Bell/Boeing V-22 Osprey Instructions

No. 503

HISTORY

The V-22 *Osprey* by Bell/Boeing and its revolutionary tilt-rotor technology is considered by many to be the most significant aircraft development in 3 decades. While viewed primarily as a military aircraft, the V-22 is also flying proof of a new method of moving people in the civilian sector as well. To many astute watchers of aviation progress, it is the civilian use of tilt-wing technology which holds the greatest promise.

The U.S. Marine Corps is the service most wanting the craft and their designation for it is MV-22A. The U.S. Air Force wants the plane for its Special Operations Forces (SOF) and will call the aircraft the CV-22A. U.S. Navy planning calls for 50 of the planes to be designated HV-22A. The U.S. Army had plans to purchase 231 *Osprey* but early in the Spring of 1988 removed themselves from the program.

The multi-mission capable plane was rolled out of the factory on 23 March 1988. After many months of thorough systems testing the V-22 *Osprey* made its first flight on 19 March 1989.

Able to carry 24 troops or 20,000 lbs. of cargo, the *Osprey* can cruise at 271 knots while in the Marine Amphibious Assault configuration. Considering that it is also capable of vertical takeoffs and landings, it is a truly remarkable machine.

Specifications

Overall Span	84'-6"
Length	57'-4"
Height	21'-9"
Rotor Diameter(2)	38'-0"
Powerplants(2)	Allison T406-AD-400 gas turbines of 6,150 shaft horsepower each
Crew	3 24 troops
Max. Speed	315 knots @ 18,000 ft.
Max. Combat Wgt.	42,712 lbs

References

Flight International magazine; 27 March 1988. Read Business Publishing, Ltd.

Aviation Week and Space Technology; 27 March & 10 April 1989. McGraw-Hill, Inc.

BEFORE STARTING

1. Study the illustrations and sequence of assembly before beginning.
2. Decide how much detail you wish to add to your model and whether or not you intend to modify or "convert" the basic model in any way. Study carefully all available reference material before beginning to ensure an authentic model.
3. Due to the amount of parts in this kit, do not detach the parts from the runner of the parts tree until you need them. This helps avoid confusion and lost parts.
4. When cementing the parts together, check the way one part fits together with another. This assures a neat job with no surprises.
5. Always remember when working with plastic model cement and paint to keep your work area well ventilated. The fumes from plastic modeling products can be harmful if inhaled.

PREPARATION OF PARTS

1. Never tear parts off the runner (parts tree). Use a Testor Hobby Knife, fingernail clippers, or a small wire cutters to remove the parts from the tree.
2. It is possible some parts may require a little attention with a file or sandpaper to ensure a proper fit and neat appearance. Hobby files and Testor Hobby Sandpaper appropriate for model building are available in most good hobby shops.
3. If you desire you may fill any seams (where parts go together) or imperfections with Testor Contour Putty for Plastic Models which is also available at good hobby shops.

PAINTING

You can obtain an excellent finish on your model using Testor finish preparation products and paints. Detailed descriptions of paint types and color are included on the pages that follow.

Good brushes are essential for proper detailing. Testor ***Model Master*** brushes are recommended and available at good hobby stores. Be sure you have the entire selection for all your modeling needs. Always clean them in Testor thinner, wash in soap and water, and store with bristles upward when not in use.

Wash plastic parts before detaching them from the parts tree. Warm water and liquid dishwashing detergent will remove the oils left from the manufacturing process. Let the parts dry and avoid excessive handling. Immediately before painting, wipe the parts with a "tac rag" (available at auto parts stores) to remove dust and lint.

Most small parts are best painted while still attached to the parts tree. You can also detach them and hold with tweezers or "magic" tape while painting. Paint in one direction only. If your paint is the correct thickness brush strokes will disappear as the color dries. If the paint seems too thick, thin with Testor Paint Thinner. Wheels may be detached from the parts tree and fit onto toothpicks or matchsticks for painting. Just hold the paintbrush against the edge of the wheel and rotate the stick and wheel to obtain a neat finish.

Let the paint dry completely before handling. When the parts are dry, assemble the model, following the directions closely. Remember cement will not hold strongly to painted surfaces. Use your Testor Hobby Knife to carefully remove paint from all surfaces to be cemented. After you have assembled the model you can touchup areas where cement might have marred the finish.

Tweezers will be useful in assembling the many small parts in this kit. The type used by postage stamp collectors is recommended.

Liquid cement, Testor #3502, is recommended for construction since it can produce the neatest, quickest, and strongest glue joints. Apply small amounts of cement, using the tip of a Testor ***Model Master*** No. 2 brush, to the surfaces to be joined while holding the parts in place. **Do not** use large amounts of cement.

Note: Clear parts are best glued in place with white glue. White glue will not mar the plastic and thus results in a better appearance than conventional model cement.

The Testor ***Model Master*** paint system is specially designed to be used on military models. The **Preliminary Painting** instructions on this sheet indicate which ***Model Master*** colors to use as indicated by name and Federal Standard (**FS**) number. These colors are called out by ***bold italic type*** . Wherever ***Model Master*** colors are not applicable the required Testor color will be called out by number and name in **regular bold type**.

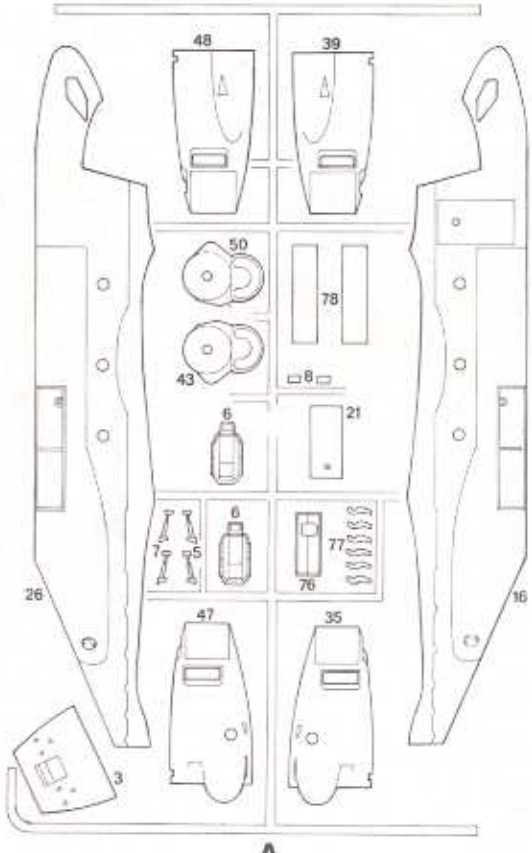
APPLYING DECALS

1. After carefully masking clear areas, spray entire model with Testor Glosscote #1261. Decals adhere best to a smooth surface and the shinier the finish the smoother it is. Allow the Glosscote to dry before going further.
2. Select the decals you plan to use and cut them from the decal sheet with scissors or a Testor Hobby Knife.
3. Working with only one decal at a time, dip the decal in clear water for no more than five seconds. Remove it from the water and place on a dry paper towel for about one minute.
4. When the decal slides easily on the backing paper, slide it to the edge of, and onto, the surface of the model with a soft Testor ***Model Master*** paint brush or tweezers. Remember the decals are very thin and can be easily ripped. Work slowly and carefully.

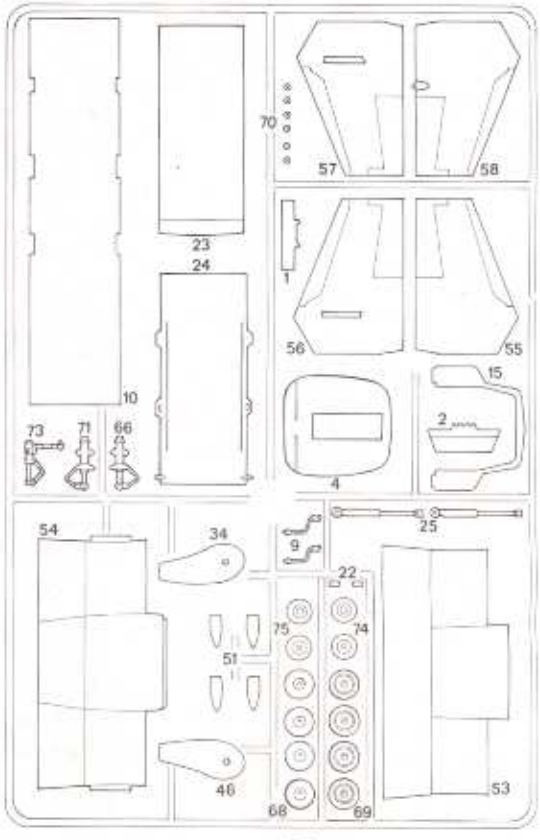
Note: In order for this model to rest properly on its tricycle landing gear, weight must be added inside the nose before assembling the fuselage halves. Lead split shot as used in fishing is recommended. Lead weights should be held in place with modeling clay or epoxy...**do not use** plastic cement!!

