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Dave Campbell
Editorial Content Chief, *WOOD* magazine

Adobe Acrobat Reader Troubleshooting Guide

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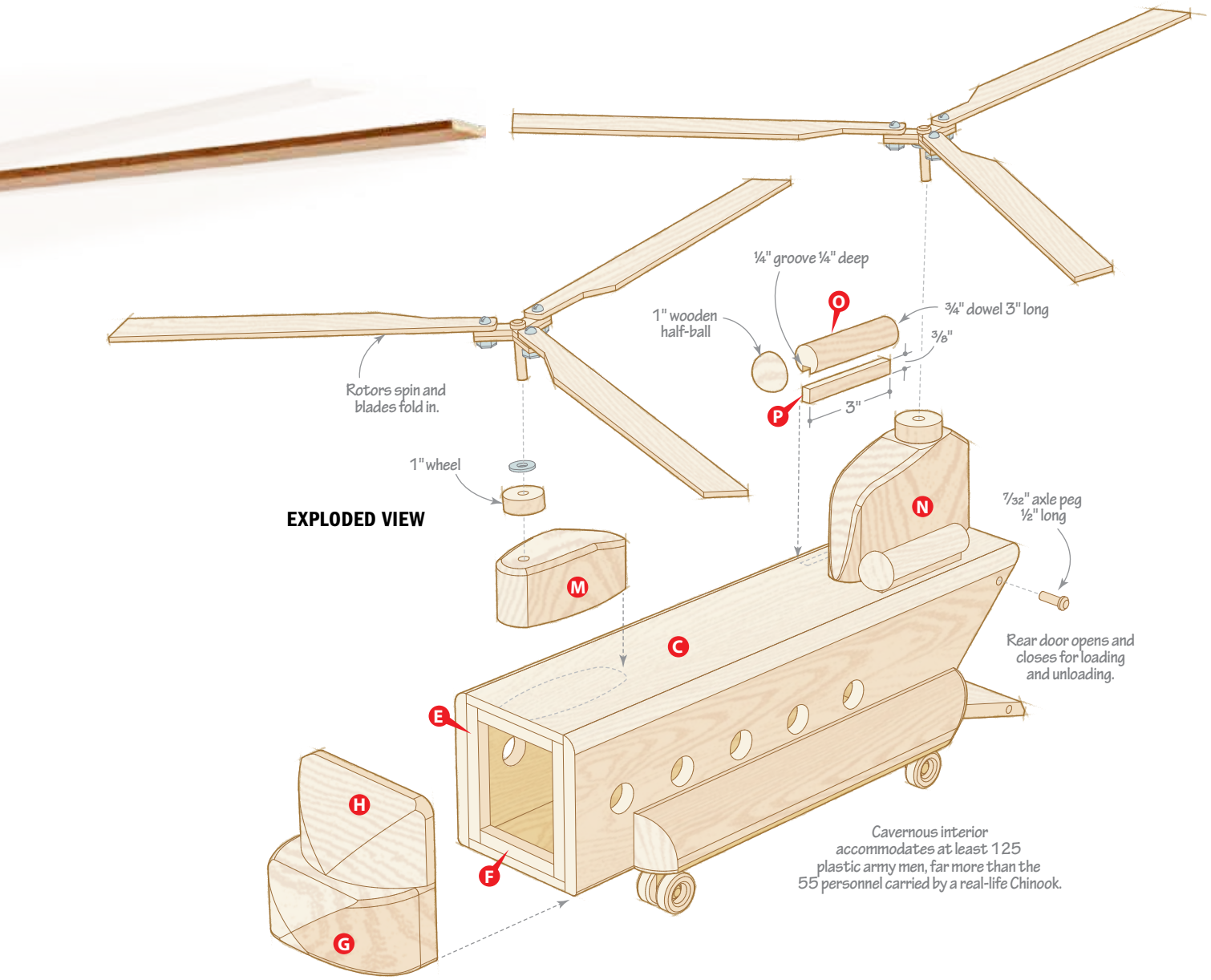
Mil-spec CH-47 Chinook Helicopter

Although it requires imagination (and some mouth-made motor noises) to get this aircraft off the ground, it shares many moving parts with its real-world counterpart. The rotors spin and fold in for easy storage. A drop-down rear door provides access to a spacious cargo bay. And rolling landing gear enables tabletop maneuvers. To speed your build along, we've gathered all the specialty parts you need in a one-stop-shopping kit. See **Source** on *page 6*.

