

Aluminum Alloy Repair

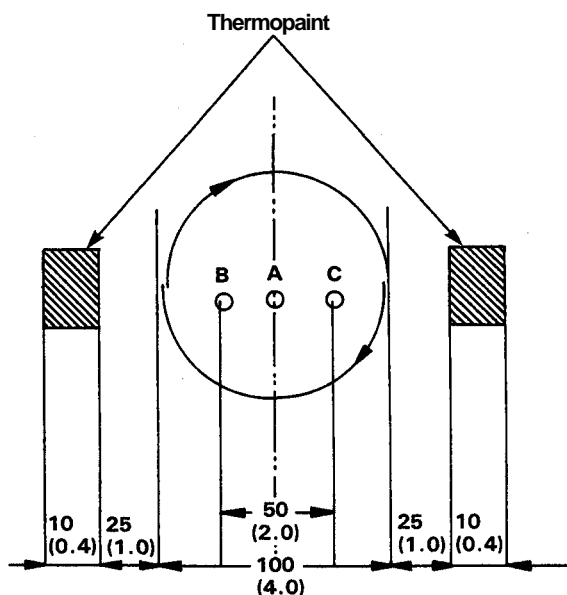
Body, Frame Area Shaping (cont'd)

NOTE:

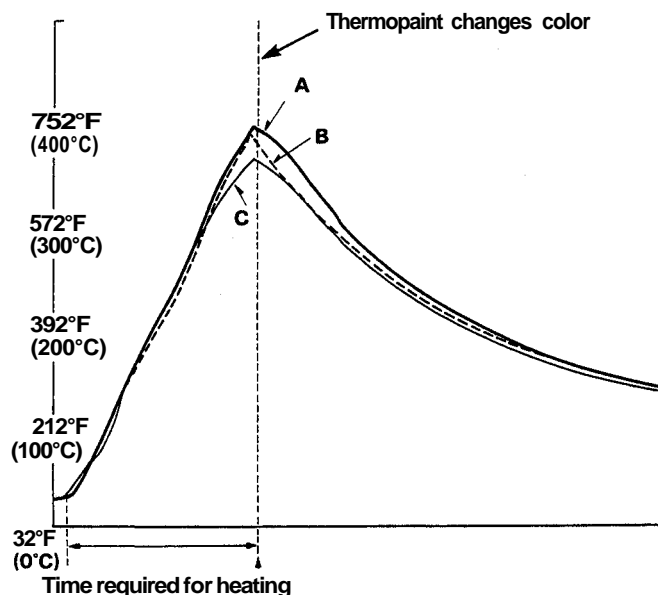
- Thermopaint (temperature indicator which changes color at 230°F (110°C)) must be used for temperature control to ensure that the aluminum alloy does not overheat.
- When heating an alloy, move the torch flame continually so that it does not focus on one particular spot.

CAUTION:

- When heated, aluminum alloys melt without changing color.
- Since the side sills of aluminum alloy bodies are susceptible to bending and torsional stress, an extruded heat-treated material (6000 series) is used. If a side sill is damaged, it must be replaced.



Unit: mm (in)



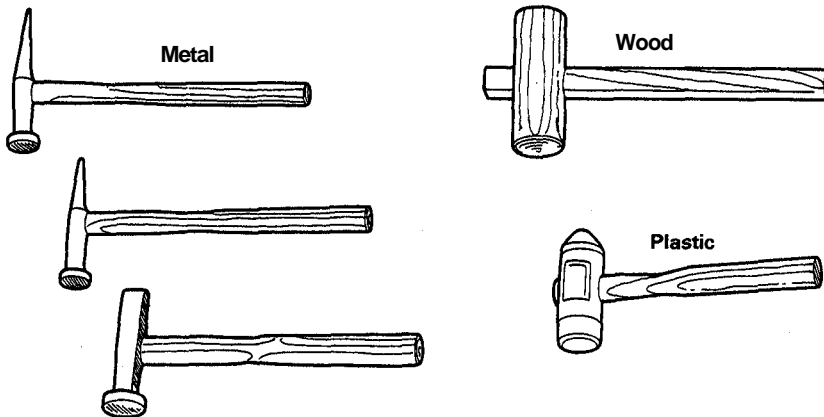
Skin Panel Area Shaping

1. Repairs using hammers and dollies

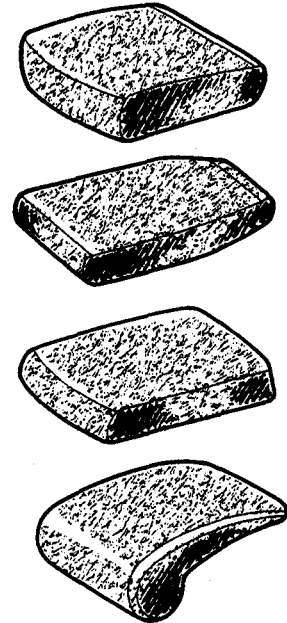
Hammering methods using hammers and dollies are basically the same as for steel plate.

