

Designing and Fabrication of Fixtures for Masking in Electrocoating

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ABSTRACT: Fixture is a specially designed work holding device using T bolts, V-blocks and clamps. Locating, clamping and unloading of work can easily and quickly be done. The total production time and cost are reduced. Masking is employed in most any metal finishing operation where only a specifically defined area of the surface of a part must be exposed to a process. The masking may be employed on a surface where treatment is either not required or must be avoided. We have advanced state of the art mask painting design technical that decrease parts material handling, provides clean edge lines and increase production rates. Our custom paint mask tooling and fixtures are used in production environment for decorative paint masking operations. Mask construction is stainless steel plate with nickel electroform where needed for an extra critical mask. Electroforms are made from a lay-up of an actual molded parts.

KEYWORDS: T bolts, clamping, stainless steel plate, nickel electroform.

I. INTRODUCTION

A FIXTURE is a work holding or support device used in the manufacturing industry. Fixtures are used to securely locate (Position in a specific location or orientation) and support the work, ensuring the all parts produced using the fixture will maintain conformity and interchange ability. Using the fixture improves the economy of production by allowing smooth operation and quick transition from part to part, reducing the requirement for skilled labour by simplifying how work pieces are mounted, and increasing conformity to across a production run.

A Fixture differs from a jig in that when a fixture is used. The tool must move relative to the work piece; the jig moves the piece while the tool remains stationary. It is also used in inspection welding and assembly. A fixture does not guide the cutting tool, but is always fixed to machine or bench by using a fixture, responsibility for accuracy shift from a operated to the construction of machine tool. When a few parts are to be machined, work piece clamp to the machine table without using fixture in many machining operation. However when the numbers of parts are large enough to justify its cost. The fixture is generally used for holding hand locating the work.

II. HISTORY

The first manufacture processes were made one at a time. Artist started with little more than raw materials and rough idea of the finished product. They produced each product piece by piece making each part individually and fitting the parts into the finished product. This process took time more over, the quality and consistency of products varied from the one artisan to the next. As they worked, early manufacturing pioneer realized the need for better methods and developed new ideas. Yesterday's work holders has the same two basic functions as today's securely holding an accurately locating a work piece. Early the fixtures may have modern refinements, but they followed many of the same principles as today's work holder design.

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III.FUNCTIONS OF FIXTURES

A fixture is a device for locating ,holding and supporting a work piece during a manufacturing operation .fixture must correctly locate a work piece in a given orientation with respect to a cutting tool or measuring device ,or with respect to another component ,as for instance in assembly or welding.

IV. PURPOSE

The term fixture is applied to a device designed to hold work while being machined , and to contain guides to govern the cutting tool. Fixtures are divided into many classes, such as grinding ,boring, turning, planning, milling ,and drilling fixtures.

This fixture used for Electro coating apply to specific work piece with out Difficulty.

V.FIXTURE DESIGN

Fixture planning is to conceptualize a basic

Number of work pieces per fixture

Locating datum faces

Orientation of work piece with in fixture

fixture configuration through analyzing all the available information regarding the material and geometry of the work piece , operation Required , processing equipment for the operation , and the

Clamping surfaces

Support surfaces ,if any requirements

operator .The following outputs are included in the fixture plan;

▪ Fixture type and complexity

VI. DESIGN OF FIXTURE WITHOUT COMPONENTS

VII.DESIGN OF FIXTURE WITH COMPONENT

Bearing Housing (2119677 & 1781716)
Painting opa Fixture(Common)

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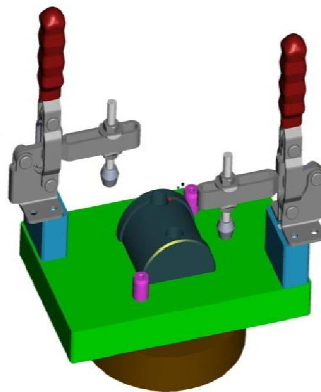


Fig 1:Design of Fixture Without Component

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It is a design of fixture without a work piece. The fixture is mainly used for holding the work piece without any breakage and cracks. This fixture is used for easily fixed the work piece and removed the work piece in quickly.

This fixture can improve our work piece quality and accuracy.

- Blue color of work piece is refers to the masking area.
- Green color is refers to the working table.
- Red color is refers to the handle.

Painting opn Fixture(Common)

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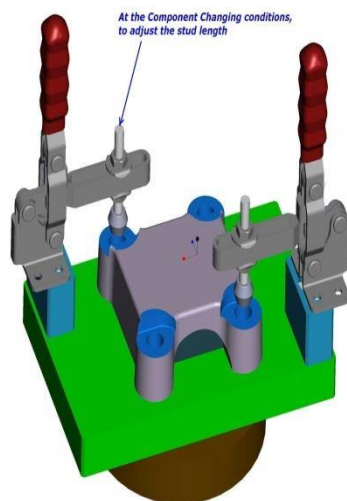


Fig 2:Design of Fixture with Component

- Blue color of work piece is refers to the masking area.
- Green color is refers to the working table.
- Red color is refers to the handle.

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Fig 3:Workpiece



Fig 4:Fixture

VIII. MASK PAINTING

Mask construction is stainless steel plate with nickel electroform where needed for an extra critical mask. Electroforms are made from a lay-up of an actual molded part. This process enables a great deal of detail to be picked up for an accurate paint application. the layup process permits a certain measure of clearance to be built into the electroform allowing for some part to part variation.

RS Coatings offers precise masking tools required in coating applications to apply paint patterns to complex parts. We have the proficiency required in manufacturing accurate masks for a high quality finishing application as we have been in this industry for more than a decade. Hence we can offer you a production-ready system that comprises of both the masking and finishing. We have advanced state-of-the-art mask painting design techniques that decrease parts material handling, provides clean edge lines and increase production rates. Our custom paint mask tooling and fixtures are used in production environment for decorative paint masking operations. We construct paint mask fixtures of heavy duty steel frames and linear bearing slides. Automatic vertical rotary paint fixtures are designed for use with a fixed HVLP spray gun, two hand non tie-down cycle buttons, an air motor and gear box for auto rotation. This feature makes the paint mask fixture ideal for the production painting of cylindrical parts, such as hubcaps and center caps. Our auto-flip-top auto-rollover trunion paint mask fixture is designed with linear bearing slide construction for precision alignment. This fixture allows part painting on the front and back sides and can optionally be configured with pneumatic hinge movement. This feature allows a mask with deep pockets to be removed from the part without scratching.

IX.MASKING TAPE

3M™ Electroplating Tape 470 is a conformable and abrasion-resistant vinyl tape with excellent resistance to most chemicals used in typical electroplating processes

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X.FEATURES

Excellent resistance to most chemicals used in typical electroplating operations.

- Prolonged exposure to elevated temperatures (above 250°F/121°C) and hot caustics may cause weakening of the adhesive bond.
- Can be qualified to meet Federal Specification

HH-T-0025 (GSA-FSS) Amendment 2

- Resists most common solvents, care should be taken to avoid ketones, chlorinated hydrocarbons, and esters, found in lacquer thinners, degreasers, paint strippers, etc., which may cause the backing to swell or curl.

XI. CONCLUSION

We can implemented this fixture attached with any type of machine. we can achieve the increase the production range. The main advantages of this fixture is therefore, low area , simple design so low skill worker can be easily operate this fixture, it reduce the production time.

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