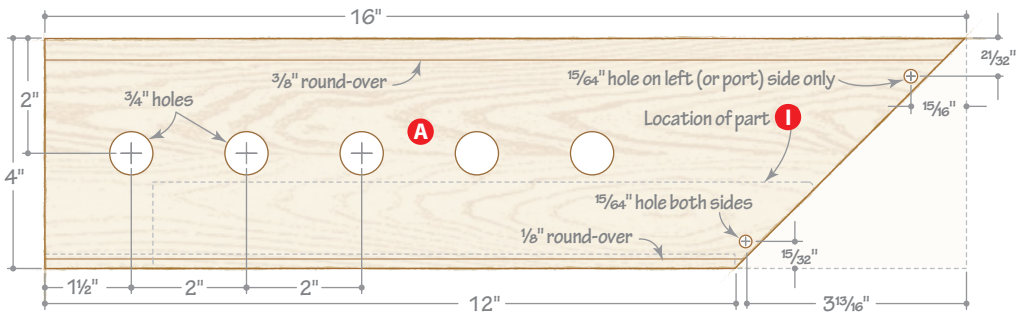
Since the first Chinooks were delivered to the military in the mid-1960s, this workhorse has served as a heavy hauler, moving troops and equipment, with oversize loads slung beneath its belly. The CH-47 Chinook serves civilian purposes as well, operating as cargo and service aircraft for oil companies, logging operations, and forest firefighters.

DIMENSIONS
6" W × 18½" D × 9 1/16" H

Nearly 20" rotor diameter



1 FUSELAGE SIDE



Fabricate the fuselage

1 Cut the sides (A) to size [**Materials List**], and stick them together with double-faced tape. Cut them to shape and drill the holes [**Drawing 1**]. Note that the 15/64" hole at the top corner is drilled in one side only.

A

Cut spacers to position the top (C) flush with the edges of the sides (A). Clamp the assembly together and check for square.

B

Bandsaw just outside the line, then sand the blanks smooth.

C

Use a ⅜" Forstner bit to rough out the flat-bottomed mortises that later accept the struts (J, K). Chisel the edges of the slots straight.

2 Cut the bottom (B) and top (C) to size. Glue them between the sides [**Photo A**].

3 After the glue dries, sand the end of the top (C) to match the angle of the sides. Round over the edges [**Drawing 1**], and finish-sand the assembly.

4 Cut the door (D) to size. Round over one end and chamfer the other and drill the holes for the axle pegs [**Drawing 2a**]. Place a drop of glue in each hole, position the door between the sides, and insert axle pegs. Wipe away any squeeze-out so the door will pivot freely. After the glue dries, cut and sand the pegs flush with the sides. Then drill the top hole in the door using the hole in the fuselage as a guide for the drill bit.

