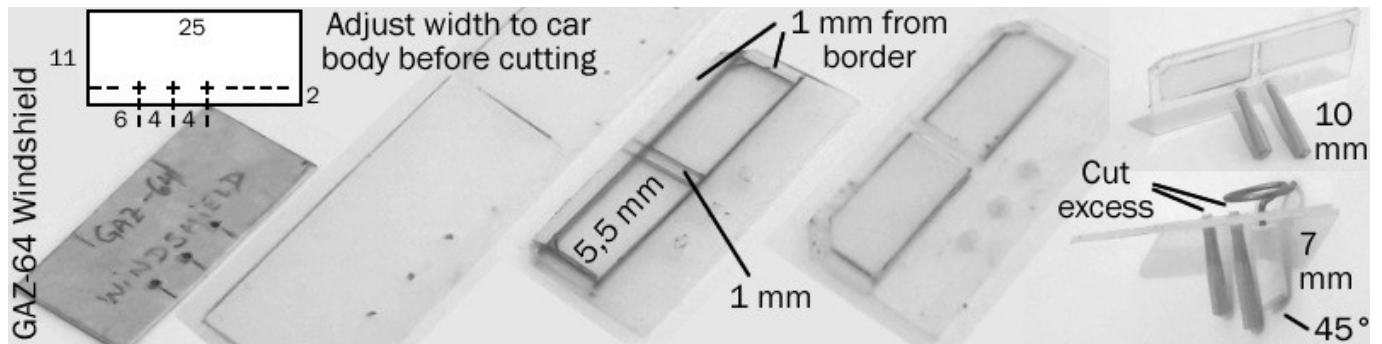
Shorten the toothpick so that its tip is just about more than flush to the board: it adds detail which you want to paint as dials.

Cut 10mm of the toothpick to act as structural beams connecting the windshield to the front par of the vehicles. These beams will be located between the hood and the

structre formed by the front wings.

Use the wheel hole to mark the cut to make for the steering wheel shaft.

When glueing to the car, maintain constant pressure to ensure for some minutes, because the forces on the beams might tilt the windshield to one side.

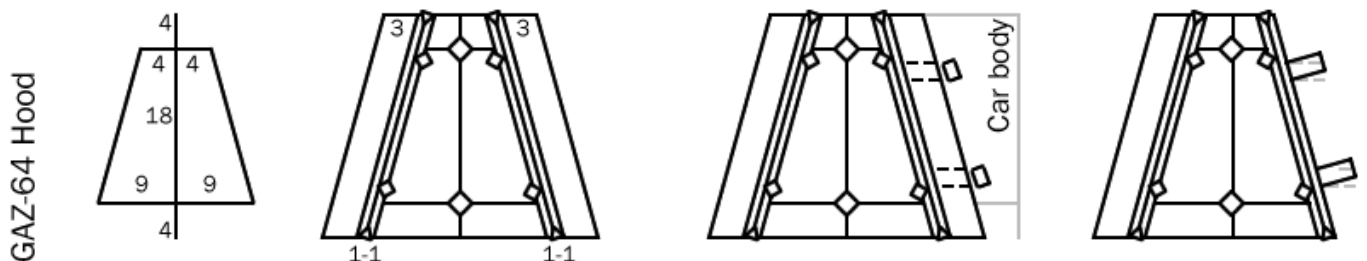


Hood - The part has been deliberately designed to be too long both at the front and at the rear so it can be trimmed down to the actual length when assembled to the car body.

Fold the hood size with a ruler or any other

straight object so that the last segment is perpendicualr to the car body's top.

The segments are so small that they should appear as forming an arc rather than be straight or angular.



