

The “Liebherr Mining Crawler Dozer PR 776” for everyone

The Project

In the Autumn of 2015 the first discussion took place between Liebherr-Werk Telfs GmbH and the teaching staff at the Federal Technical Training and Research Institute at Innsbruck (HTL) Anichstraße. The aim was to create an inexpensive paper model of the Liebherr PR 776 that could be constructed by young people to a remarkable scale of 1:25. The task of creating such a model was given to the students of Class 3 Mechanical Engineering. With support from the teaching staff and Liebherr, 16 students from the 3BHMBT class worked with great enthusiasm on the project. To evaluate the practical suitability of the model kit, the services of specialist modeller Mr. Albert Nindl were called upon. The completed model was presented at the Bauma 2016 exhibition in Munich, in conjunction with the world première of the full-size Liebherr PR776, and over the following months the kit was developed for "series production".



Class 3BHMBT at the Liebherr exhibition stand with professors Jörg Knofler and Michael Grif together with Johannes Mayr from Liebherr.

We are more than pleased with the fantastic result and would like to hereby express our thanks for the excellent collaboration with the HTL Anichstraße!

From the team at Liebherr-Werk Telfs GmbH

The Federal Technical Training and Research Institute Innsbruck Anichstraße

In 1877 architect Johann Deiningner founded a drawing and model making school in Innsbruck. After the addition of a number of buildings and the introduction of new disciplines, the department of Mechanical Engineering was opened in 1959/1960. This was later extended to accommodate the disciplines of Electronics, Electrical Engineering, Business Administration, and a Research Centre. To keep pace with changes in the demands of the market, the range of subjects on offer has also been further extended to include the new discipline of Biomedical and Healthcare Technology.



The Liebherr Group of companies

Liebherr is not just one of the world's largest construction machinery manufacturers. With over 41,500 employees, it also shapes technological progress in many other industry sectors. The Liebherr family still actively steers the management of the group. The exceptional broad product range of the Liebherr Group is the result of step by step development. This range

covers a total of eleven business areas, which in addition to construction machines also includes mining products, maritime cranes, gear cutting and automation systems, products for the aerospace and transportation sector, components, refrigeration and freezing appliances and hotels.

Die Liebherr-Werk Telfs GmbH

Crawlers have been an integral part of the Liebherr range for more than 40 years. They are developed, built and distributed by the Liebherr plant at Telfs, Austria. Development milestones, such as the hydrostatic drive and the intuitive joystick control, offer maximum efficiency and easy operation.



The largest hydrostatically driven crawler dozer in the world

The new PR 776 crawler for mining was presented to the public in 2016 at the Trade Fair for Construction Machinery in Munich. Weighing over 73 tonnes, it is not just the largest bulldozer in the Liebherr range, but also the world's first fully stepless machine in its class, and the largest hydrostatically driven crawler in the world.

This advanced drive concept makes it exceptionally efficient and very simple to operate using joysticks. However, the PR 776 also sets new standards in comfort and safety.

This class of crawler dozer is frequently used in mines around the world, for example in the mining of coal, iron ore, copper, gold or diamonds. However, these giants can also be found extracting gravel and ballast, and in stone quarries and earth moving. Further information about the Liebherr Group, its products and services, and the PR 776 can be found at www.liebherr.com.



Assembly Instructions for PR 766 Paper Cut Out Model

1. The Liebherr PR 776 crawler dozer paper cut out model consists of 5 sub-assemblies:



2. 2. Materials and equipment required

2.1 Quality of paper (optional)

The use of semi-gloss photo paper (maximum 190 g/m²) or standard copy paper of 120 to 160 g/m² weight is recommended.

2.2 Printer settings

Choose the settings in the printer driver menu that are recommended by the paper manufacturer (quality and weight of paper, highest printing quality)

2.3 Tools

Metal ruler

Scissors and craft knife to cut paper

Glue (craft glue)

Small wooden sticks (to produce bends, and as glue spatula)

Caution! Keep the materials and equipment out of the reach of children.

3. Assembly instructions

3.1 Hints on cutting out

First, examine and identify the areas that are more complex (e.g. cuts inside the contoured edge, etc.). As a general rule, the folded sheet is cut out along the outer contoured edge, but pay attention to the glue tabs. Within the outside edges, there are also printed contour lines that must not be cut. Label smaller cut outs on the back. It may be necessary to touch up the colours at the folds, if the printed colour comes off after folding. Take care to colour any areas that will be exposed once the model is assembled before gluing it together

3.2. Explanation of lines and symbols:

The lines to be cut (contoured edges, glue tabs) are indicated by narrow continuous lines. Printed lines or areas may have different line widths or textures. Glue tabs can be identified by the bevelled sides. The folds, both for the glue tabs or for assembly, should be creased BEFORE cutting out (see point 3.3).

3.3. Producing perfect folds

Creasing of the required outer and inner folds beforehand will considerably improve the end result. You can use a panel pin or a used ballpoint pen refill pen to do this. Alternatively you can lightly score along the required fold with the paper cutting knife. To improve the visual appearance, you may need to run a suitable coloured marker or pencil along the folds on the finished model. Bring the folded paper into a perfect rectangular or rounded structure before gluing it together.

3.4. Forming the cut sheets in to sub-assemblies

The simplest way to produce the sub-assemblies is to follow the preferred sequence for the glued joints, as shown in the series of photos or the instruction video.

3.5. Assembling the sub-assemblies into the finished crawler dozer

Finally, the sub-assemblies must be joined together at the designated positions. The detailed description for this can also be found in the instructions for the individual cut outs.

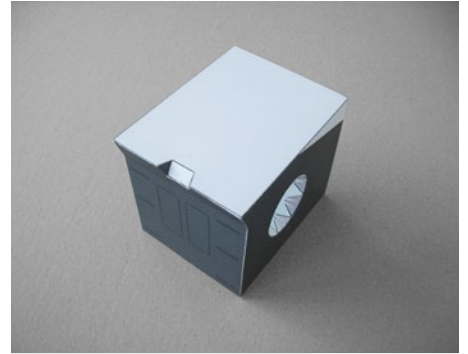
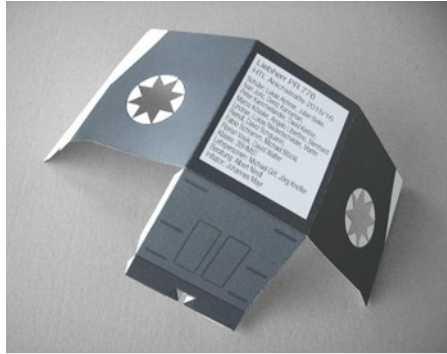
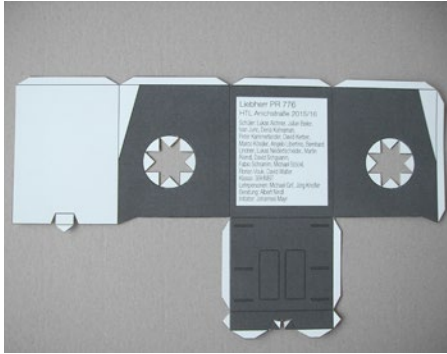
3.6. Alternative use of the model as a pen holder

By making the corresponding cut outs in the roof of the cab before gluing, it is possible to use the finished model as a holder for pens or similar items.