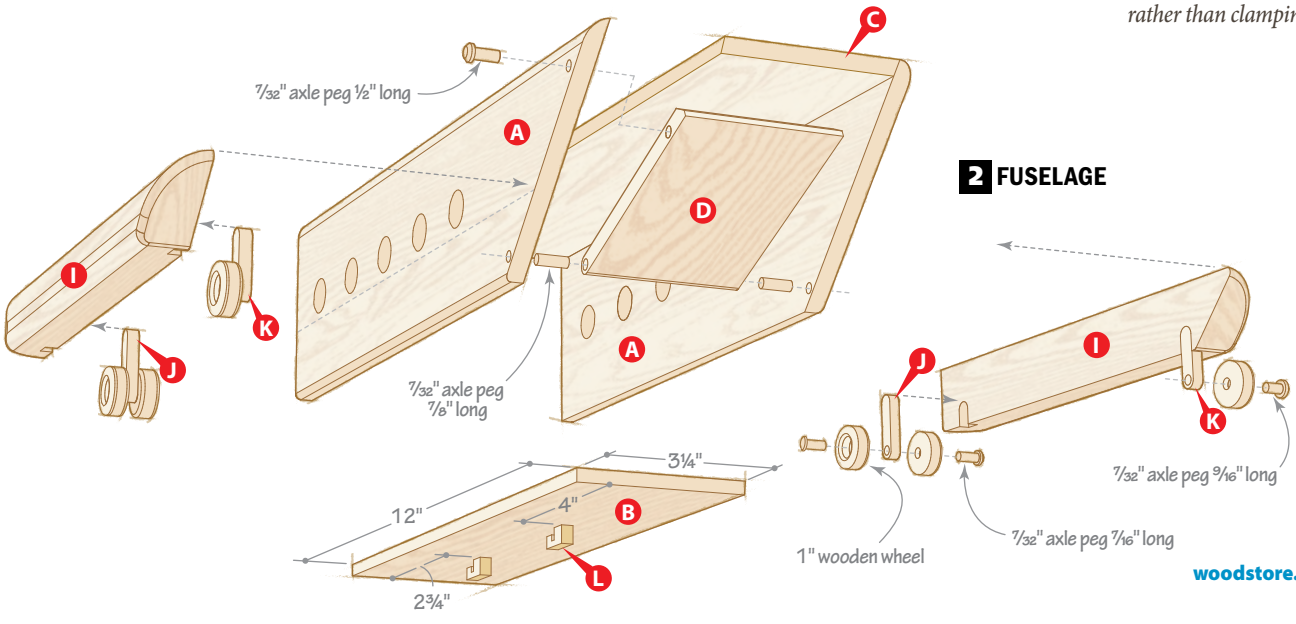
Tip! *A blast of compressed air will force squeeze-out from between the door and sides.*

5 Cut the nose mounts (E, F) to fit in the fuselage [**Exploded View**]. Glue them flush with the front end of the fuselage.

6 Cut the nose cone (G) and cockpit (H) to size. Spray-adhere copies of the **Side-view Full-size Patterns** to each blank, and bandsaw the profiles. Apply the **Top-view Patterns** and cut those profiles [**Photo B**].

7 Glue the nose cone and cockpit together, flush at the back and sides. Then, glue this assembly to the fuselage, flush all around.

Note: *Because of the odd shapes of the pieces, you may need to hold the parts in place until the glue grabs rather than clamping.*



No 1" round-over bit? No problem. Simply cut bevels outside the layout line at 20°, 30°, and 45° to remove the bulk of the waste. Finish shaping the curve with a block plane and sandpaper.

Clamp a scrap to the tank to keep it flat on the table as you cut the ends to shape.

Fuel around with the tanks

1 Cut the fuel tanks (I) to size. Lay out the radius on the ends and drill the mortises for the struts (J, K) [**Fuel Tank Full-size Patterns**, **Photo C**].

2 Rout the 1" round-over along the top edge of each fuel tank (I), or use the tablesaw [**Photo D**].

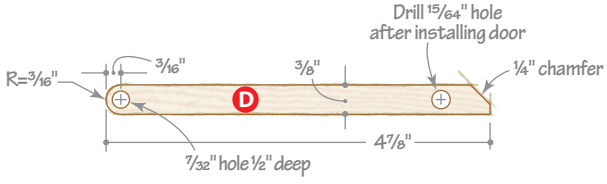
3 Apply copies of the **Fuel Tank Full-size Patterns** to the tanks and shape the tanks [**Photo E**].

4 Cut a ¼×⅜×8" blank for the front and rear struts (J, K). Lay out the lengths for each, drill the holes, then cut and sand them to shape [**Drawing 2b**]. Glue the struts in place in the fuel tanks (I), then glue the tanks to the fuselage [**Photo F**].