5. Once the decal is in the desired position apply a small amount of Testor Decal Set #8804. This will help the decal conform to any irregularities in the surface of the model. Allow the decal to dry undisturbed. Should you desire to purposely move it before it has dried, apply a little Decal Set to a soft brush and push the decal slowly into the desired position.
6. When the decals are completely dry (usually overnight), apply a coat of Testor Dullcote, #1260, to the entire model. This will give it an authentic, dull finish and protect the surface of the model. Now you can carefully remove the masking from the clear parts.

Use the drawings of the complete parts trees as a part locating reference while building the model.



A



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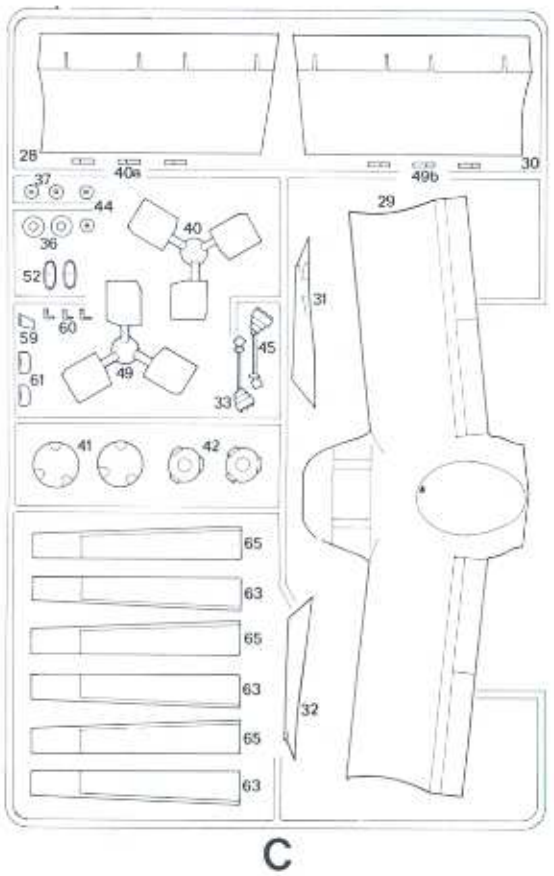
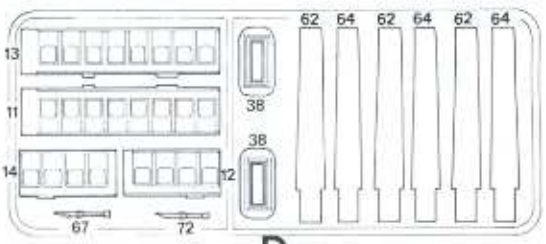
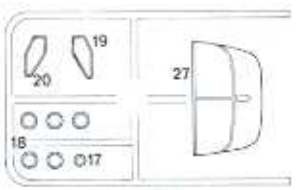


C



D



E

COLOR KEY

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D	*FS 37038 Flat Black*
E	*FS 17178 Chrome Silver*
F	*FS 17875 Insignia White*
G	No. 1780 Steel
H	No. 1103 Red
J	No. 1124 Green
K	No. 1184 Zinc Chromate

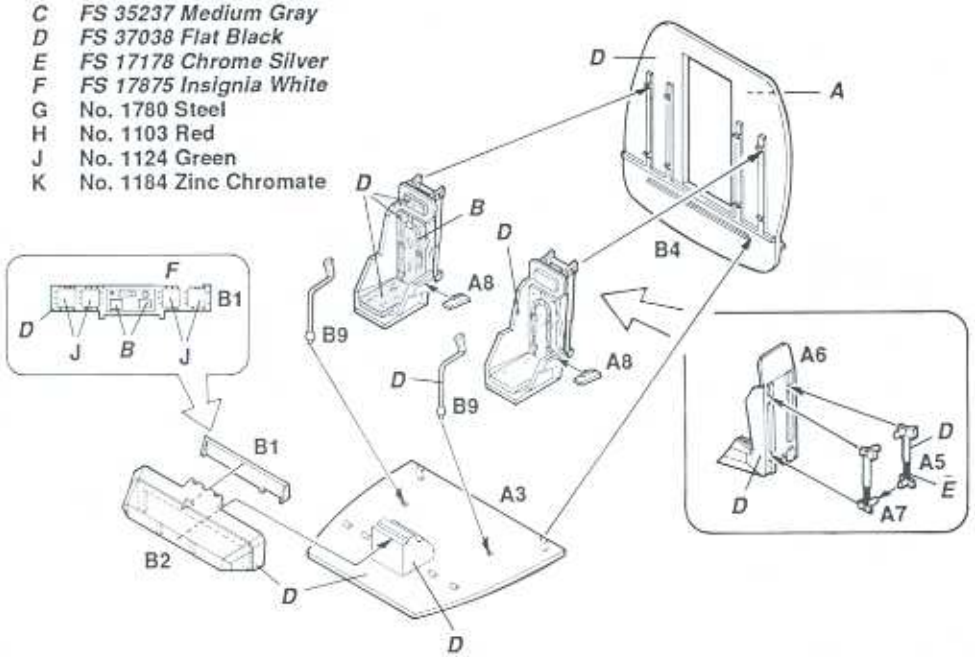
1 COCKPIT AREA

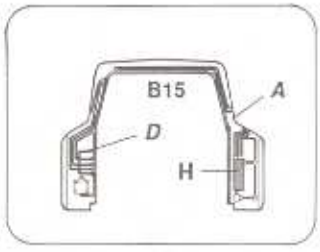
Preliminary Painting

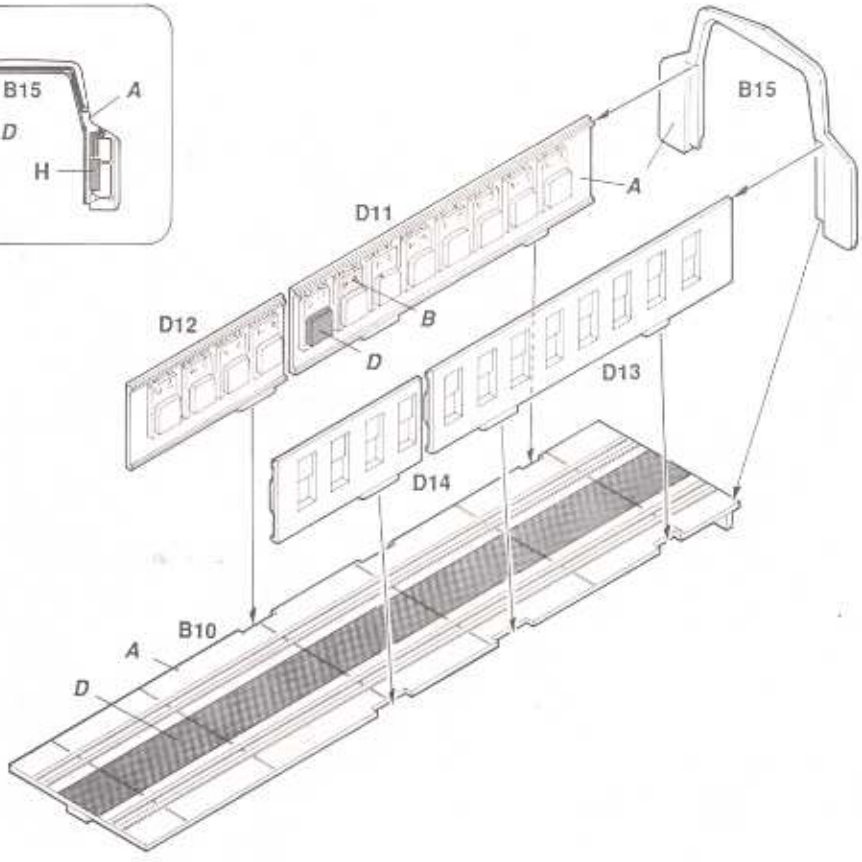
Paint parts as indicated by letters in the assembly step illustration and the **COLOR KEY**.