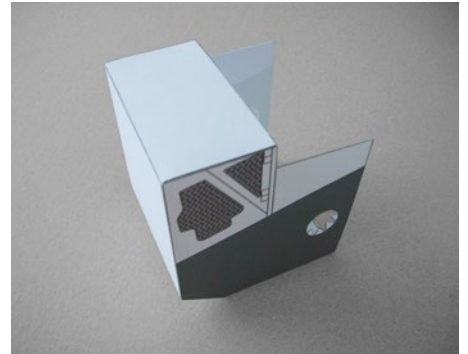
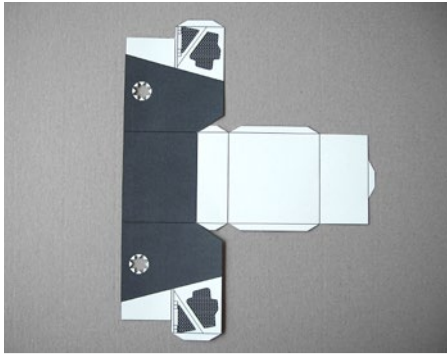
Caution, a continuous edge of at least 3 mm must remain

A: Mainframe with cab

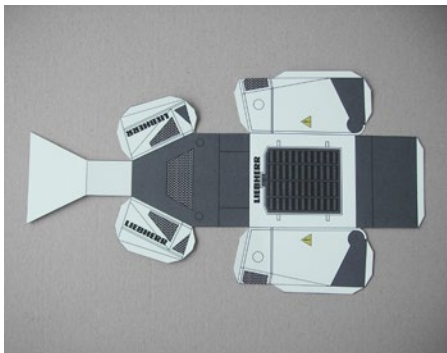
Rear part of mainframe (1)



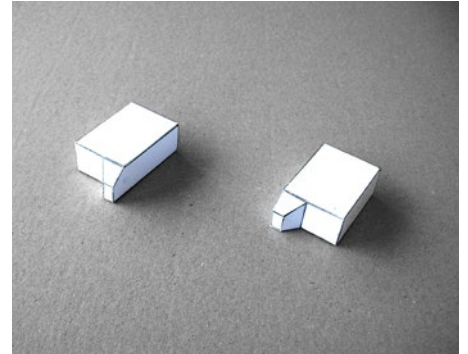
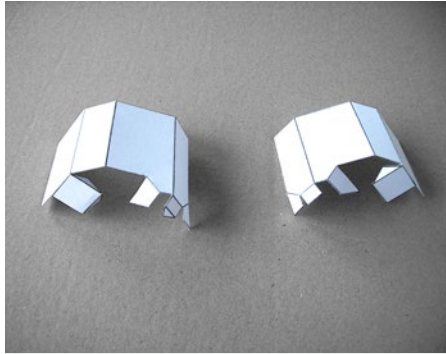
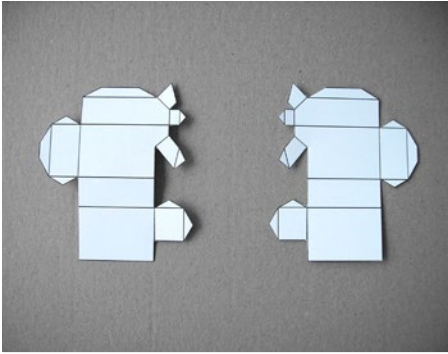
Centre part of mainframe (2)



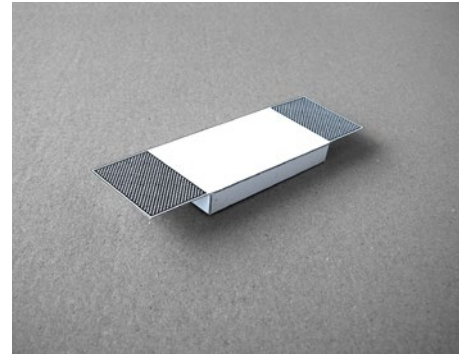
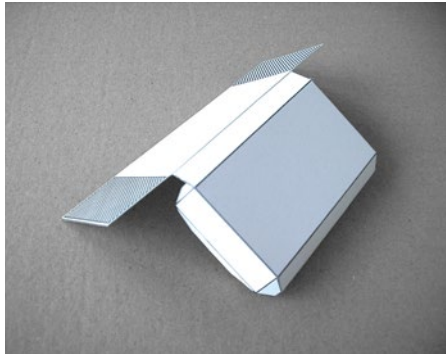
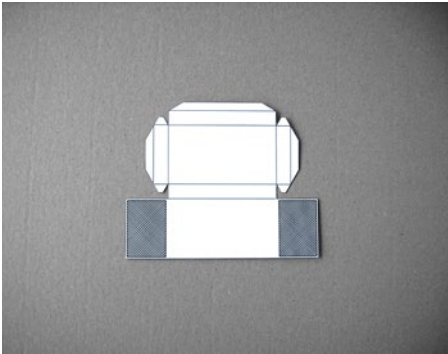
Front part of mainframe with engine hood (3)



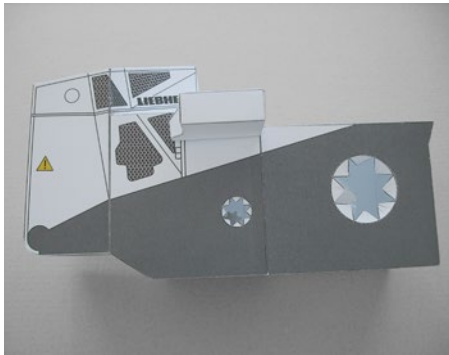
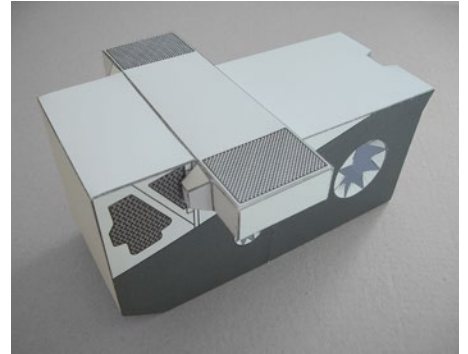
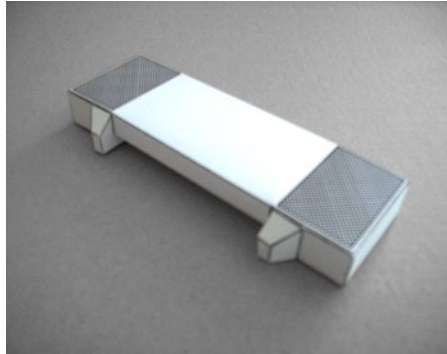
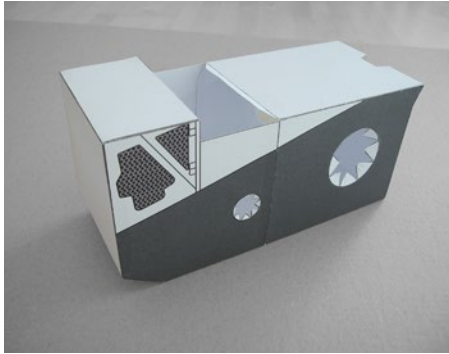
Left and right battery compartments on the mainframe (4 + 5)



Centre battery compartment (6)