The hammers and dollies shown below are used for aluminum alloys which have a relatively high elongation.

HAMMERS



DOLLIES



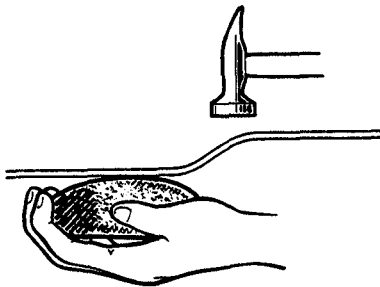
NOTE:

- The hammer head is rounded so the surface will not be dented.
- The resistance of aluminum alloy panels to corrosion is reduced when soldering is used to shape a panel. Also, since cracks sometimes form, soldering should not be performed.

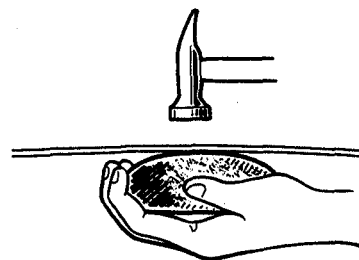
There are two ways of using a dolly when hammering:

"Hammer off dolly" where the hammer and dolly are positioned askew, and "hammer on dolly" where the panel is sandwiched between the hammer and the dolly, and the hammer is used above the dolly.

Hammer off dolly:



Hammer on dolly:



- The "hammer off dolly" method with its minimal elongation and work-hardening is frequently used for aluminum alloys. It is used to hammer down surfaces.

NOTE: Be careful that the surface does not fall below the contour.

- Aluminum alloys react quickly to hammering with the "hammer on dolly" method, and elongation results. When this method is used, the surface must be tapped very lightly.
- The contact surfaces of the hammer and dolly must be kept clean and polished at all times so that the base metal is not marked or scratched.

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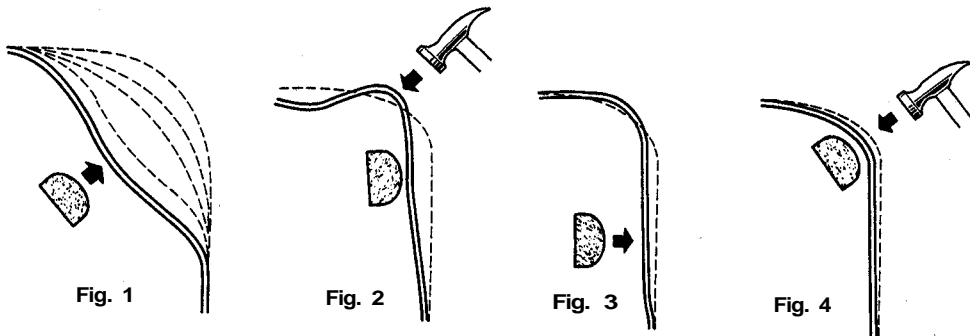
Aluminum Alloy Repair

Skin Panel Area Shaping (cont'd)

Hammering

To shape a deformed panel, use a hammer and dolly to smooth out unevenness. As shown in the figures below, a first even out a large indentation close to the original shape.

Use this method to straighten sharp curves from inside. After the shape has been restored to line C Fig. 1, use the hammer carefully to prevent panel elongation, then continue as shown in Fig. 2,3 and 4.



Drawing

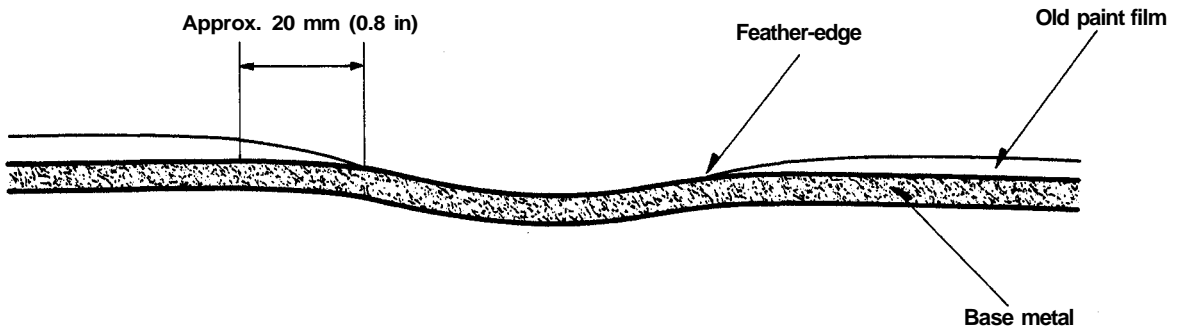
As with steel plates, a gas torch can be used to apply heat, then draw the surface area to correct panel warp.