Assembly

1. Cement ejection seat frames, **A5** and **A7**, together and to back of seat, **A6**. Cement arm rest, **A8**, to seat. Build 2 seats. Set seats aside to dry.
2. Cement instrument display panel, **B1**, to housing, **B2**. Cement housing to top of console located on **A3**. Cement control sticks, **B9**, to **A3**.
3. Cement seats to aft wall, **B4**. Now cement floor, **A3**, to aft wall, **B4**. Set unit aside to dry.







2 CARGO AREA

Preliminary Painting

Paint parts as indicated by letters in the assembly step illustration and the **COLOR KEY**.

Assembly

1. Cement the sidewall components, **D12**, **D11**, **D13**, **D14**, to cargo bay floor, **B10**. Now cement cargo bay bulkhead, **B15**, into place.

COLOR KEY

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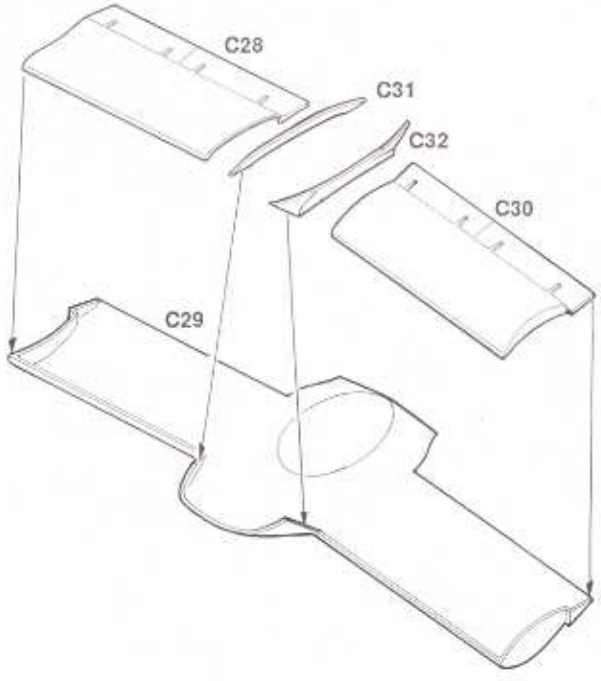
K	**No. 1184 Zinc Chromate**



3 WING

Preliminary Painting

None.

Assembly

1. Cement lower wing surfaces, **C28** and **C30**, to upper wing surface, **C29**.
2. Cement fairings, **C31** and **C32**, to wing.

4 FUSELAGE

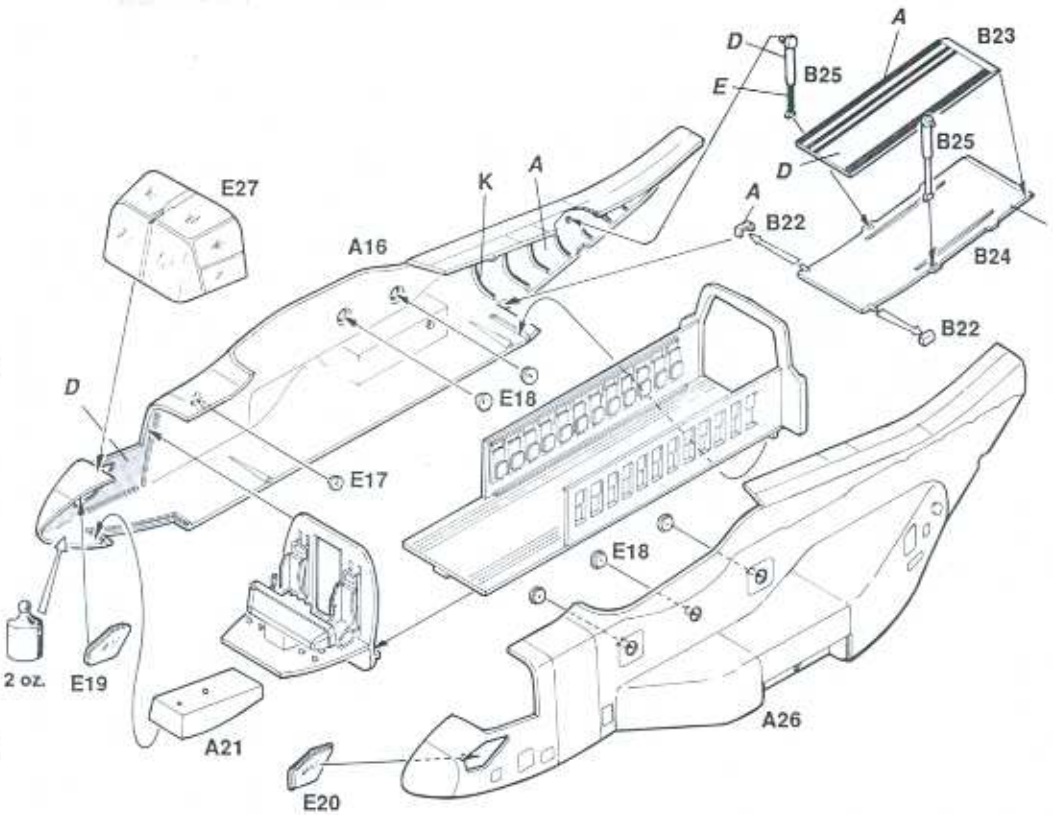
Preliminary Painting

Paint parts as indicated by letters in the assembly step illustration and the **COLOR KEY**.

Assembly

Note: Decide now whether you want to build your V-22 with tail ramp down (See **Inset A**) or up; whether you will build your model with landing gear down or retracted. If your model is being built to hang from the ceiling in a flight configuration you won't need to add the nose weight.

1. Carefully cement the fuselage porthole windows, **E18** and **E17**, to the fuselage. You might want to use White Glue for this step.
2. Now cement the cockpit side windows, **E19** and **E20**, to the fuselage halves, **A16** and **A26**.
3. Cement the cockpit unit (done in Step 1) to the right fuselage half, **A16**.
4. Cement the cargo area (done in Step 2) to the right fuselage as shown.
5. Mount 1 1/2 - 2 oz. of weight in the nose. Fishing lead split shot is good for this. Mount the weight in the nose with modeling clay - do not use plastic cement.
6. Cement the nose landing gear well box, **A21**, into place.
7. You can now, very carefully, cement the fuselage halves together as shown in **Inset B**. Be sure all the internal parts are guided into their correct position before the cement sets hard. Once together let the fuselage dry before going on.
8. Cement ramp, **B23**, to ramp door, **B24**.
9. If building the model with ramp door closed, simply cement it to the fuselage as shown in lower **Inset A** illustration.
10. If building with ramp door open, cement a hinge retainer, **B22**, to right fuselage. Now guide pin on ramp door into **B22**. Now cement a **B22** to left fuselage side being sure the left pin on the ramp door is trapped between **B22** and the fuselage.
11. Now cement the ramp actuator cylinders, **B25**, into place as shown.
12. Carefully cement the windscreen, **E27**, to the fuselage.