Part III – Seats and wheels

Making front seats

Double wire clip (DWC)

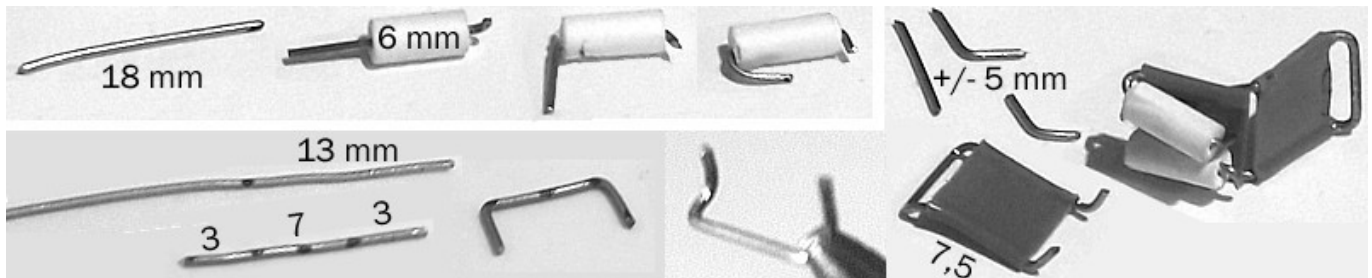
Top tube : 13 mm of medium wire, measure 3mm for either side of the central mark, fold down.

Fold rearwards, do not hesitate to bend significantly rather than too shallowly.

Feet: cut 18 mm of medium wire, make a cut at one end, slip 6 mm of Q-tip stem onto it,

then bend so that the height between the bottom (low side of the Q-tip part) and the top of the wire is about 4mm.

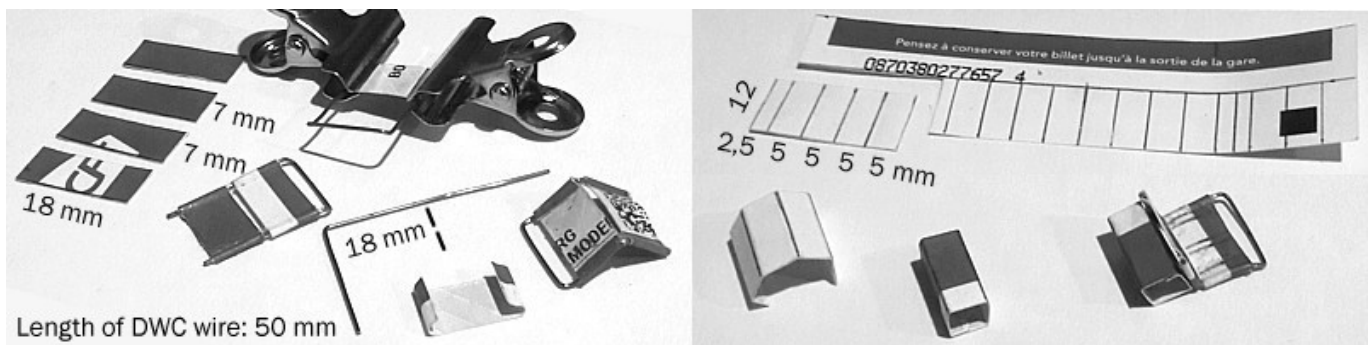
Cut the DWC ribbon into two 7mm-long pieces. The DWC ribbon is 7,5 mm wide, which happens to be exactly the width of a standard seat at this scale. Pro tip : use the DWC to measure the correct distance to have a square shape.



Back seat

Thin cardboard 7mm strip, cut 18mm pieces

complete medium wire (50 mm) measure 12 mm, bend at each end, then bend backwards.



Making wheels

Length **spare wheel** axis : 5mm

Position : 5,5mm from side, 2 to 3 mm from top ridge

Make a wheel painting jig

Part VI – last parts

Headlights

2 mm of Q-tip stem.