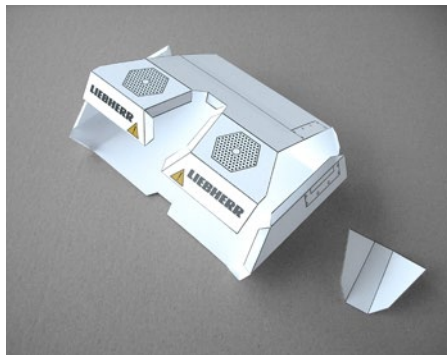
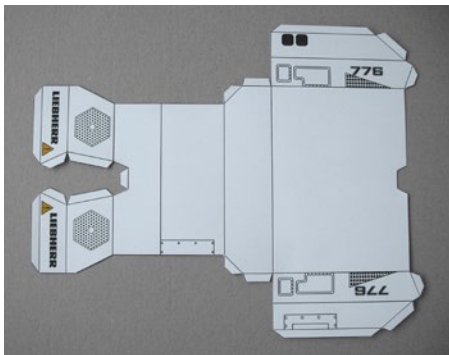


Assembly of mainframe and battery compartments (6)



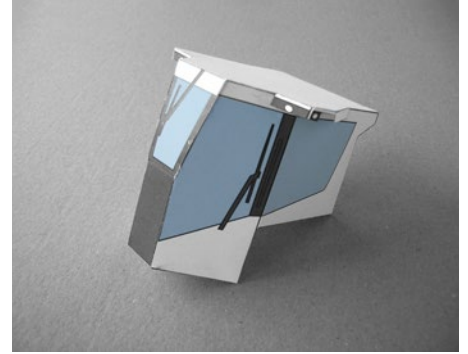
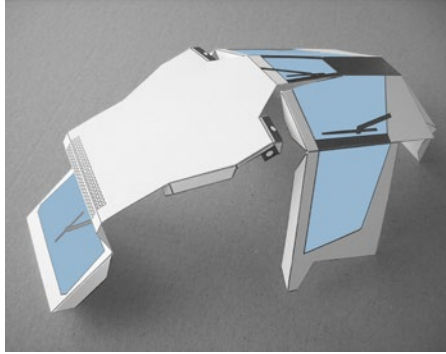
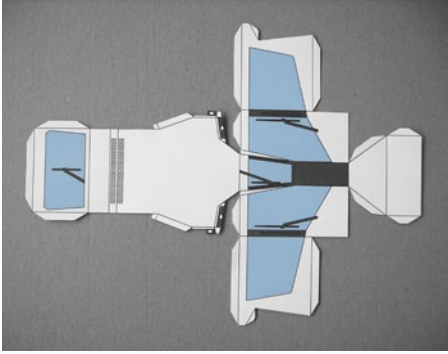
Fuel tank (7) with recess (7a)

First glue the side panels to the surface for the cab, then join up with the upper surface and glue the recess last.

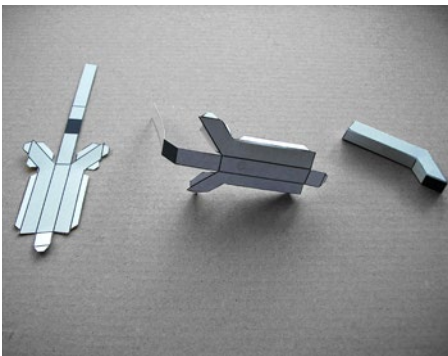


Cab (8)

First close up the side window panels to the front window, then glue on the roof with the side panels.

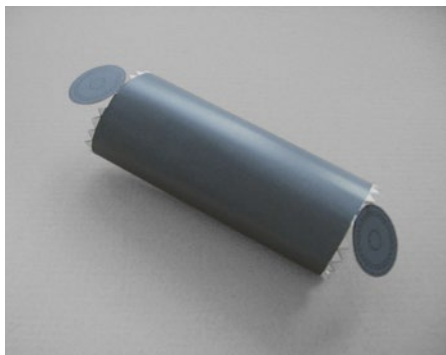
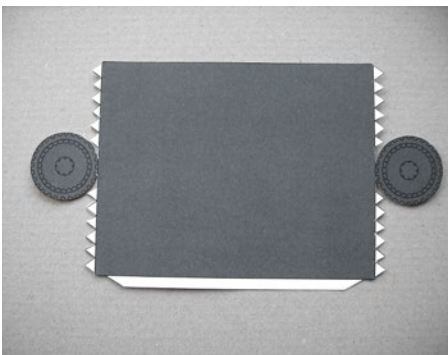


Right and left exhaust (9 + 10)



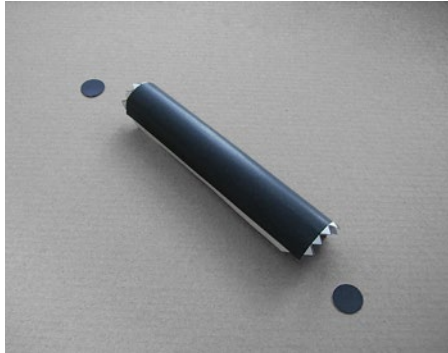
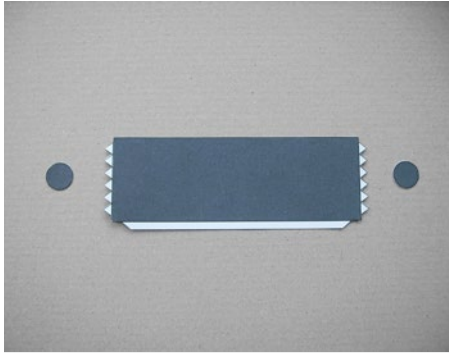
Final drive with sprockets (11)

Before gluing, roll the surface around a cylindrical object.



Carrier rollers (12)

Before gluing, roll the surface around a cylindrical object.



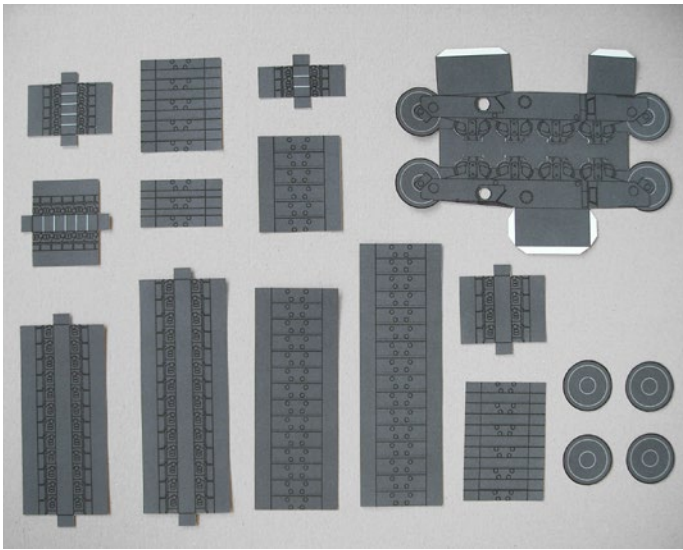
B: Undercarriage

The track chain is made up of straight and curved pieces (for strengthening, and because of the printing, an inner and outer part are glued together beforehand). The tabs of the straight pieces are glued to the inside of the round pieces, whereby the inner tabs must be glued first, in order to produce the correct

circular dimension of the finished chain. This is then placed on the pivot shafts and glued to the undercarriage frame, which in turn is glued to the mainframe.