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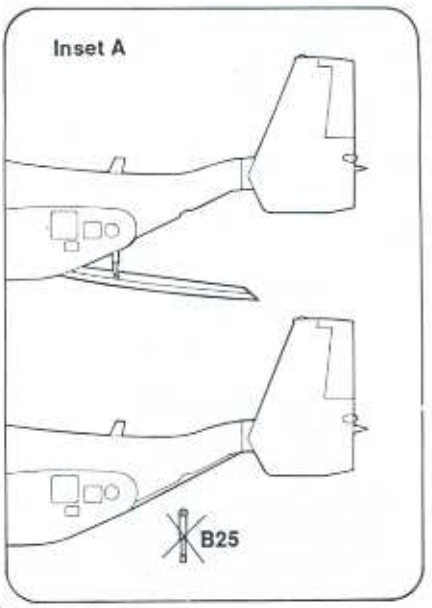
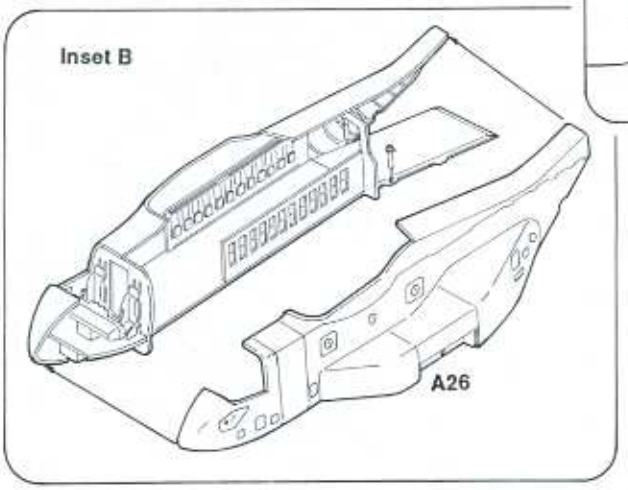




5 LANDING GEAR

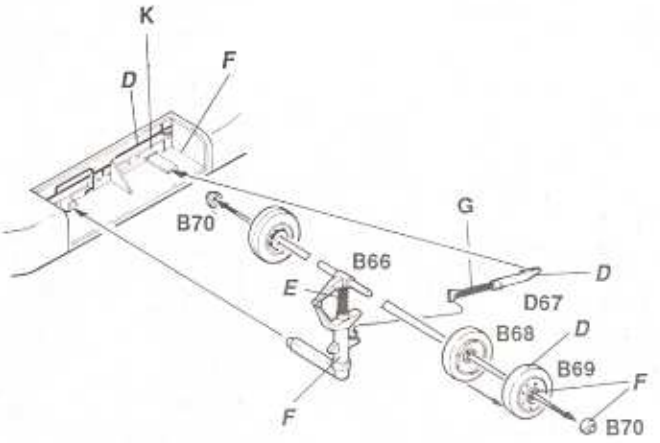
Preliminary Painting

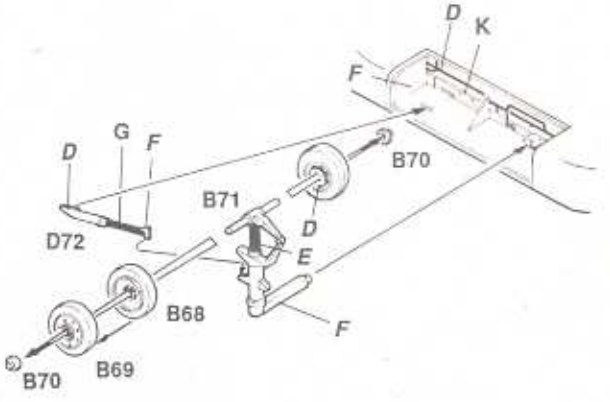
Paint parts as indicated by letters in the assembly step illustration and the **COLOR KEY**.

Note: If you have decided to build your model in a flying configuration with gear retracted go on to Step 6. If building with gear down begin assembly here.

Assembly

1. Cement tire/hub units, **B68** and **B69**, together. Cement tires (2) onto axles of right main strut, **B66**. Now cement strut to fuselage as shown. Now cement hubs, **B70**, into place. Next cement retraction link, **D67**, into place as shown.
2. Assemble left main gear as shown using strut **B71** and retraction link, **D72**.





COLOR KEY

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H	**No. 1103 Red**
J	**No. 1124 Green**
K	**No. 1184 Zinc Chromate**

6 NOSE GEAR

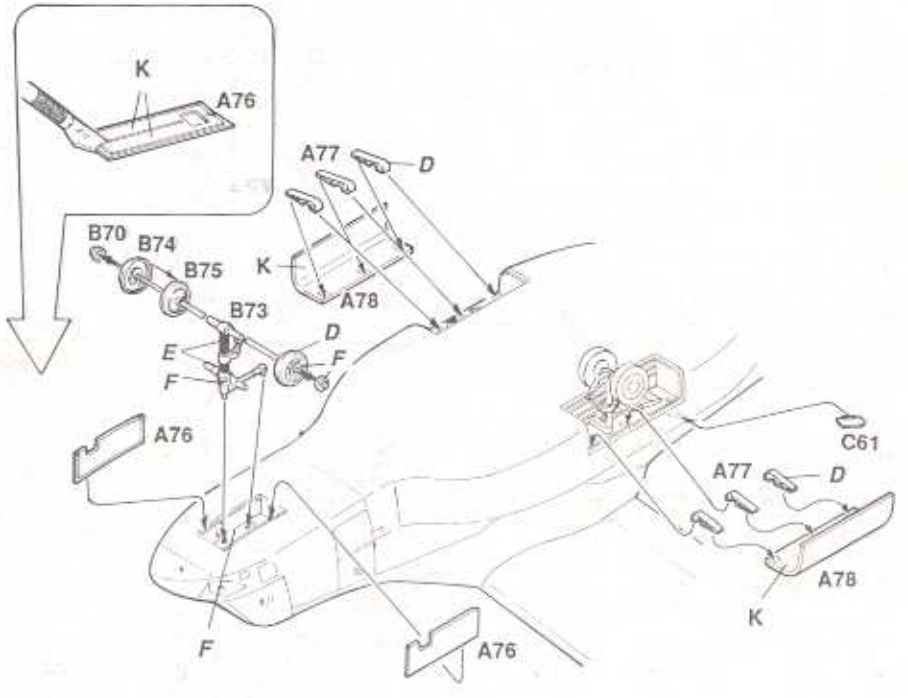
Preliminary Painting

Paint parts as indicated by letters in the assembly step illustration and the **COLOR KEY**.

Note: If building your model in flying configuration simply cement the door, **A76**, **A77**, and **A78**, directly into position.

Assembly

1. Cement tire/hub units, **B74** and **B75**, together (make 2) and to axles of nose gear strut, **B73**. Now cement hubs, **B70**, into place. Now cement the strut unit into place as shown.
2. Cut the nose gear door, **A76** into 2 pieces as shown. Now cement the doors into place.
3. Cement 3 hinge arms, **A77**, to each main door, **A78**, as shown. Set doors aside to dry. Cement deflection strip, **C61**, to each side of fuselage as shown. Now cement main gear doors into place.



7 LEFT NACELLE

Preliminary Painting

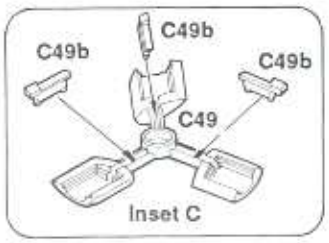
Paint parts as indicated by letters in the assembly step illustration and the **COLOR KEY**.