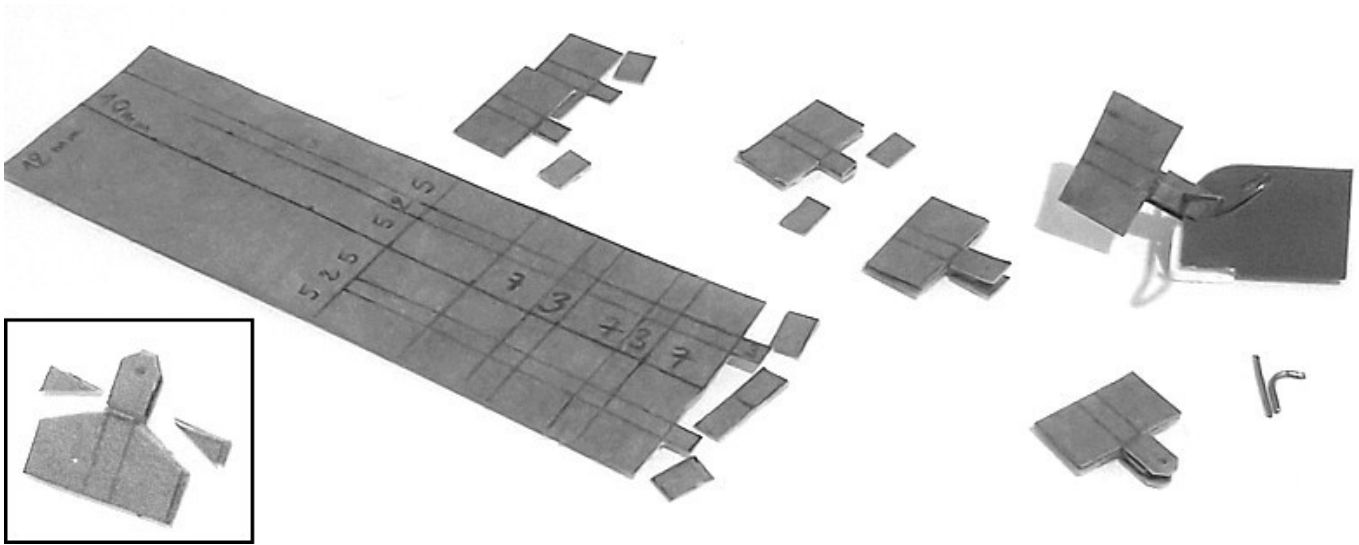
Measuring, cutting and protruding both

headlights:

Glueing both headlights: 70 s

Trailer hitch: band 12mm wide , 10mm medium cardboard, one part 7mm and the

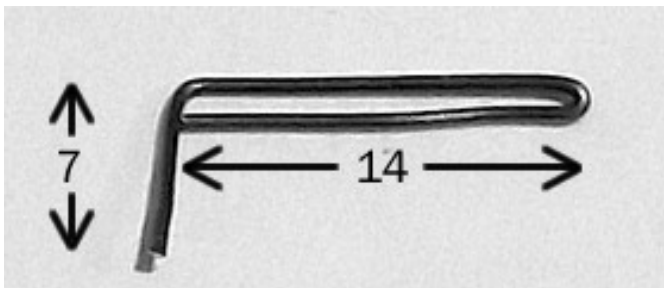
middle 2mm wide, use the (chute) to make the attachments flaps. Perforate.



Canvas top, rolled

Take a piece of medium wire, measure a distance of 14 mm from one of its ends, fold in two at that mark. Fold the longer part at a right angle to the loop, as shown in the illustration. Cut 7mm from the top of the assembly.

Cut a flag-shaped piece of Double Wire Clip, 2 to 2,5 mm high and slide it to the lower end of the structure. It will prevent the structure from sagging into the hole and act as a spacing fixture so that the loop stays about the vehicle's side.



Using pliers, bend the end of the loop so that from above it follows the rear corner of the vehicle's body.

We will hide the bent end of the loop with a piece of tea bag paper that will represent the rolled canvas top.

Note: the leftover part should be over 13mm long and can thus be used to create the top tube of the chair. If it is shorter, then use it to connect the seat parts together.

Rolled canvas : tea bag paper, cut strips of tea bag paper 64 x 20 mm (for volume effect) or 32 x 10 mm (without volume effect)

Make sure a hole has been pierced on the top side of the mudguard, as close as possible to the side panel (about half a millimeter from it) and about 10mm from the rear fold and 2mm from the front fold.

The smaller strip hides the bent loops and holds the structures in place. For a better looking part, use the larger part and fold it like in the illustration.