All undercarriage and track chain parts

(13, 13A, 13B, 13C, 13D, 15A, 16A, 17A, 18A, 19A, 20A, 21A, 22A, 23A, 24A, 25A, 26A) und
(14, 14A, 14B, 14C, 14D, 15B, 16B, 17B, 18B, 19B, 20B, 21B, 22B, 23B, 24B, 25B, 26B)

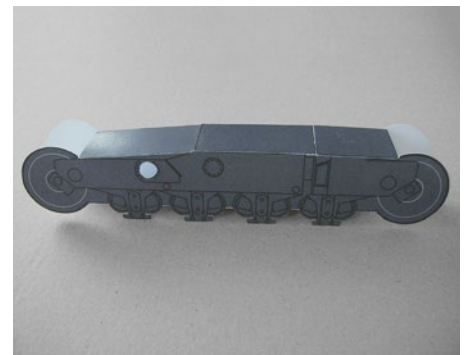
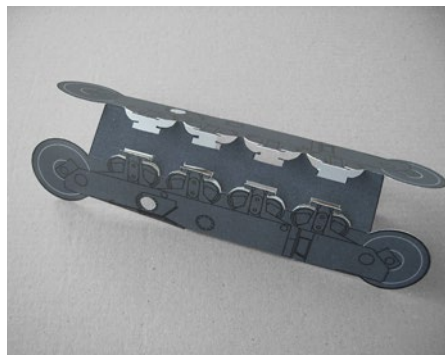
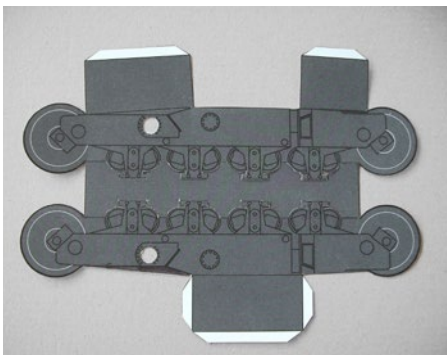


<https://www.youtube.com/watch?v=0-JQAJPLtpE&feature=youtu.be>

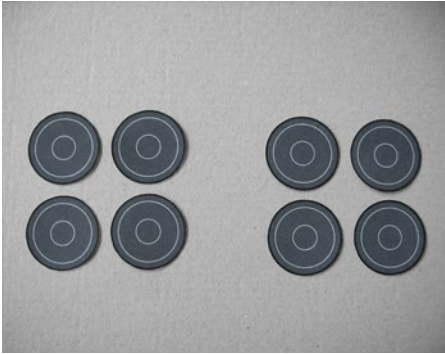
Left track frame (13)

Right track frame (14)

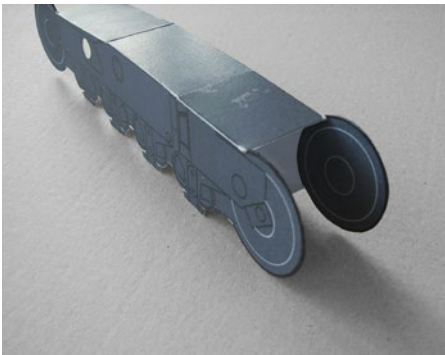
Both shapes must be cut out (idlers, guide tabs)!



Idlers (13A-13D and 14A-14D)



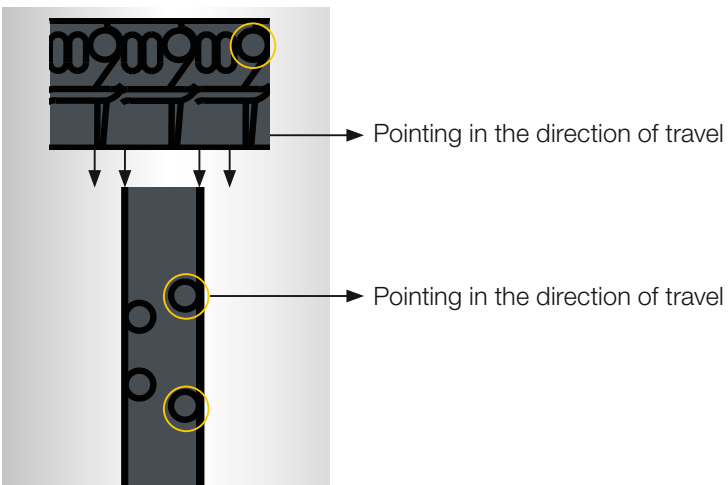
Idlers can be glued to the inside of the undercarriage, to cover up the white surface:



Track chain

(15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26 jewels A+B)

Caution: The assembled chain has the following features: On the chain track pads, the holes spaced further apart point in the direction of travel (small circles), as should the chain connecting pins (large circles).



The completed chain consists of the following parts (exclusive of the track frame):



The following steps are duplicated in each case:

Lower outer straight part of the chain (15A, 15B)

Lower inner straight part of the chain (16A, 16B)

Rear outer straight part of the chain (17A, 17B)

Rear inner straight part of the chain (18A, 18B)

Front outer straight part of the chain (19A, 19B)

Front inner straight part of the chain (20A, 20B)

Note: All straight chain parts are assembled in the same way.

Instructions for straight outer parts:

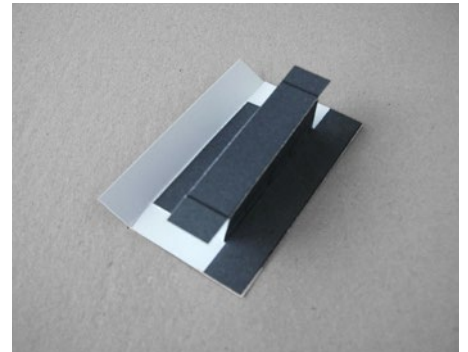
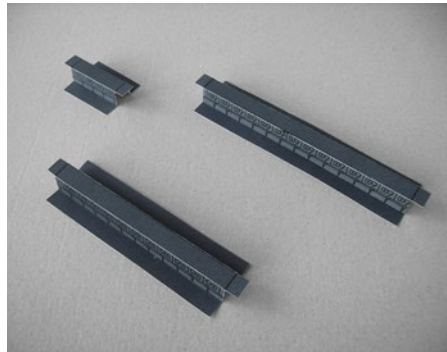
(15, 17, 19 in each case A+B)

Instructions for straight inner parts:

(16, 18, 20 in each case A+B)

Assembly of the straight parts:

(15+16, 17+18, 19+20 in each case A+B)



First glue the tabs of the inner parts into the outer parts, then fold and firmly glue the protruding edges.

The following steps are duplicated in each case:

Upper outer chain radius (21A, 21B)

Upper inner chain radius (22A, 22B)

Rear outer chain radius (23A, 23B)

Rear inner chain radius (24A, 24B)

Front outer chain radius (25A, 25B)

Front inner chain radius (26A, 26B)

The correct position of the glue tabs of the inner parts is given by the cut in the outer parts, starting at the edge of the outer parts.

Note: All round chain parts are assembled in the same way.

