PHIELDBUG OPEN SOURCE VERSION PROJECT SUMMARY

An Introduction to the
PhieldBug Open Source Version
Project



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See LICENCE.txt for a copy. Or read it at https://ohwr.org/cern_ohl_s_v2.txt

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Introduction

This document summarises how to build a PhieldBug Open Source Version. This is not the build manual, which is available as a separate free open-source download.

The PhieldBug Project

PhieldBug Open Source Version is a comprehensive set of plans and instructions for building an IVA-accepted teardrop trailer sleeping-pod. Dozens of PhieldBugs have already been built to these plans and all have passed the UK IVA test.

Despite being very economical to build, PhieldBug is of high quality, is comfortable to use, and - unlike most professional teardrop trailers - is extremely lightweight.

Chassis Is Optional

There are two parts to PhieldBug: the pod (made of marine-ply and uPVC); and the chassis (made of steel).

Constructing a chassis is optional: it is entirely possible instead to build just the pod and mount it onto an existing trailer-base. This means significant savings in parts and labour, and potentially means that an IVA will not be required - just build the pod, mount it on an existing roadworthy trailer-base, and go camping.

Rigid

The reason that almost any chassis can be used with the PhieldBug pod, is that the pod is entirely self-supporting. The double-skin construction is lightweight and yet also very, very stiff. So, unlike almost all other teardrops on the market, the PhieldBug pod does not require a heavy steel platform chassis underneath it. A simple A-form or T-form chassis is more than sufficient, and barely-used examples of these types of ready-made trailers can often be picked up for very modest sums - a few tens of pounds - as disposals from boatyards and sailing-clubs.

Light. *Really* Light

We have gone to great lengths to make PhieldBug Open Source Version the lightest teardrop - by far - available today. The empty weight of a completed pod, with all its interior and exterior fittings, is under 100kg. An entire completed trailer, with chassis, will weigh approximately 150kg. So manoevering PhieldBug on the campsite or festival ground is extremely easy. And virtually any car - including classic cars, low-powered air-cooled campers, classic Minis, and even lightweight kitcars - can pull PhieldBug Open Source Version with very little impact on performance and handling.

Insulated

PhieldBug is double-skinned, for improved insulation. This enormously reduces the condensation

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issues which plague more common single-skin teardrop designs.

Beautiful

PhieldBug has clean curvaceous lines, minimalist fastener-free surfaces inside and outside, and door outlines that organically fit the teardrop aesthetic. There are no ugly and troublesome capping-strips or rubber seals to break up the smooth lines.

Solo Assembly

PhieldBug Open Source Version is designed to be assembled single-handed. The construction is so lightweight that almost everyone will find it easy to handle the parts solo.

Precision Parts and High-Tack Adhesive

The pod parts are CNC-cut, so PhieldBug parts assemble precisely together, with almost no re-shaping.

Assembly is mainly by high-tack adhesive which is quicker and much less tedious than using thousands of unsightly fasteners and is far less messy than stitch-and-glue.

The precision of fit and the method of construction make for a quick but relaxed build. Much of the 'build' time will be spent simply doing nothing while the adhesive holding a whole panel in place has time to cure. In most cases, even clamps are not required because the adhesive has very high initial grab.

Assembly is mostly a repeated sequence of: squirt glue, press parts together, then take the rest of the day off.

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What to Buy

There is a comprehensive Bill Of Materials (BOM) which specifies the exact quantity of absolutely every part which needs to be purchased, right down to every nut, bolt, rivet, and even each piece of tape.

All parts can be obtained on the open market, either off-the-shelf or by commissioning from readily-available service providers. However, we do provide an optional cutting and printing service for some parts, as detailed below.

- A few parts in the BOM have to be 3D-printed. We provide a 3D-printing service for these parts. Ask us about our 3DP-PACK. Or, if you prefer, the parts can be commissioned from any of the many independent online 3D-printing services.

- One part in the BOM has to be laser-cut from steel plate. We keep a stock of these parts. Ask us about our PLATE-PACK. Or, if you prefer, the part can be cut by any independent laser-cutting service - widely available online.

- All the timber and plastic parts are designed to be CNC-cut from marine plywood, clear polycarbonate, and uPVC sheet. We provide a comprehensive cutting service for these parts. Ask us about our SHEET-PACK and GLAZE-PACK. Or again, if you prefer, the parts can be commissioned from any CNC cutting service. But compare our prices - and quality - first!