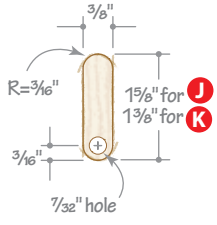
5 Working on an oversize blank, bandsaw the hooks (L) and cut them to size [**Drawing 2c**]. Glue the hooks, centered, to the bottom (B) [**Drawing 2**].

Align the fuel tanks with the bottom and rear of the fuselage.

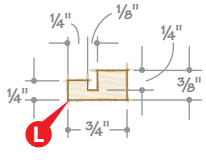
2a DOOR EDGE VIEW

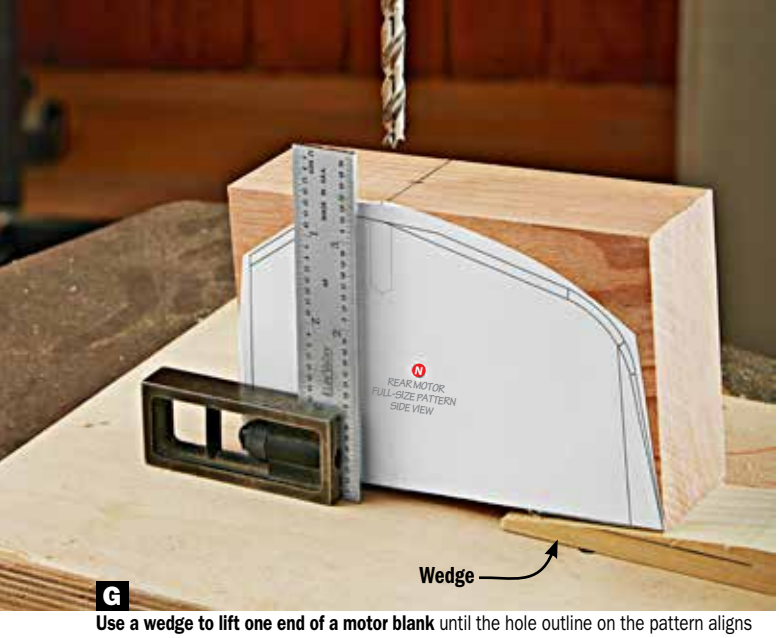


2b LANDING GEAR STRUT



2c HOOK





G **Use a wedge to lift one end of a motor blank** until the hole outline on the pattern aligns with a square. Then drill the hole.

H **Leave about 1" square** on each end of the blank to prevent it from rolling. Then rout a ¼" centered groove the length of the blank to accept the mounts (P).

Shape the motors and rotors

1 Cut blanks to size for the motors (M, N). Spray-adhere the side patterns to the respective blanks. Drill the hole in each [**Photo G**].

2 Bandsaw along the side patterns. Then apply the **Motor Top-view Patterns** and bandsaw these profiles. Sand the motors smooth and round over the top edges. Glue the rear motor (N) to the top (C) flush at the rear. Overlap the front motor (M) 3/16" onto the cockpit (H) and glue it down. Glue a 1" wheel [**Source**] to each motor, using an axle peg to align the holes. Remove the peg.

3 To make the turbines (O), rout ⅜" roundovers on a ¾×¾×9" blank [**Photo H**]. Cut the turbines to length, and glue a 1" half-ball [**Source**] to one end of each [**Exploded View**].

4 Cut the turbine mounts (P) to size and glue them into the slots in the turbines. Glue the turbine assemblies centered between the rear motor and the edge of the top, with the front ends flush with the front of the motor.

5 Cut the six rotors to size. Adhere them together with double-faced tape to make two stacks of three. Apply a copy of the **Rotor Full-size Pattern** to each stack, drill the hole, and cut and sand the rotors to shape.

6 Cut four ⅛×2×2" maple blanks and glue them together in pairs with the grain running perpendicular to each other. Apply a copy of the **Rotor Hub Full-size Pattern** to each, drill the hole, and cut them to shape.