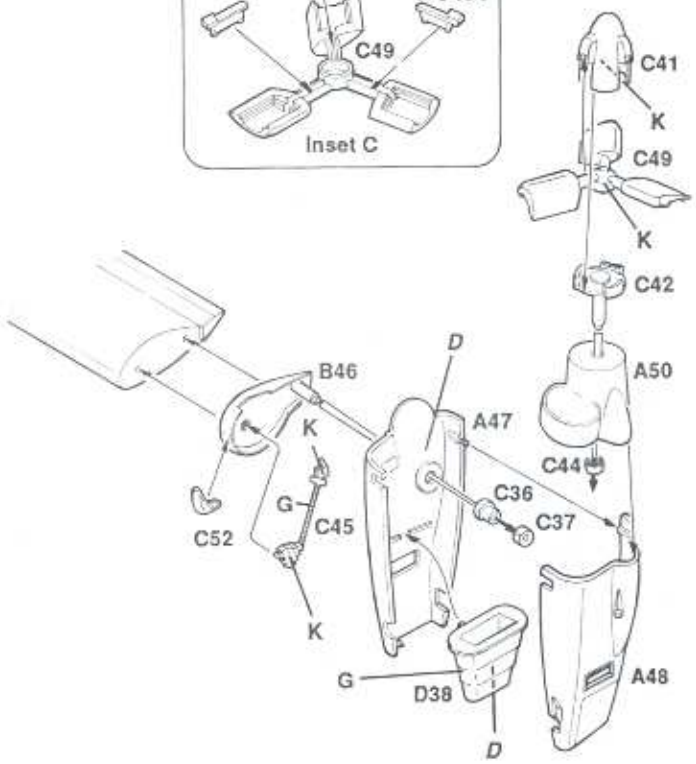
Assembly

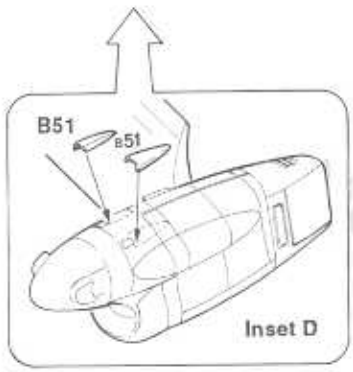
1. First, now... don't wait. Cement the bearing bushing, **C36**, to the inboard nacelle half, **A47**. Be sure the bearing is centered on the hole. Set aside to dry.
2. Locate rotor hub, **C49**, and cement filler blocks, **C49b**, to the slots in the hub as shown in **Inset C**.
3. Cement the hub units, **C41** and **C42**, around the rotor hub, **C49**, as shown. Now slip the shaft of **C42** through nacelle inlet, **A50**, and cement retainer, **C44**, to the shaft with just a tiny drop of glue. Be very neat and be sure **C42** turns inside **A50**.
4. Cement the infrared exhaust suppressor, **D38**, to the inside of nacelle half, **A47**.

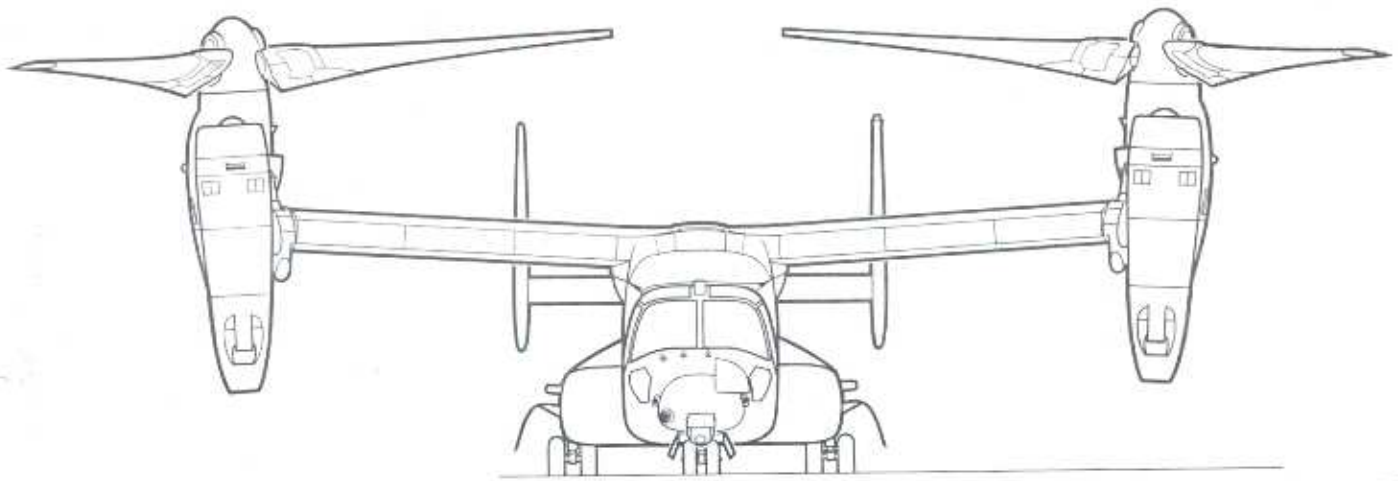
Note: If building your model in a forward flying configuration throw tilt actuator, **C45**, away. If building the model in ground position cement **C45** to the tip fairing, **B46**, as shown.

5. Cement fairing, **C52**, to front of tip fairing, **B46**, as shown. Now slide shaft of **B46** through bearing of inboard nacelle half, **A47**. Now cement retainer, **C37**, to tip of shaft. Set unit aside to allow retainer to dry securely to shaft.
6. When dry cement outboard nacelle half, **A48**, to **A47**. Now cement the nacelle inlet, **A50**, and hub unit to the nacelle.
7. Cement scoops, **B51**, to the nacelle shown in **Inset D**.
8. Now cement the entire unit to the left wingtip as shown. Watch to see it doesn't get out of alignment while drying.









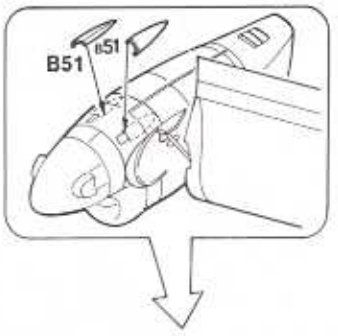
8 RIGHT NACELLE

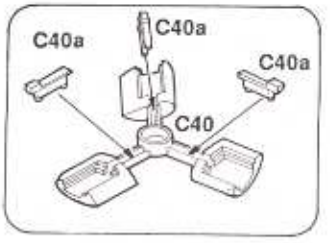
Preliminary Painting

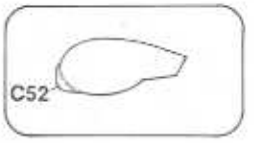
Paint parts as indicated by letters in the assembly step illustration and the **COLOR KEY.**

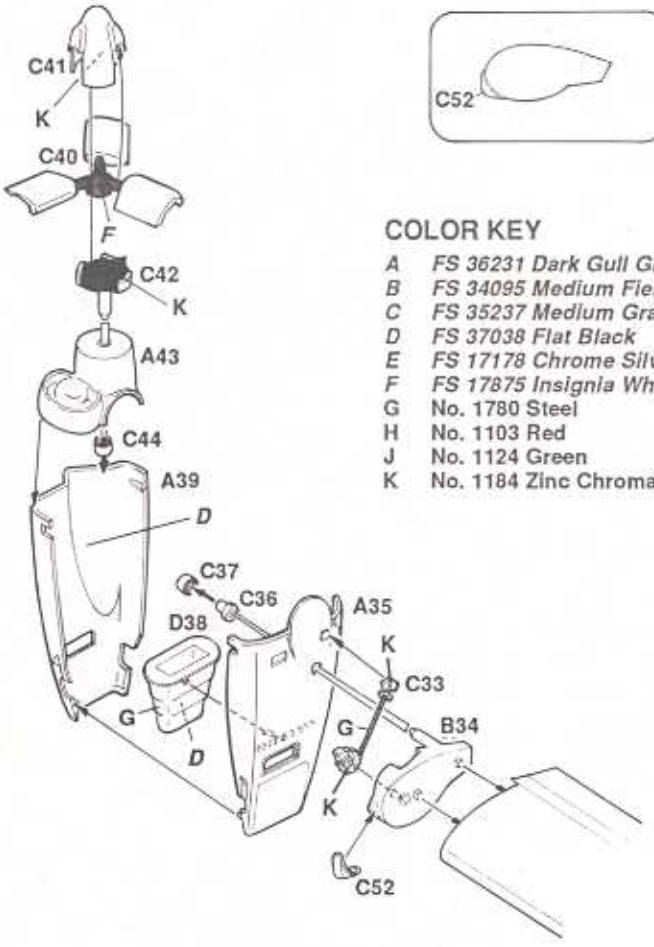
Assembly

1. The assembly is basically the same as you did for the left nacelle in Step 7. Again, work slowly and carefully following the illustration at right.
2. **Inset E** shows the nacelles mounted in the forward flight mode. When built in this configuration the tilt actuators, **C33** and **C45** are not used.
3. Take your time. Step 7 and this one are critical to the model of the V-22. Work slowly and carefully and allow time for cement to dry.