- The aluminium roof can be CNC-cut from sheet, but we would advise that it is better - and much cheaper - to hand-cut it using a budget nibbler tool. A template is included in the design which makes marking and cutting extremely simple. We do not offer an aluminium cutting service but out SHEET-PACK includes the template.

- Finally, there are several options for obtaining the chassis: first option - our recommendation - is to buy a second-hand dinghy trailer-base which will usually come complete with all the expensive parts such as hitch, suspension, bearings, mudguards, and wheels. Second option is to commission a chassis from a local welder, or to weld it yourself. Alternatively, we do have a small number of galvanised chassis in stock, available at-cost. But when they’re gone they’re gone.

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Documentation

The following documents are released open-source:

- This document.
- Licence.txt . Which is the open-source licence under which the entire design is published.
- PhieldBug-OpenSourceVersion.zip . Which contains all the drawings, as a single DXF, for all parts except the 3D-printed parts.
- 8qty .STL files as PhieldBug-3DP-OpenSourceVersion.zip . Which contain the drawings for all the 3D-printed parts.
- PhieldBug-BuildManual-OpenSourceVersion.pdf . Which is the pictorial build manual, explaining in great detail how to assemble a complete PhieldBug.
- PhieldBug-BOM-OpenSource.ods . Which is the Bill Of Materials, with three sheets:
  - Sheet ‘STOCK’: What to buy. (Also, the parts optionally available ready-made from us.)
  - Sheet ‘DXF CATALOG’: How to use blocks in the DXF drawing file to make the parts.
  - Sheet ‘LAYERS’: How to use the layers in the DXF drawing file.
- PhieldBug-UserManual-OpenSourceVersion.pdf . The user manual for the completed trailer.

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Quick Pictorial Build-Guide

Here is a lighting run-through of the key construction stages of the assembly.

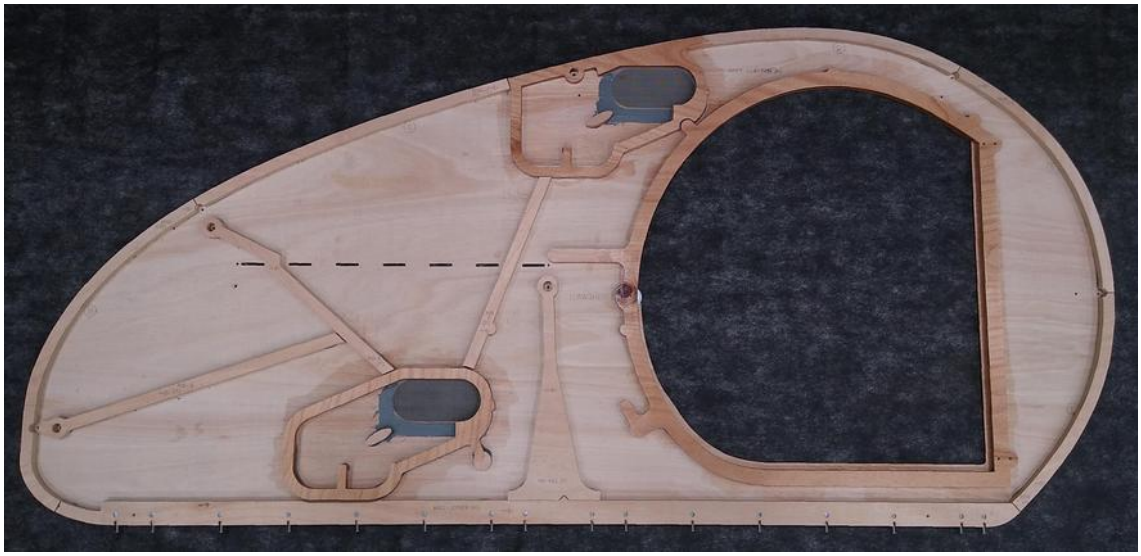
Pre-Varnish All the Parts

Far easier to varnish now, *before* they have been built into an assembly.



Assemble the Lightweight Side Panels

The side panel assemblies simply glue together using the high-tack adhesive. No fasteners are used. Insect-proof ventilators and an insulating air-gap are integral features.