Finish and assemble

1 Apply a finish to all parts. We used satin aerosol lacquer.

2 Attach the rotors to the hubs (R) [**Drawing 3**]. Put a drop of glue in the hole in each motor and attach the rotor assembly with a washer between the hub and wheel.

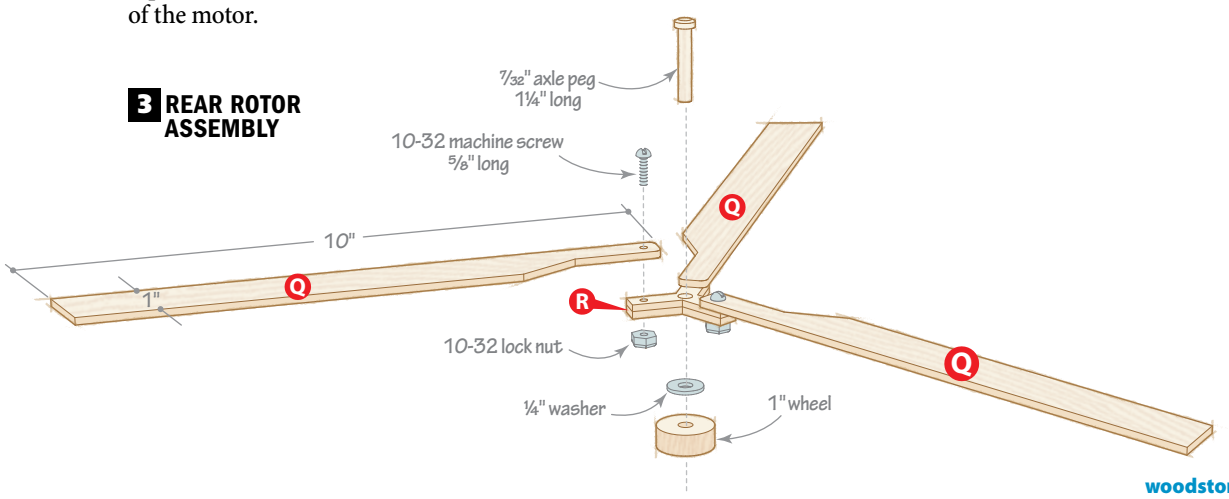
3 Cut pegs to length to attach the wheels to the struts. Note that the front wheels have a peg on each side [**Drawing 1**]. Your Chinook is ready for service.

Tip! *Drip mineral spirits along the edges of the rotors to soften the tape adhesive before separating them.*

▶ Making cross-grain laminations strengthens a potentially fragile part.

Produced by **Craig Ruegsegger** with **Kevin Boyle**
Project design: **Kevin Boyle**
Illustrations: **Roxanne LeMoine, Lorna Johnson**

3 REAR ROTOR ASSEMBLY



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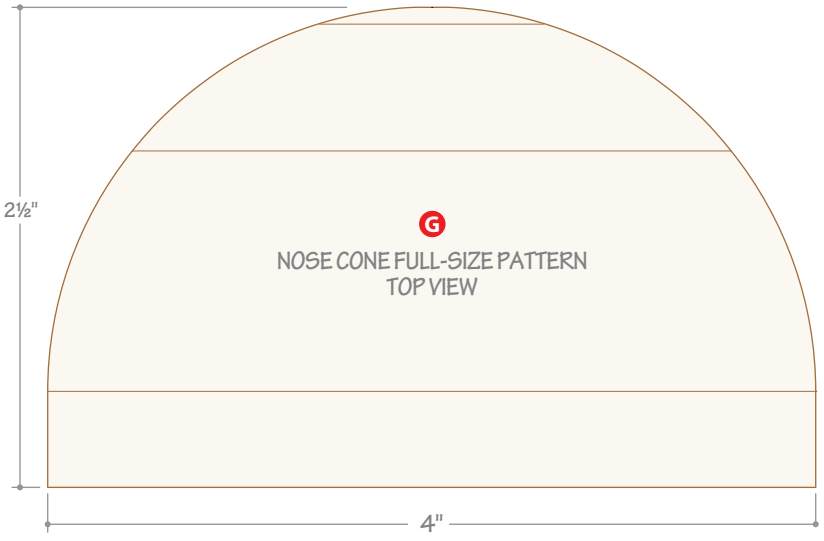
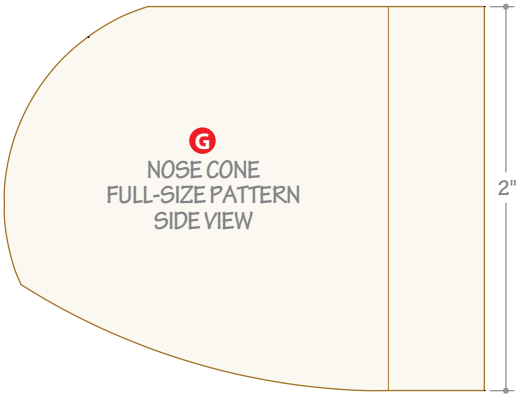
Materials List