Aluminum alloy does not change color when heated, so it is important for the temperature to be controlled by applying thermopaint so that the panel does not melt.

NOTE: The kind of drawing hammer (serrated face) used for hammer finishing of steel plate should not be used for aluminum alloy since it can cause cracking.

2. Paint film removal and cleaning

Use an #80 to #120 sanding disc to remove the paint film. Hold the disc plate lightly against the surface to avoid inducing strain. Proceed with feather-edging over a wide area bordering on the old paint film.



- 1. Grind down the old paint film using a #80 sandpaper pad over a wider area than the putty area.
- 2. When using #120 sandpaper to smooth the sanding marks from the #80 paper, leave an edge measuring between 20 ~30 mm (0.8~1.2 in) and proceed with feather-edging.
- 3. Use compressed air to blow away any dust, dirt or moisture on the putty surface. Remove any oil or grease with a wax and grease remover.
 - If it is raining or if the humidity is high, warm up the base metal using an infrared lamp or heater to remove the moisture.
 - Similarly, warming up the base metal in cold weather (to about 68°F (20°C)) also improves putty adhesion and speeds up the drying process.

(cont'd)

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Skin Panel Area Shaping (cont'd)

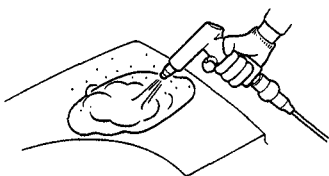
3. Finishing with putty

Unlike steel plate, putty cannot be applied directly to the bare surface of aluminum alloys. Apply an epoxy primer first, then add the putty. Putty is a material reduces the amount of work time involved in panel repair. With its excellent restorative properties and workability, using of putty is better than repairing a panel by hammering it or applying heat.

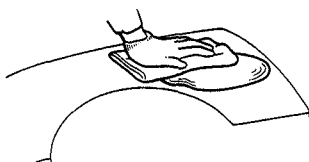
-1. Puttying

The basic instructions for applying putty are: clean the surface of the panel to be repaired, do not allow air to enter the putty, do not apply a thick layer at one time, and apply the putty to conform to the panel shape.

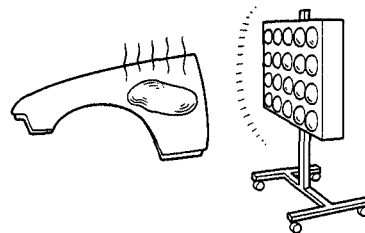
Air blowing



Grease removal



Drying

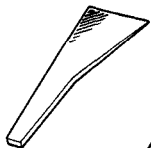


Main points in applying putty

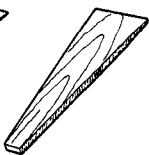
- For flat surfaces, use a harder spatula; for gently curving surfaces, use a softer spatula; for sharply curving surfaces, use a flexible spatula made of rubber.

NOTE: Apply the putty from bottom to top, taking care not to reduce the height of the center area.

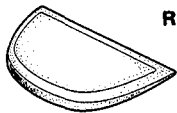
Plastic



Wood

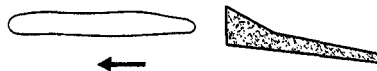


Rubber

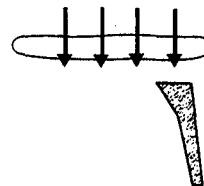


How to use a spatula:

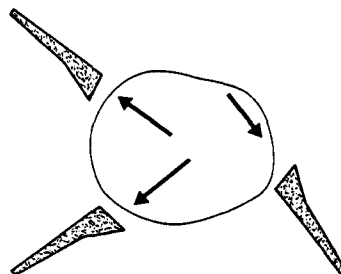
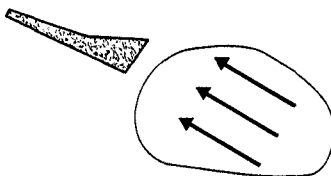
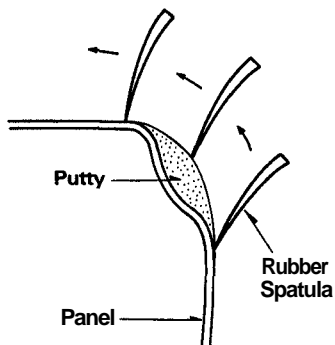
Good



No Good



How to use a spatula on curved areas:



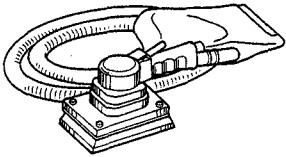
-2. Putty sanding

There are three stages in putty sanding: roughing, leveling and border line flattening.