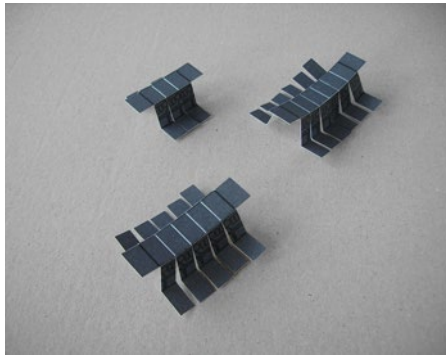
Instructions for round outer parts:

(21, 23, 25, in each case A + B)



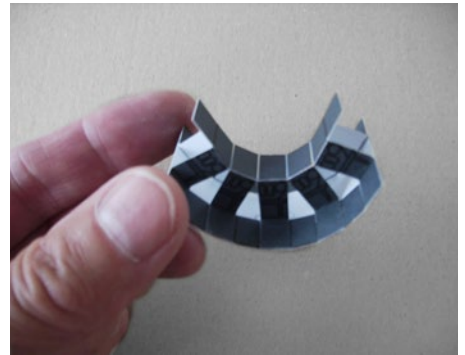
Instructions for round inner parts:

(22, 24, 26, in each case A + B)

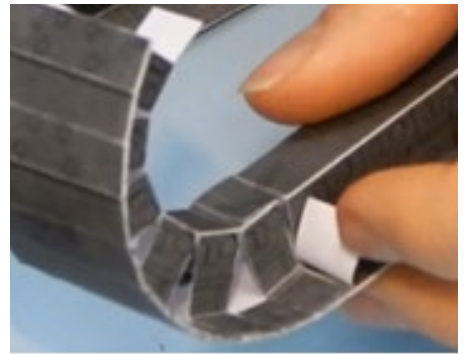
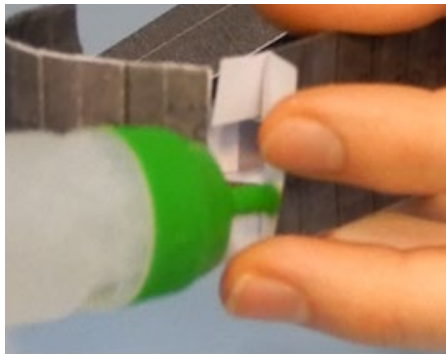
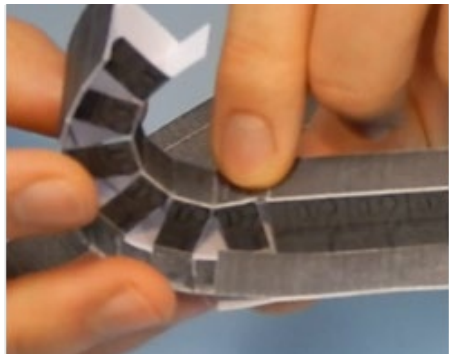


Assembly of the round parts

(21 + 22, 23 + 24, 25 + 26, in each case A + B)



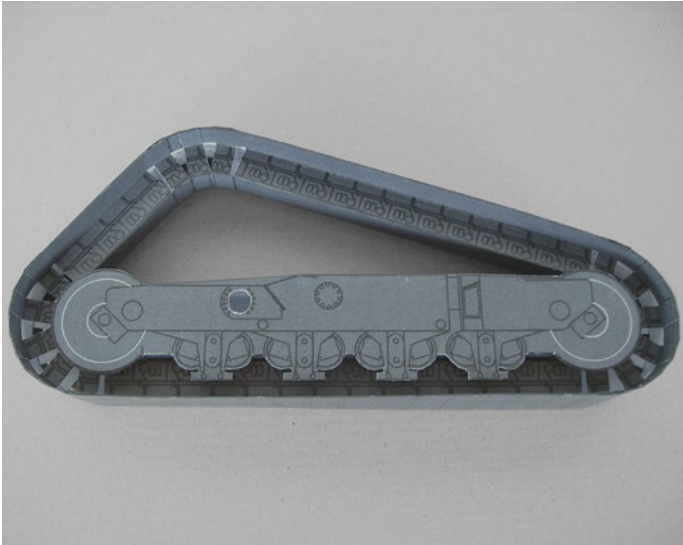
Assembly



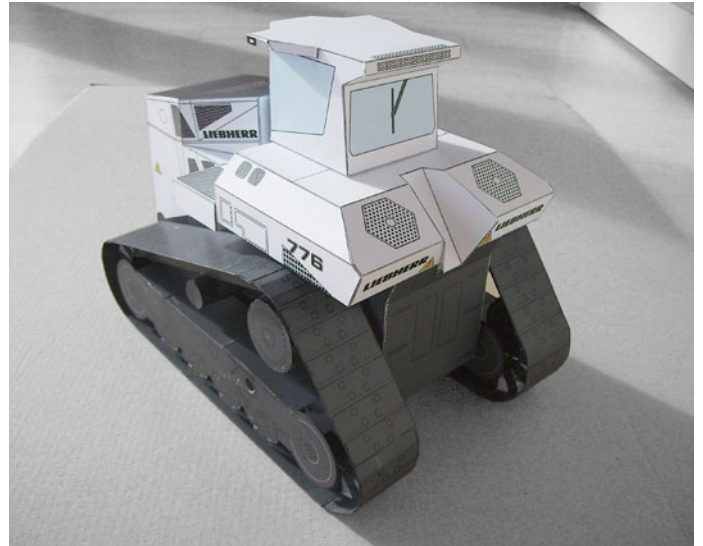
First glue the inner tabs, then in each case glue the adjacent outer parts with the outer tabs. Care must be taken that the inner chain links lie flush against the straight pieces.

Finished undercarriage

Glue the track frame in to the chain with a slight overhang so that a 3D effect is created.

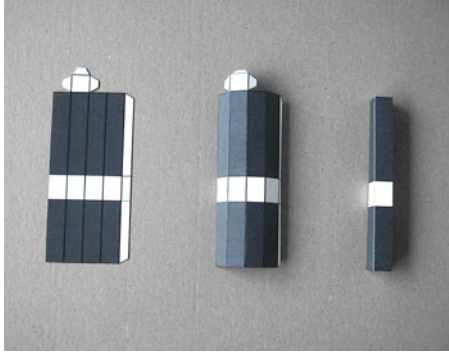


Construction progress

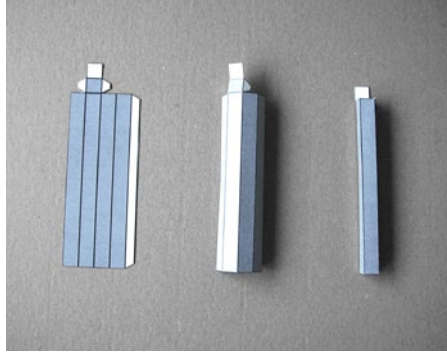


C: Pushframe with blade and lifting cylinders

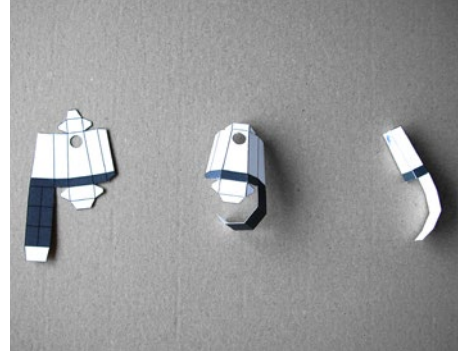
Left lifting cylinder (27)
Right lifting cylinder (28)