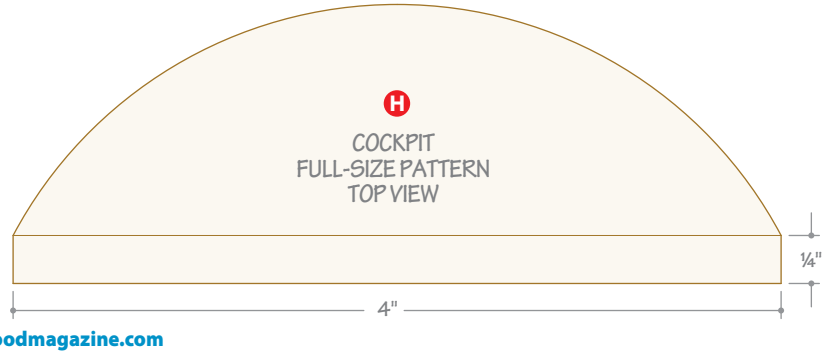
Part		FINISHED SIZE T	W	L	Matl.	Qty.
A	sides	⅜"	4"	16"	M	2
B	bottom	¼"	3¼"	12"	M	1
C	top	¼"	3¼"	16"	M	1
D	door	⅜"	3 3/16"	4⅞"	M	1
E	vertical nose mounts	⅜"	⅜"	3½"	M	2
F	horizontal nose mounts	⅜"	⅜"	2½"	M	2
G	nose cone	2"	2½"	4"	C	1
H	cockpit	2"	1 7/16"	4"	C	1
I	fuel tanks	1"	1½"	11½"	C	2
J*	front struts	¼"	⅜"	1⅝"	M	2
K*	rear struts	¼"	⅜"	1⅜"	M	2
L	hooks	¼"	⅜"	¾"	M	2
M	front motor	1½"	1½"	3⅝"	C	1
N	rear motor	1½"	3⅛"	5"	C	1
O*	turbines	¾"-dia.		3"	M	2
P	turbine mounts	¼"	⅜"	3"	M	2
Q	rotors	⅛"	1"	10"	M	6
R*	rotor hubs	¼"	1⅝"	1⅞"	LM	2

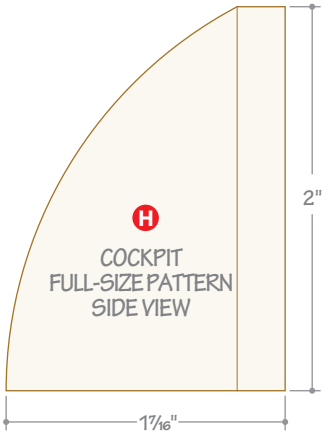
*Parts initially cut oversize. See the instructions.