Measuring, cutting and ending wire for both sides: 165 s
s - Installing and bending the corner for both sides: 70 s (or less)

Canvas door flap, rolled

Make hole on each side, first with a thin pin then a medium pin. Piercing both holes : 60 seconds

cut 8mmx8mm squares of tea paper: marking a ribbon with 9 squares : 2min20s (-)
cut two square off at a time.

roll this square around a portion of medium wire in order to produce a roll.
Cutting off two squares of tea paper and rolling them both : 40 seconds

Take 100mm (10 cm) of thread, enough for both fingers to grab on its ends to tie the double knot.
insert thread. A simple tool made from medium wire (see photograph above) is most helpful here.

make loop, insert loop, on the other side use

pin or wire to unwrap the loop while holding one side of thread on the outer side.)
Apply glue to the door hinges, place the rolls of tea paper.

Tie each roll of paper with a double knot.

cut thread, leaving 3mm to 4mm of thread on each end so that they remain visible. Paint these ends too so the thread doesn't unravel.

All this takes about 60 seconds to do.

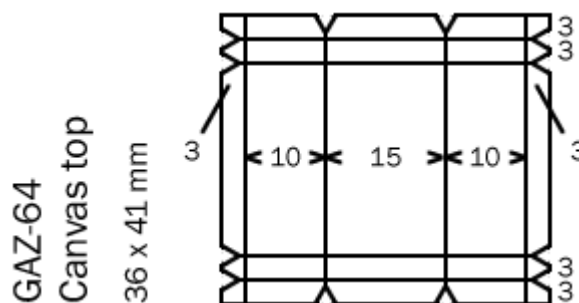
Canvas top deployed

Before painting

Medium wire, fold in the middle, then fold a 3mm. Measure 4mm, then fold each branch 45°, they are at 90° from each other.
Mark at 10mm then fold the rest in the same direction as the first 3mm

Connect the wire assemblies with each other using DWC tubes, then spray-basecoat the assembly.

Pierce holes for the thin wire



Connect each assembly to the body with thin wires

Cut at the first (junction) side corner, or fold inside

Glue the back of the canvas top

After painting

Take the transparent paper from a discarded windowed envelope and cut a rectangle at least 7mmx5mm in size.

Cut an opening 4mmx3mm in the back part of the canvas top (see schematics., cut an X, 4mm from bottom 3mm from top

cut an X, glue the flaps inside. Still on the inside, apply glue around the opening and glue the transparent paper as a window.

First glue the bottom to the back end of the car, making sure it is parallel to it. Then apply glue on the parts of the canvas you want to glue, and apply to the struts, progressing forwards. You can adjust the canvas on the windshield elements.

Once the canvas is positionned, pinch its lateral borders to accentuate the corner.