Left lifting cylinder rod (29)
Right lifting cylinder rod (30)

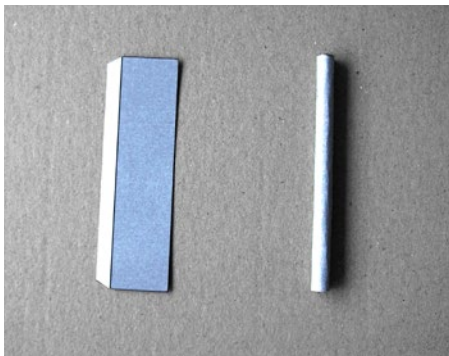


Left lifting cylinder mount (31)
Right lifting cylinder mount (32)

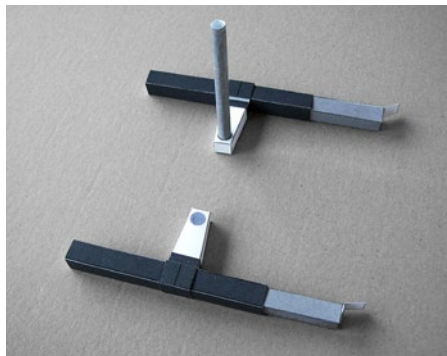


Through axle for lifting cylinder mount (33)

Glue a bracket onto the through axle and glue the other bracket after mounting the axle through the engine hood.



1



2



3

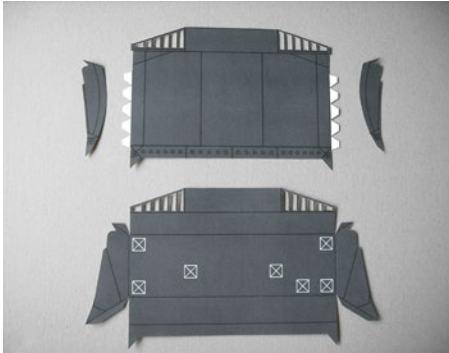
Front blade part (34)

Rear blade part (35)

Left side part (36)

Right side part (37)

Bend the surfaces of the blade component (Fig. 2), attach the side panels onto the glue tabs (start with the top glue tab), fit the side panels one above the other, and fit the lower edge and upper edge into the rear blade part (Fig. 3).



1



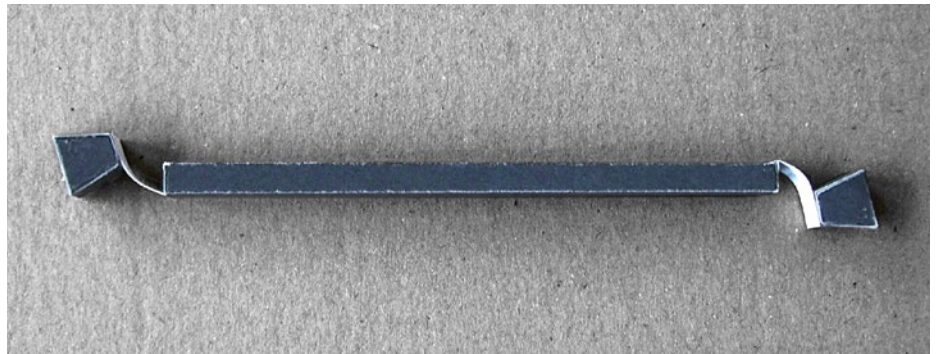
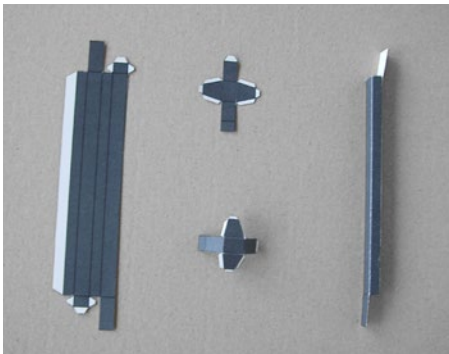
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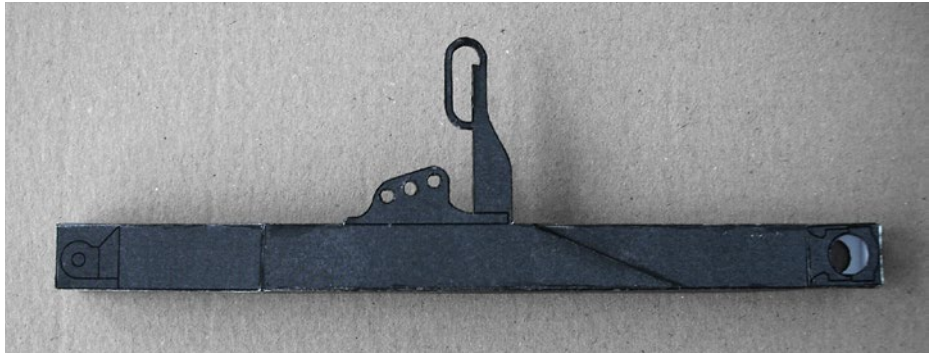
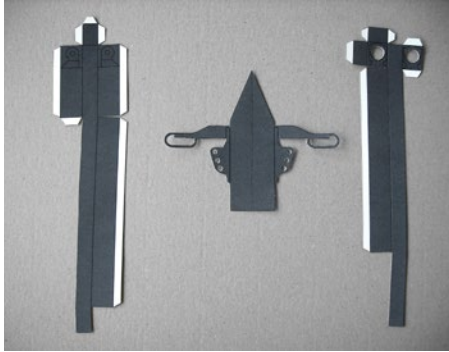
3

Cross brace (38, 38A, 38B)

Using the spacers (38A + B), this is attached with the tabs to the engine hood and the blade. It should be noted that the tab must be shaped as shown in the figure (not folded!).



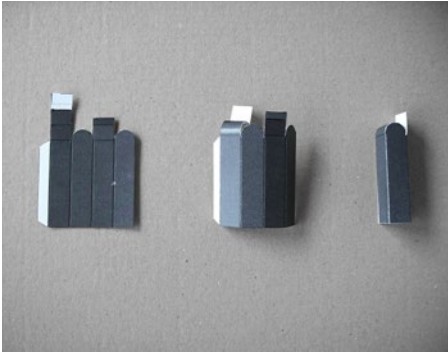
Left pushframe (39A, 39B)
Right pushframe (40A, 40B)
Steps with handrail (48, 49)



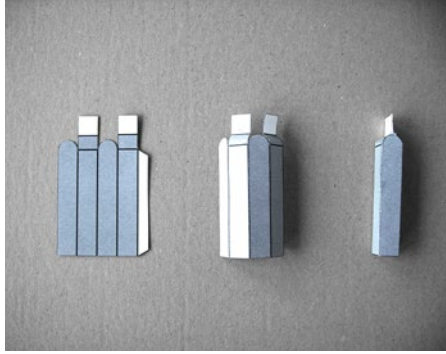
Left connector to undercarriage (41)
Right connector to undercarriage (42)



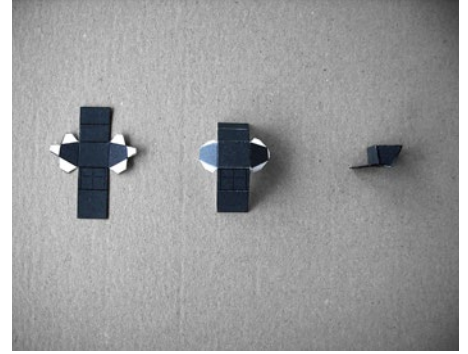
Left blade tilting cylinder (43)
Right blade tilting cylinder (44)