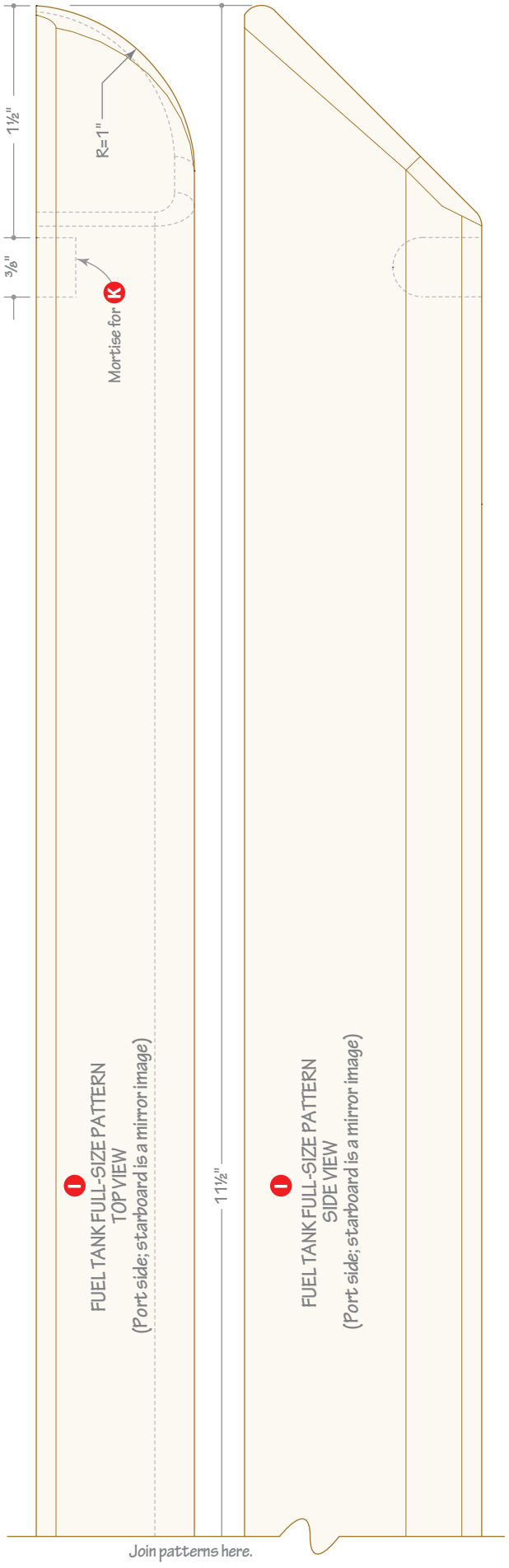
Materials key: M-maple, C-cherry, LM-laminated maple.
Blade and bits: ⅜" Forstner bit; ¼" straight, ⅛", 3/16", 3/8", 1" round-over router bits.
Source: Each kit includes the hardware and specialty parts to build one helicopter. You provide the lumber. 10-32x5/8" machine screws (6), 10-32 lock nuts (6), ¼" washers (2), 1" half-balls (2), 1" wheels with tread (6), 1" smooth wheels (2), 7/32" axle pegs (11), kit no. RS-01140, 888-636-4478, woodmagazine.com/chinookkit.