Internal fittings, such as net pockets and elastic retainers, are fitted at this stage, too.

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Fasten the Floor to the Galvanised Chassis

Laser-cut zinc-coated spreader-plates secure the pod to the lightweight T-form chassis at three locations, each with three M10 domed bolts.



Build the Frame

The marine-ply frame bolts together. Most fasteners are concealed, creating a sleek internal finish.



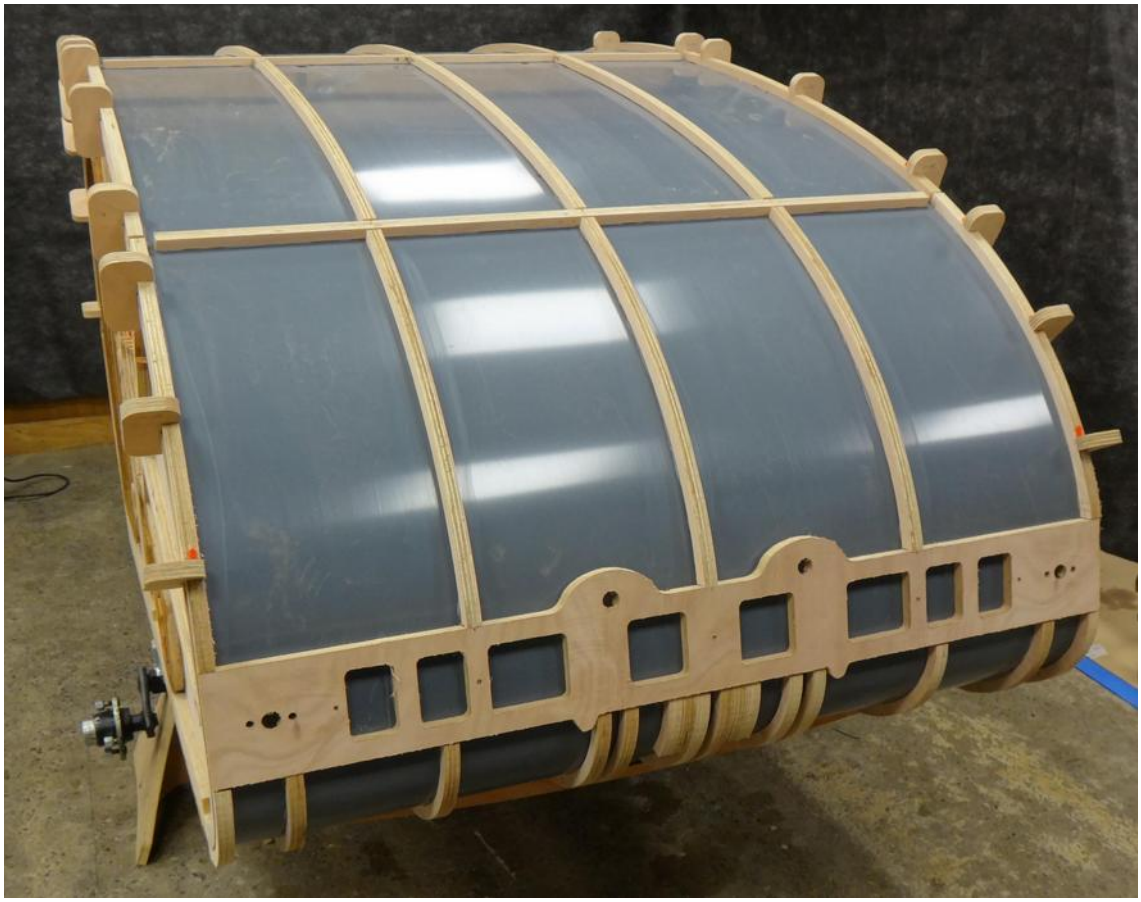
The lightweight internal shelving is integral to the frame. Jigs will be removed later.