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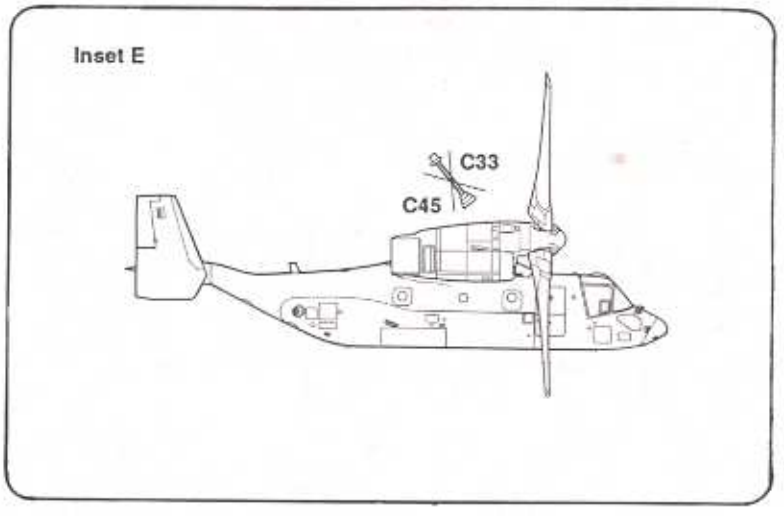


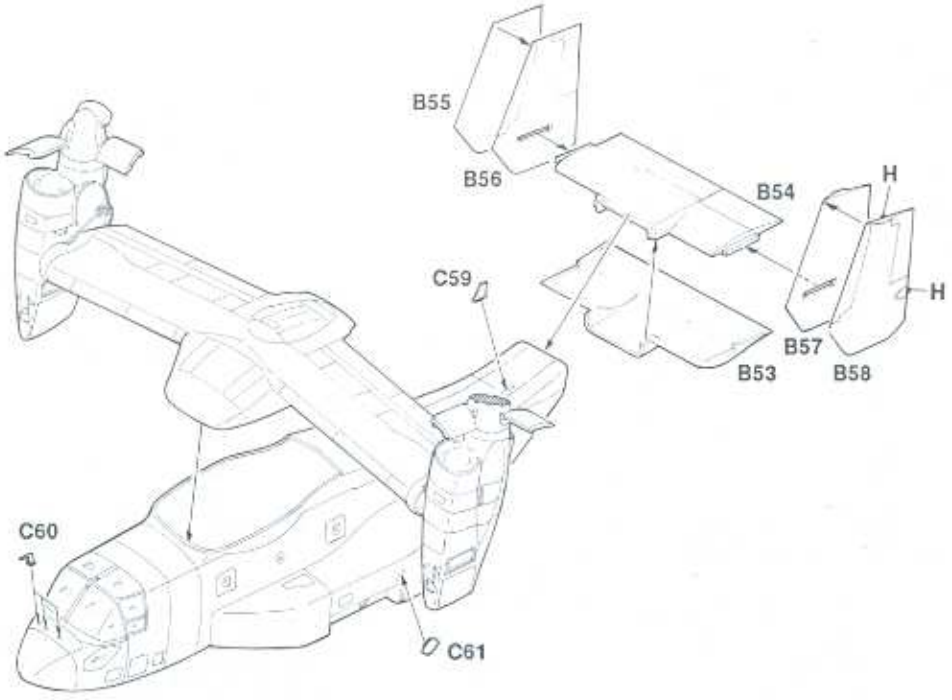
9 BASIC COMPONENTS

Preliminary Painting

There is none. Paint the various lights and pitot tubes after this step is complete.

Assembly

1. Cement the wing and nacelle unit to the fuselage.
2. Cement the pitot tubes, **C60**, to the fuselage.
3. Cement the upper and lower stabilizer halves, **B54** and **B53**, together and to the fuselage. Allow time to dry.
4. Cement vertical tail surface halves, **B55** and **B56**, together. Now cement **B57** and **B58** together. Now cement the surfaces to the stabilizer. Check for alignment.
5. If you failed to attach deflection strip, **C61**, in Step 6 do it now as shown here.



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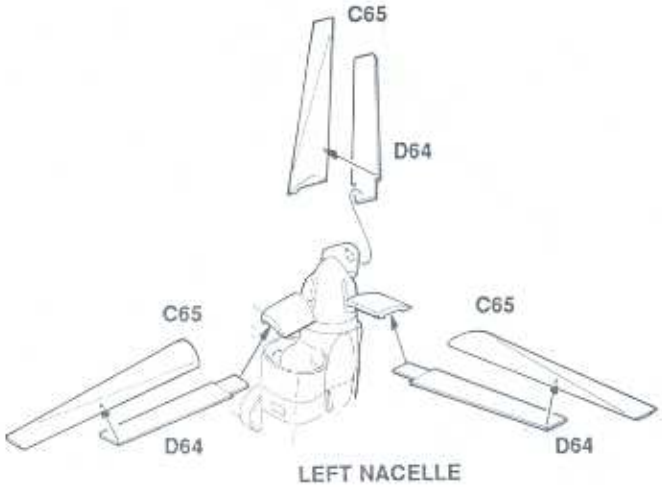


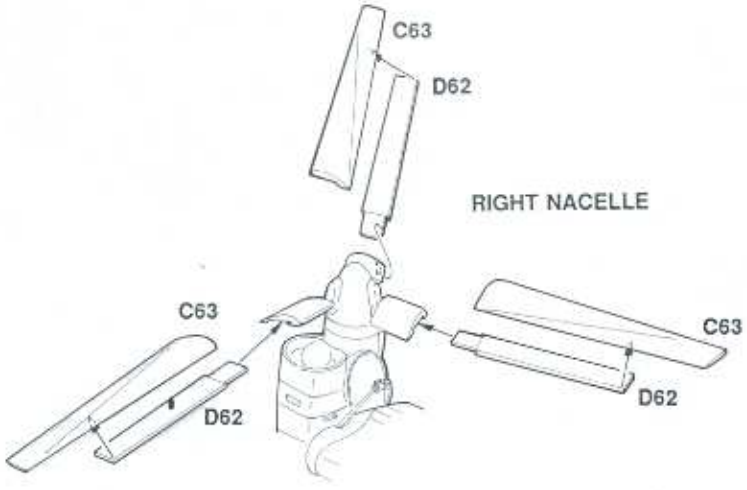
10 FINAL ASSEMBLY

Preliminary Painting

Paint rotor blades ***FS 37038 Flat Black*** after assembly.

Assembly

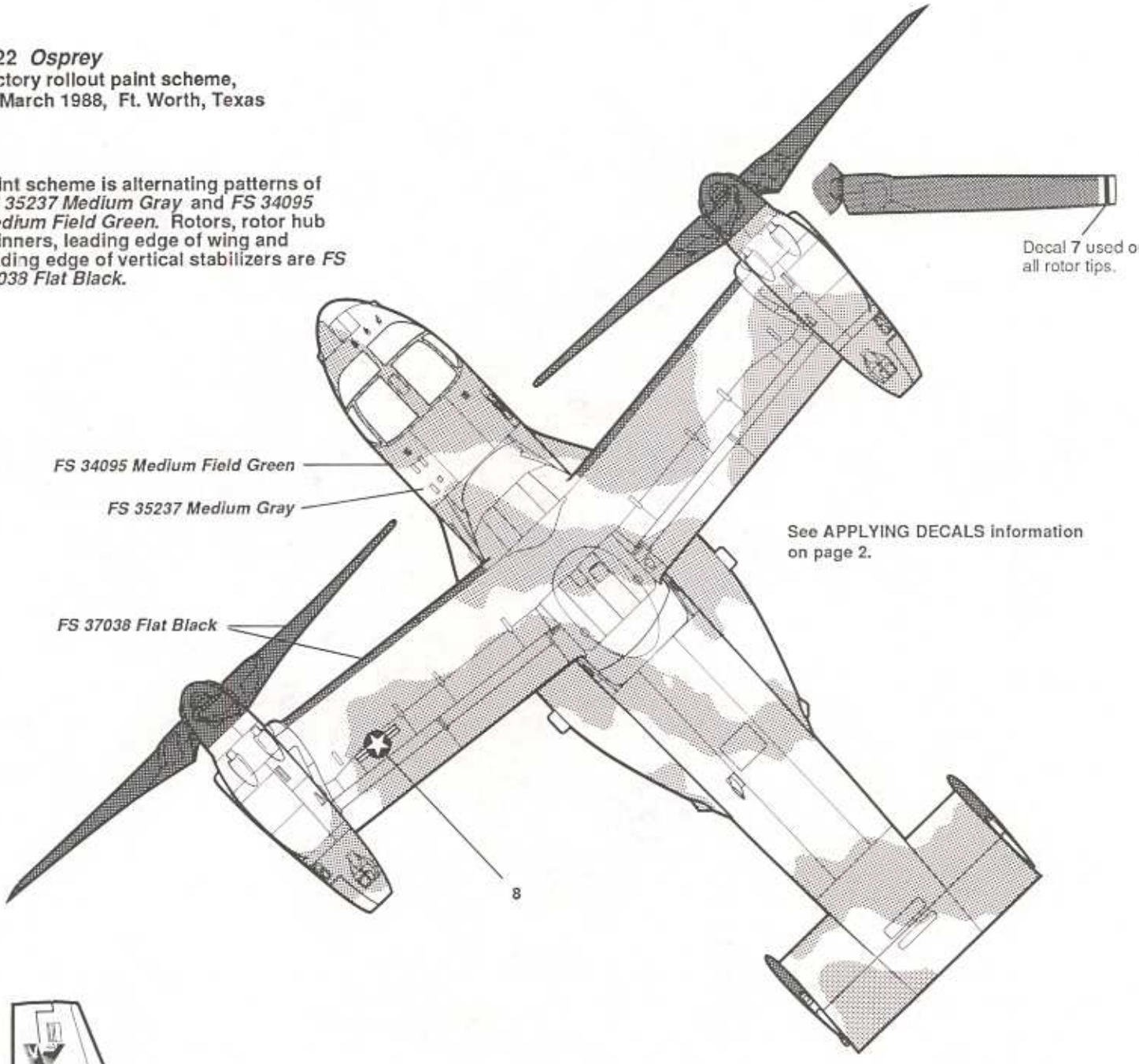
1. Locate and cement together the rotor blades for the left nacelle. These are **D64** and **C65**. After assembling 3 blades, cement them to the nacelle as shown. Be sure the cement dries properly and the blades don't sag.
2. Now assemble the blades for the right nacelle as shown. Again, work slowly and carefully.
3. Assembly of your V-22 model is now complete.