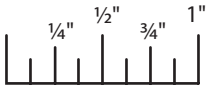


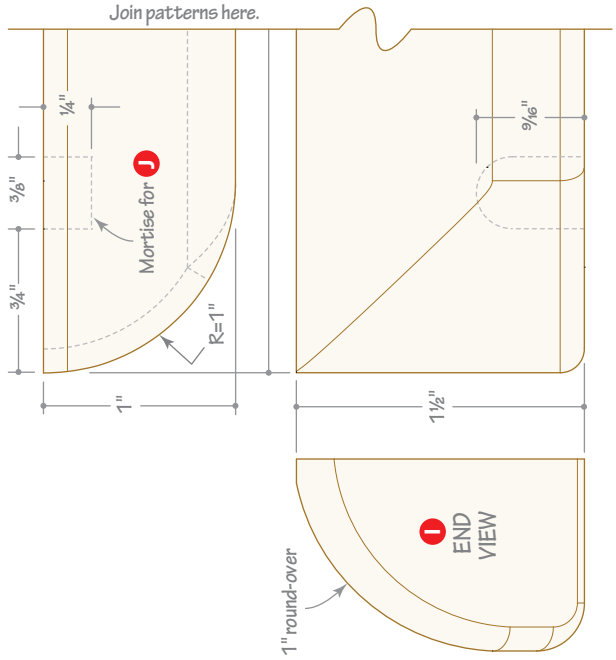


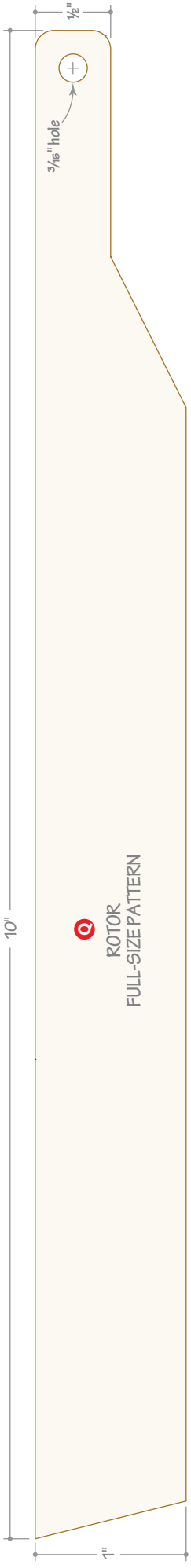


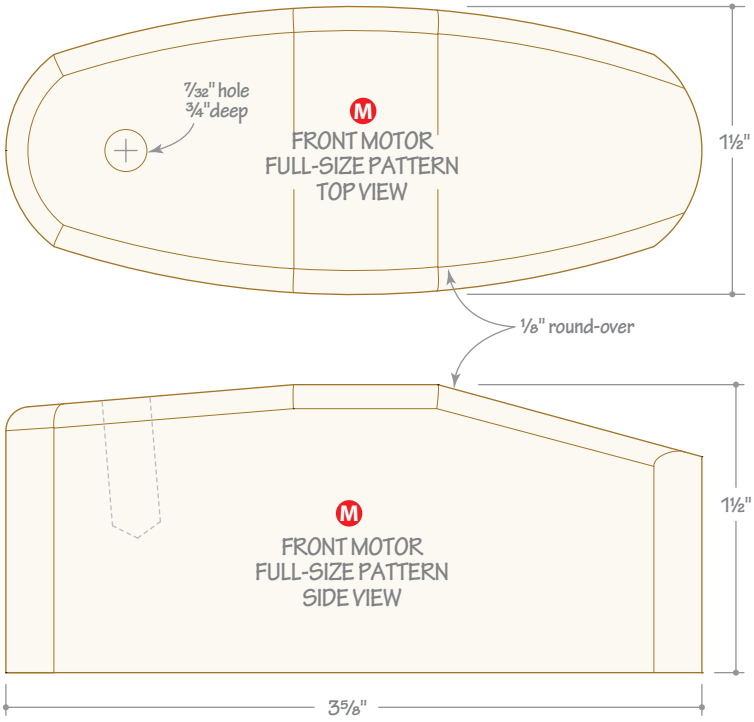


To ensure full-size patterns are correct size, your printer should be set to print at 100% (not fit to page). Measure full-size patterns to verify size.









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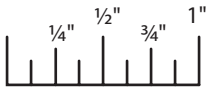

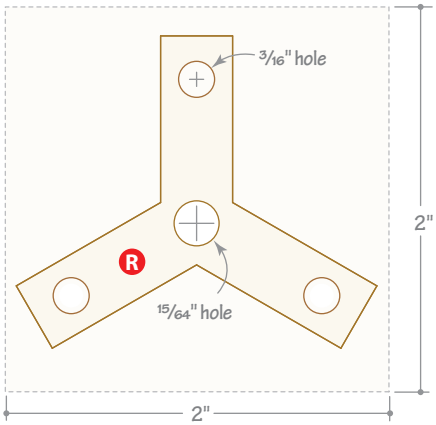

ROTOR HUB
FULL-SIZE PATTERN

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