Canvas door flap, deployed

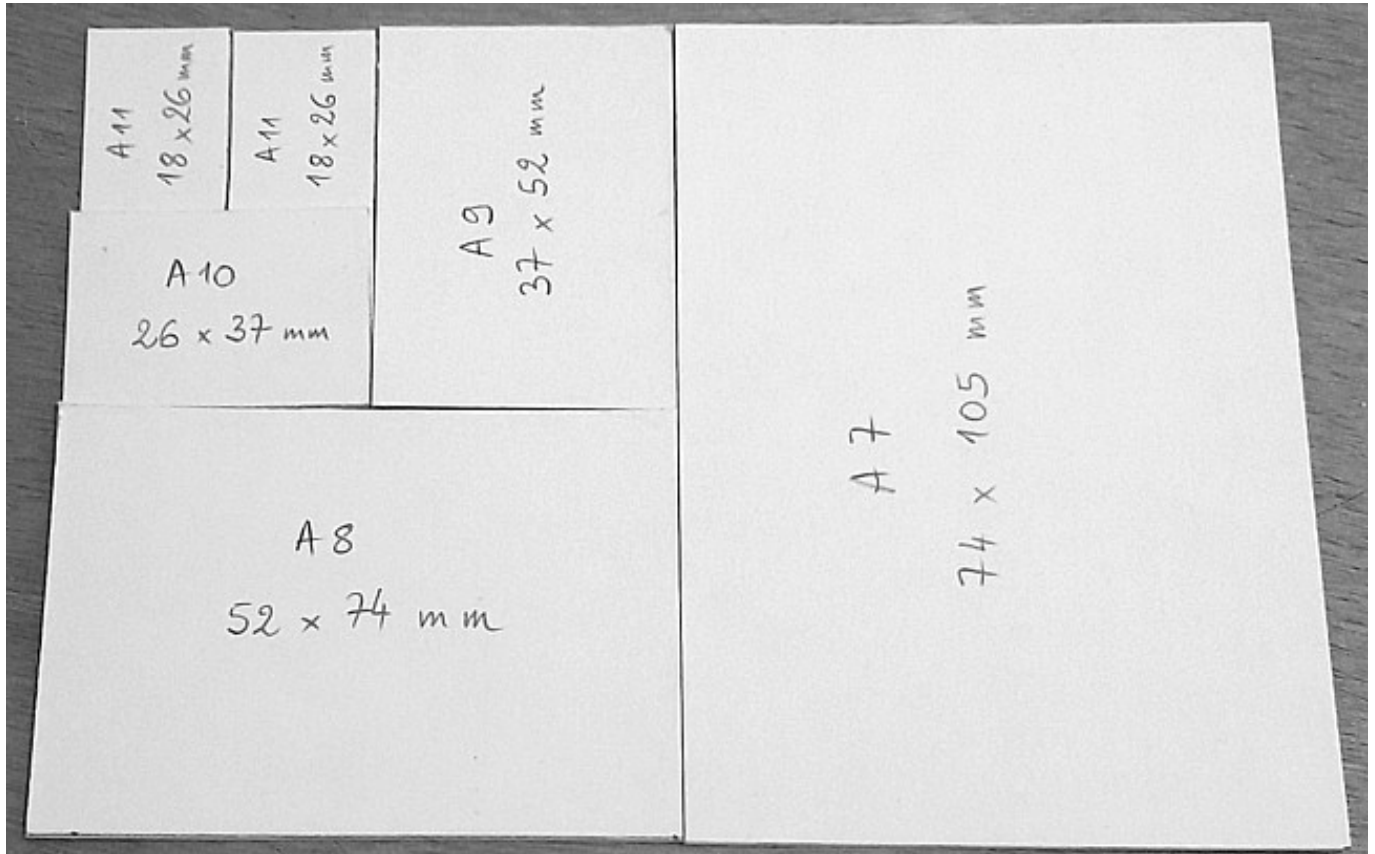
tea paper, right trapeze, height 8mm, top length 14mm, bottom 11mm.
apply glue around the door opening, put piece of tea paper over it. glue over, cut the bottom

part of the flap to match with the curvature of the door opening.

Either way, hole midway of side height, about one millimeter from hole straight limit.

Part V: bases

1. A9 size base elements and assembly

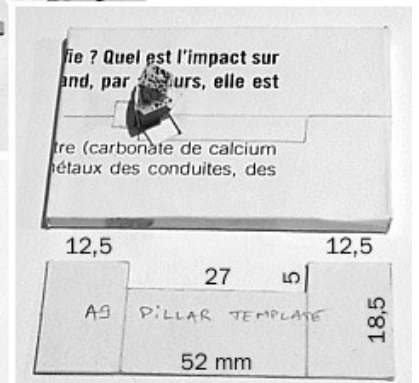
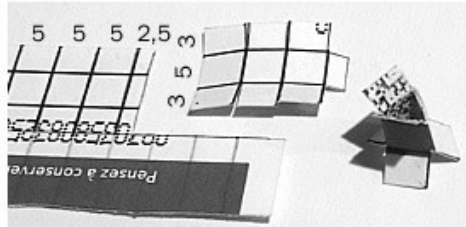
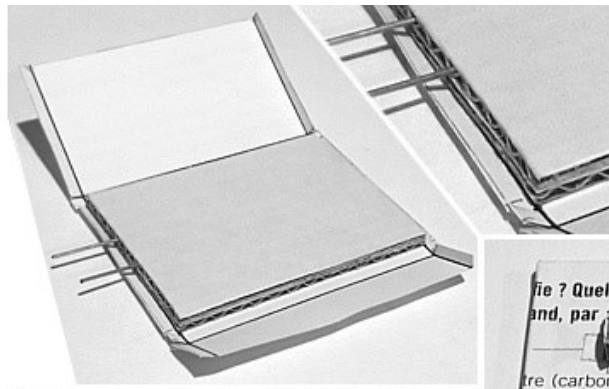
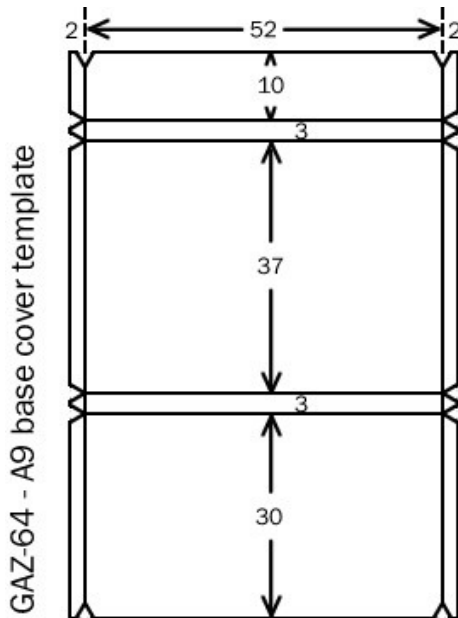