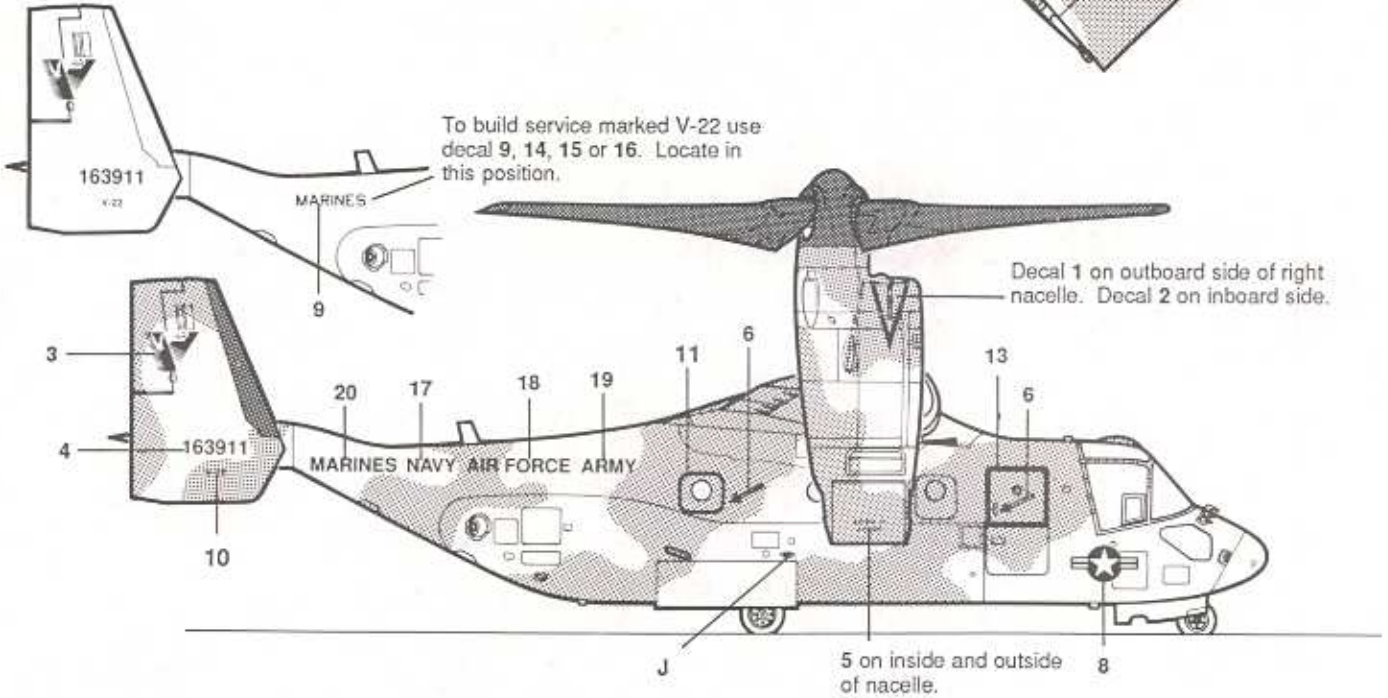
V-22 *Osprey*

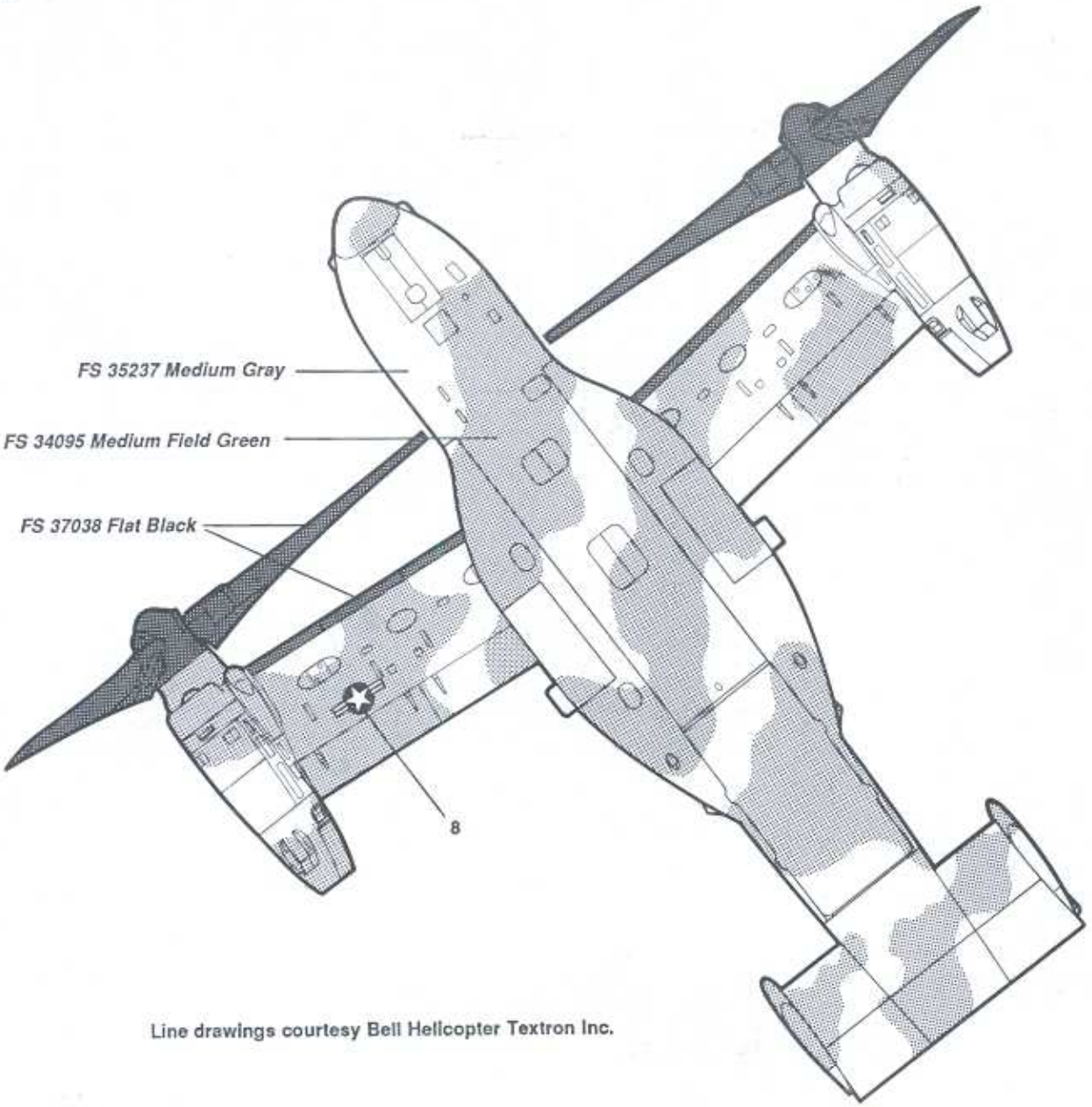
Factory rollout paint scheme,
23 March 1988, Ft. Worth, Texas