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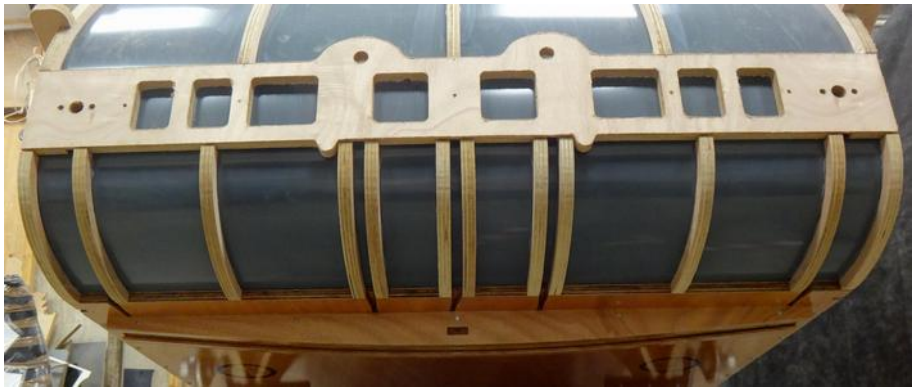
Fit the Inner Roof

The precision-cut inner roof skin pulls the frame exactly to shape and produces a rigid monocoque pod. Longerons are installed on top to create an insulating air-space above the inner roof.

Jigs are included in the drawings, so parts can be precisely positioned with no measuring. All parts are bonded with high-tack adhesive.



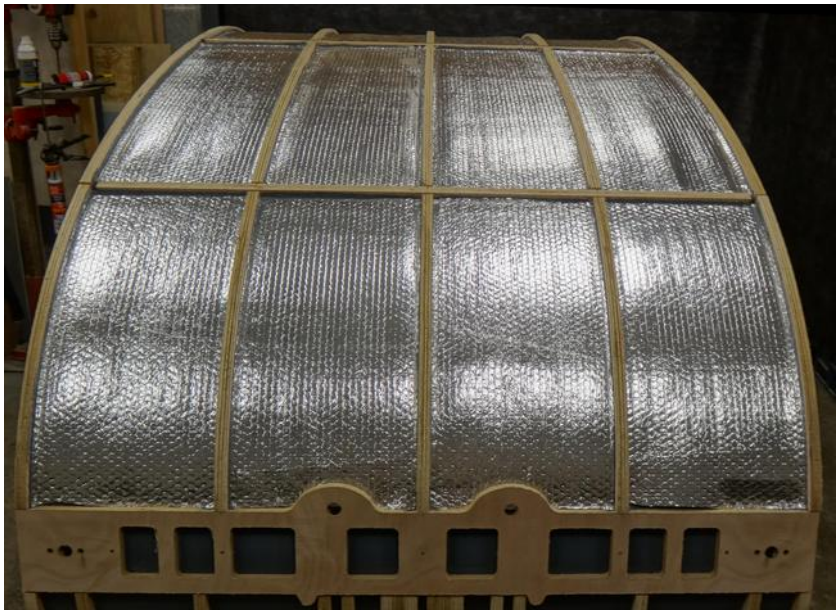
Cable-runs are hidden in the same structure, for internal electrics and external LED lighting.



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Insulate

Insulation installs in the air-gap to prevent indoors condensation in challenging conditions.



Wiring harness, concealed in the air-gap, supplies the interior LED lights and USB powerpoints.

Outer Roof Skin

The aluminium roof skin is bonded into place. There are no visible fasteners on the roof. Again, jigs and clamps are included to pull the roof into a perfect curve matching the contour of the pod.



Afterwards, the openings for external lighting cable-runs can be precisely located and opened-out, and their fastener positions can be pilot-drilled accurately, using the included drilling-jig.

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Fit Outer Side-Skins

Very high quality pre-varnished marine-ply outer side panels are simply bonded into place. No fasteners, no trim-strip, and no clamping are required. The woodgrain is spectacular.



Fit Doors

The double-skinned doors are cut from the same sheets used for the side assemblies and are built in the same way. When the doors are closed the woodgrain matches exactly - inside as well as outside.



Doors have cast stainless-steel hinges and large clear hard-coated polycarbonate windows. The woodgrain of the window-shutters *also* exactly matches the woodgrain of the exterior panels.

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Fit Seats and LED Lights

Comfortable seating and good lighting inside a teardrop pod are an absolute must-have. PhieldBug's seat-backs are cold-moulded to a snug back-hugging compound curve. The dimmable LED lights are perfectly positioned for reading.



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Fit-Out...

Galvanised mudguards bolt on. Rear LED lights install into pre-drilled holes with concealed cabling.

...and Go Out

Ready for adventures.



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