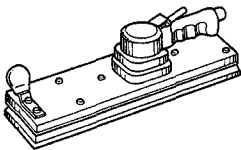
- Sand the putty in all directions.
- Always use an orbital sander or double-action sander.
- Operate a power-driven file by hand for finishing.

Sander motion:

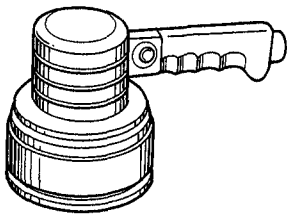
SHORT ORBITAL SANDER



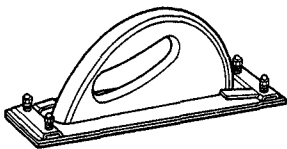
LONG ORBITAL SANDER



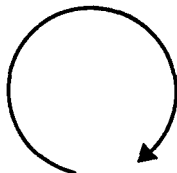
DOUBLE-ACTION SANDER



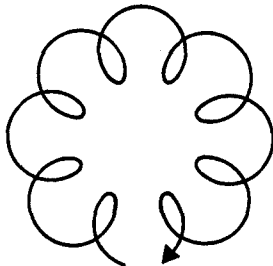
HAND FILE



Movement of
single-action
sandpaper area:

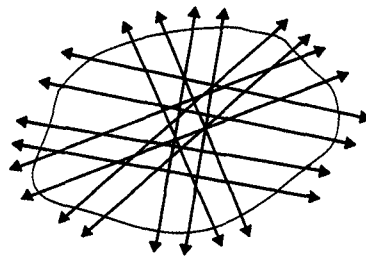


Movement of
double-action
sandpaper area:



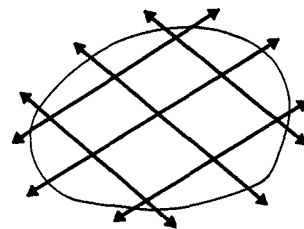
Sanding a flat surface:

Move in all directions over the surface of the putty.



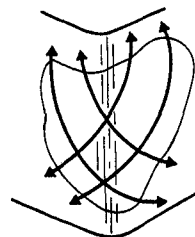
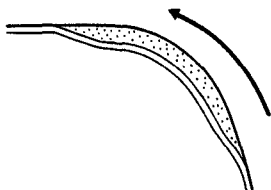
Sanding a gently curved surface:

Move the sander diagonally in a specific direction only.



Sanding a sharply curved surface:

Move the sander smoothly to roll over the high-point of the curved surface.



Aluminum Alloy Repair

List of "Dos" and "Don'ts"

1. Sanding work

- 1) Don't use the same sanding tools or sandpaper for both aluminum alloy sheets and steel plates.
- 2) Do operate the sanding tool at a low speed; don't operate continuously as this heats the surface of the metal.
- 3) Don't use clogged sanding tools or sandpaper.
- 4) Do use a stainless steel wire brush; don't use an iron wire brush.

2. Welding work

- 1) Don't forget to clean and sand the weld zones.
- 2) Do check welding conditions using a test piece prior to welding: don't start welding body areas without preparation.
- 3) Don't use electrode wire other than A5356WY.
- 4) Don't use shielding gas other than 100% argon gas.
- 5) Do keep electrode wire in airtight containers and store in a dry, constant temperature location; don't use wire that has been left around for a long time.
- 6) Don't use acetylene or oxygen gas welding or brazing.

3. Sheet metal work

- 1) In structural areas that have been damaged or buckled, do replace any parts with cracks; don't repair cracked parts after frame straightening.
- 2) Do repair buckled areas by heating them in controlled temperature, don't try to extend them when cold.
- 3) Don't clamp anything directly without protection.
- 4) Don't use a serrated face hammer.
- 5) Don't perform soldering (leading) shaping.
- 6) Don't forget to apply an epoxy primer before puttying.

4. Assembly work

- 1) Do use only the designated nuts and bolts; don't use any part which has not been coated with [DACRO] or [DACRO + TORQUER]

5. Inspection

- 1) Don't forget to check for cracks after frame straightening and after welding.