Paint scheme is alternating patterns of *FS 35237 Medium Gray* and *FS 34095 Medium Field Green.* Rotors, rotor hub spinners, leading edge of wing and leading edge of vertical stabilizers are *FS 37038 Flat Black.*

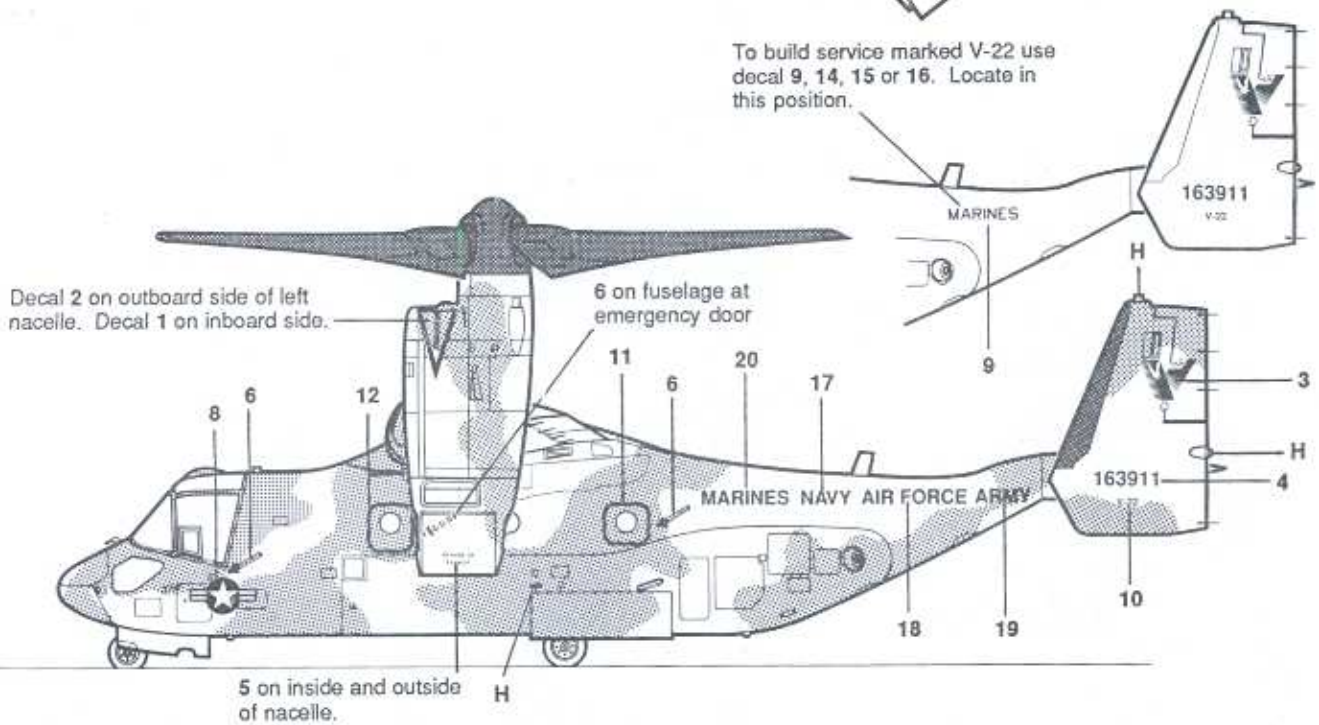


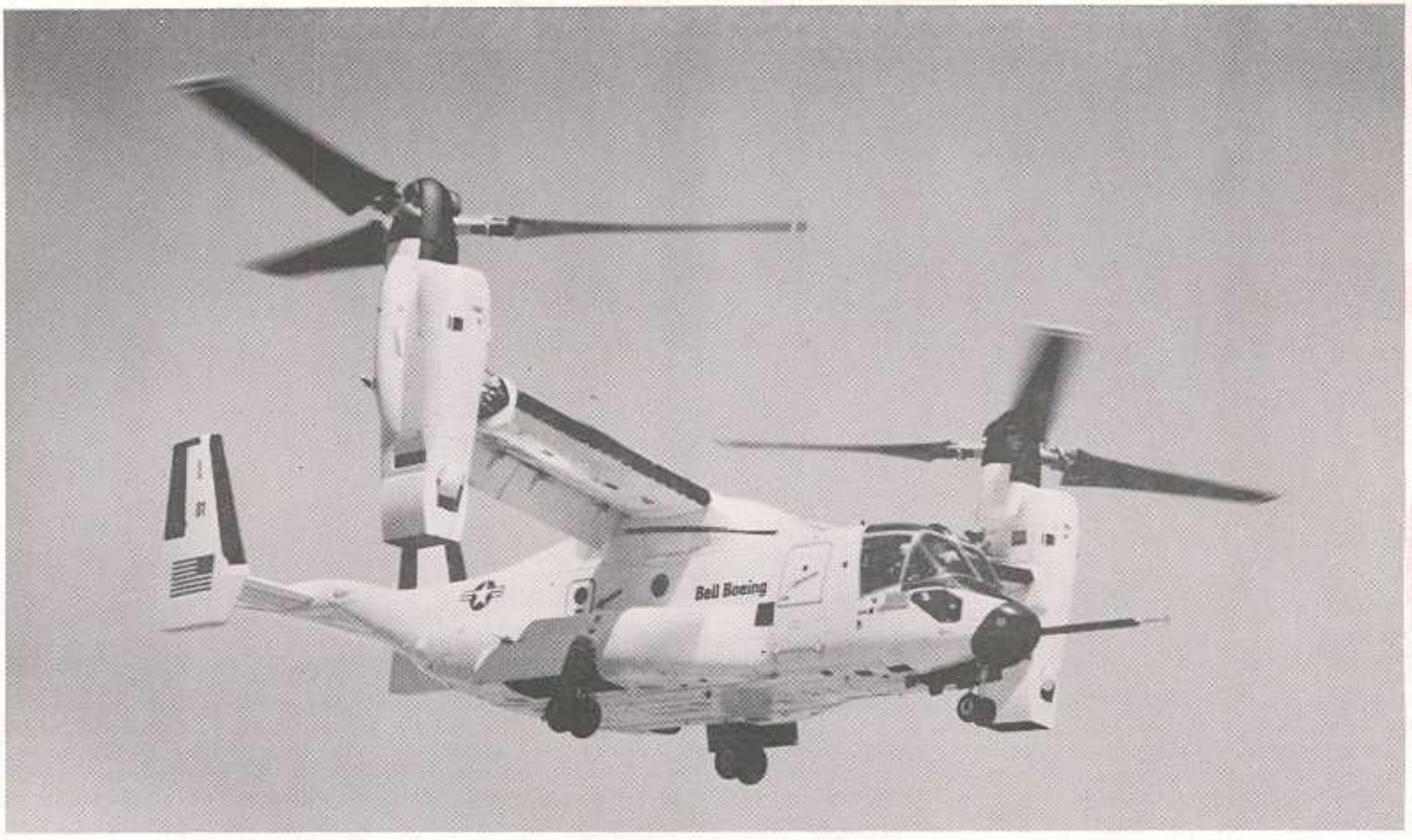
See APPLYING DECALS information on page 2.





Line drawings courtesy Bell Helicopter Textron Inc.





**Bell Boeing V-22 Osprey first flight,
19 March 1989, Ft. Worth, Texas**