Left piston rod (45)
Right piston rod (46)



Left headlight (68)
Right headlight (69)



Construction progress

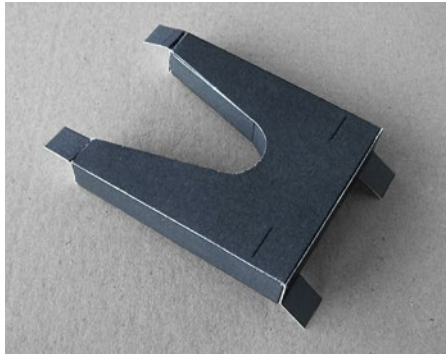
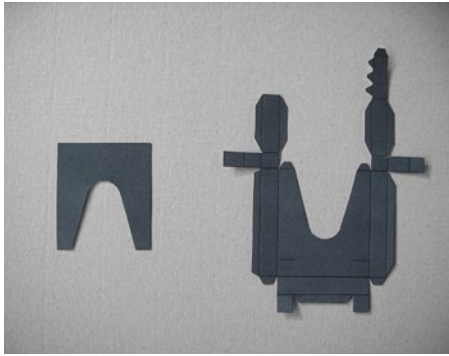


D: Rear ripper

Lower base frame (50)

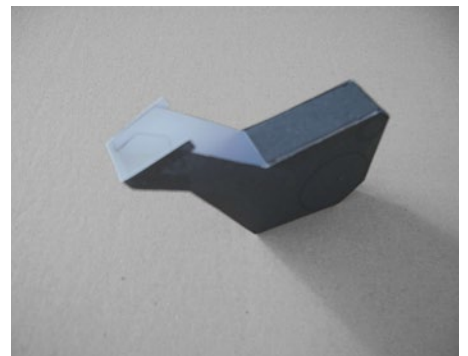
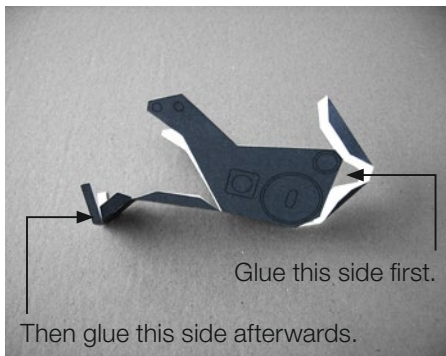
Upper base frame (51)

Glue the tabs of the cylinder before gluing the cover.



Right side part (52)

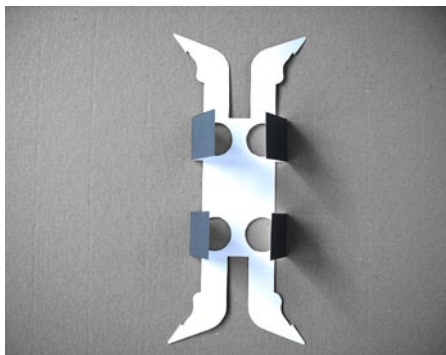
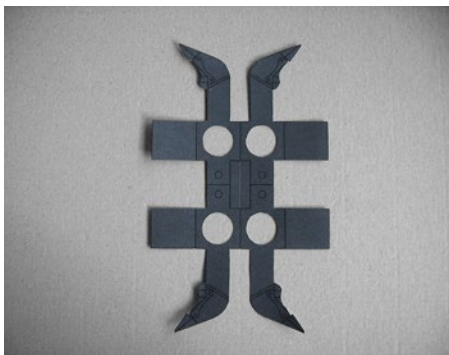
Left side part (53)



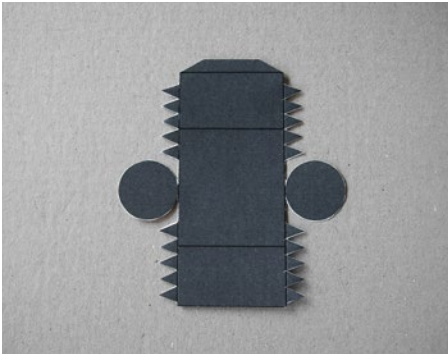
Ripper shank (54)

(Cut out hatched area)

Here, the tabs are folded inwards and the ripper shank is glued four times for stiffening.



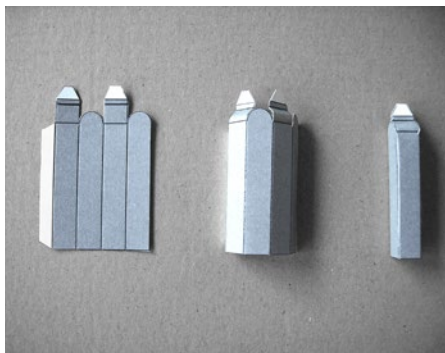
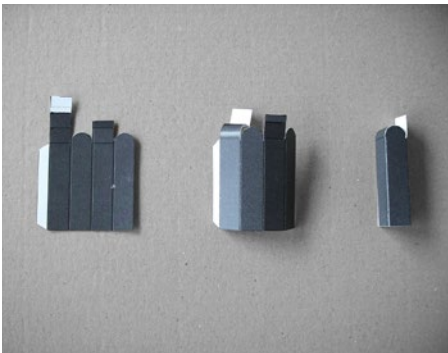
Cross tube (55)



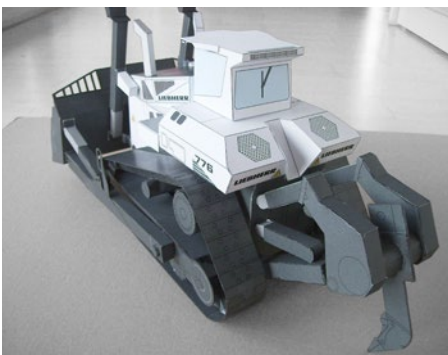
- Upper left lifting cylinder (56)**
- Upper right lifting cylinder (57)**
- Lower left tilting cylinder (60)**
- Lower right tilting cylinder (61)**

Caution! Use the longer inside parts here.

- Left piston rod (58, 59)**
- Right piston rod (62, 63)**



Construction progress



E: Work platform

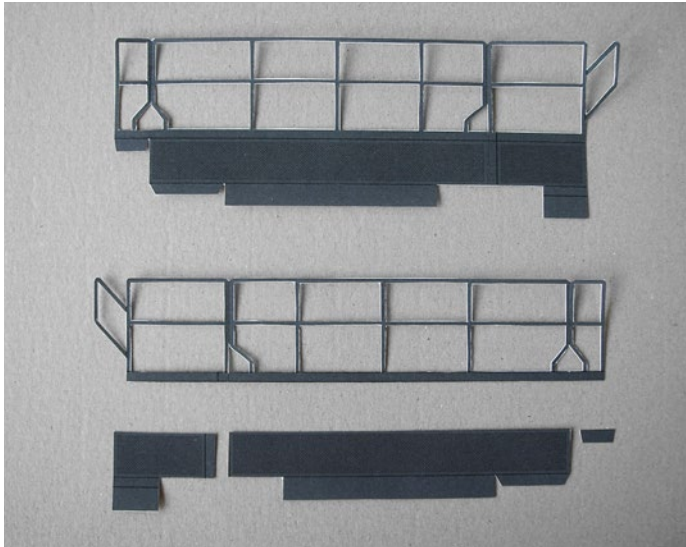
Left rear (64, 64A)

Right rear (65, 65A)

Here, two cut outs are glued together for stiffening.