Toothpick Miniatures bases are extending the A4 paper size system, as illustrated above. Troopers use the A11 size, light vehicles such as the GAZ-64 jeep use the **A9 size** (37 x 52 mm)

The base needs two pieces of **corrugated cardboard** 1,5mm thick, as found for instance in pizza delivery boxes, paper and

steel wire, bailing wire or steel bits.

Cut the 37 x 52 mm pieces from the cardboard so that the corrugations (the undulated, or wavy, cardboard sheet in the middle) of the two pieces are perpendicular one to the other (see detail A on the illustration below).



Draw a piece of **paper** according to the dimensions specified in the illustration below. You can make a template for it, but given the few number of times you'll be using it it is just as efficient to draw directly onto paper.

Use a roller pen on the lines so that the shape

can fold precisely. Cut the paper piece off and fold along every line to give the piece its shape.

Cut to separate the small "intersection" part so that it can be folded later on the sides of the base (see detail B on the illustration).

Take the cardboard piece with the short corrugations and glue it to the central part of the paper piece. Once it is in place, glue the other cardboard part, with the long

corrugations, on top of the first one (see detail A on the illustration).

This gives the base the most strength.

Now is the time to cut two pieces of steel **wire** less than 50 mm long and insert them inside the cardboard piece with the long

corrugations (see detail C on the illustration). They do not require to be glued inside, but if you do they won't rattle afterwards.

Apply glue on the smaller lapel and fold it onto the cardboard. Proceed with the large one; it is expected to overlap on the smaller lapel.

Note: the order of folding the lapels is not important here but it is when you're

assembling the trooper miniatures.

Glue the small tabs to the side of the base, then the side lapel that is going to be on the bottom side (where the overlapping lapel is located) and finally the side lapel from the top side, much like wrapping a parcel.

2. Base pillars

On a piece of **thin cardboard**, draw 5mm intervals with a roller pen; every fourth interval will be divided in two, in order to provide a tab with which to glue sides of the

pillar together.

Still with a roller pen, draw intervals of 3mm, 5mm and 3mm as shown in the illustration

above. With a <u>cutter</u> , cut to separate the 3mm	petals one from another.
Fold into the shape of a prism then <u>glue</u> the tab to the opposing side. Unfold the petals	and <u>cut</u> one petal off the top side, so it doesn't get in the way of the wheel axle.
Make a simple <u>positioning template</u> as shown in the illustration. The template will be aligned on one side of the base in order to draw positioning lines. Finally <u>glue</u> both	pillars with the base of the triangle against the vertical positing line and its point to the horizontal one.
All that is left to do is to apply base materials if required, spray-paint a <u>basecoat</u> colour and <u>paint</u> the base. <u>Glue</u> the vehicle to the base	only when the paint has dried on all parts.