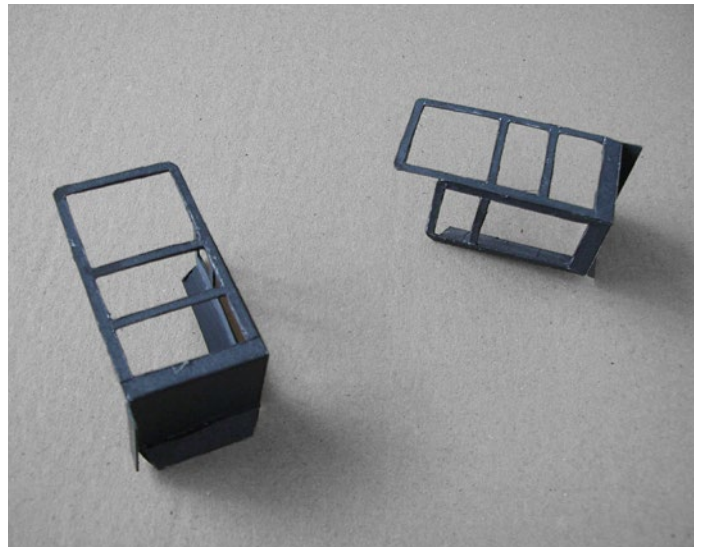
One of these must first be cut along the bending edges into separate parts in order to ensure that no overlapping occurs (due to folds) when gluing to the other part.

Do not cut the small board right through (64, 65) as it provides stability in the corner.

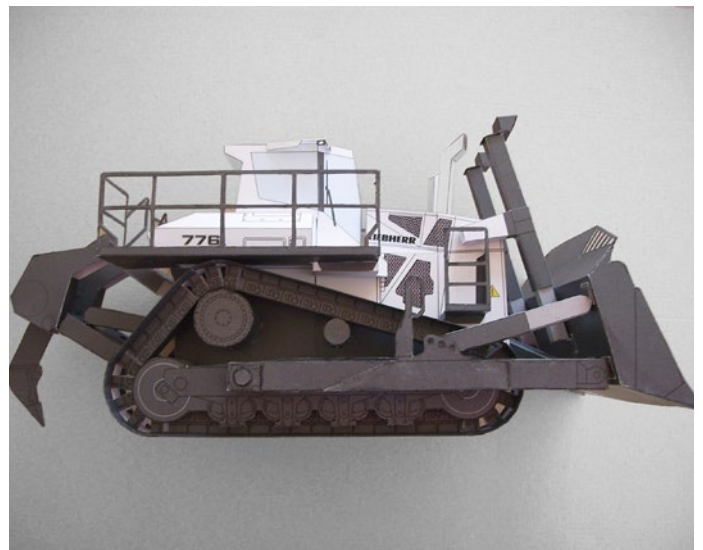
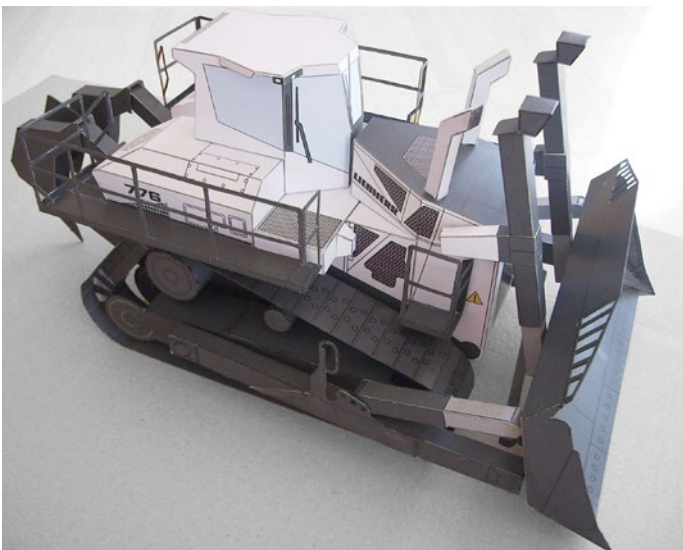
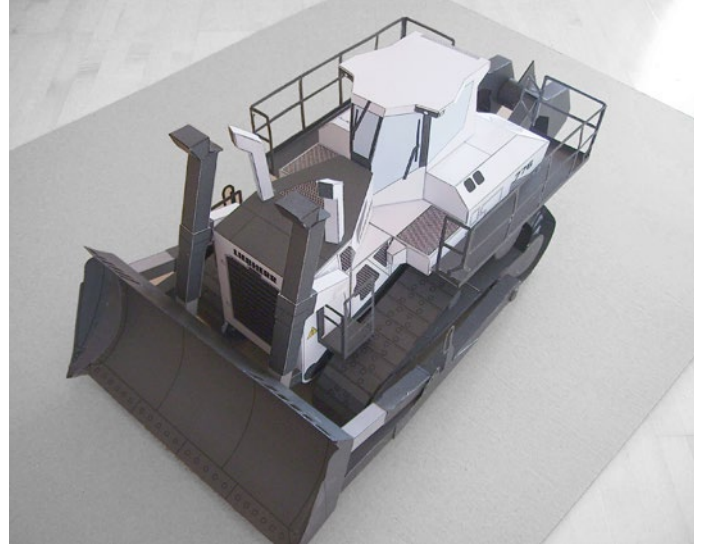
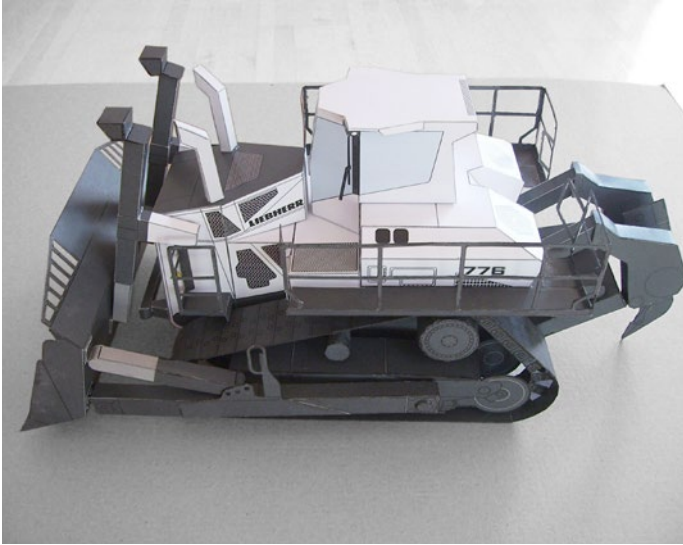


Left front (66, 66A)

Right front (67, 67A)



Completion



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Liebherr-Werk Telfs GmbH

Hans Liebherr-Straße 35, A-6410 Telfs
☎ +43 50809 6-100, Fax +43 50809 6-7772
www.liebherr.com, E-Mail: lwt.marketing@liebherr.com
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