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Process Optimization In Car Sill Assembly

S.P.Bharadhan, R.Elavarasan, R.Gokulnathan, A.Kathiravan

Abstract— They will be engaged in the production-line to motion each and every activity and to carry out the time-study of the component as will.They will be assigned to make a complete study on the process sequence, during the manufacturing process. Basically car-sill is one of the component's used in the elevator which is place in the lower deck of the car and is used to bridge the gap between the floor landing and the car.

Keywords— manufacturing process., elevator etc.

I. ABOUT PROJECT

The car sill is one of the most important component in the elevator in which the car sill assembly are located in the car.The total set-up of the car sill component are fixed in the car in which it moves in vertical direction towards upward and downwards inside the buildings.It is used to bridge the gap between floor landing in the car and which theComponent is used to energy to both or straight doors are guiding way with .in a single component is a car sill assembly.In which we do our project with focusing on the reduction of production timing and also the cost in this car sill manufacturing process. This process includes reduction of welding costs and also the elimination of supporting column in facia plate.

II. COMPANY PROFILE

2.2.1 Kone Elevator India Private Limited

KONE is one of the world's leading elevator and escalator companies. It provides its customers with industry–leading elevator and escalators and with innovative solutions for their maintenance and modernization

KONE, one of the global leaders in elevator and escalator industry .It offers the best experience by developing and delivering solutions enable people to move smoothly comfortably and without waiting in buildings in an increasingly urbanizing Environment .

KONE Corporation is the world's largest elevator Company, It provides installation, modernization and maintenance of elevators, escalators and automatic doors. Company operates approximately 800 service centers in 40 countries across.

KONE has obtained ISO 9001: 2008, ISO 14001: 2004 & OHSAS 18001: 2007 certification.

2.2.2 Konepurpose

KONE moves people and goods reliable, innovation, dedicated and responsible ways that add sustainable value to our customers business and end users life.

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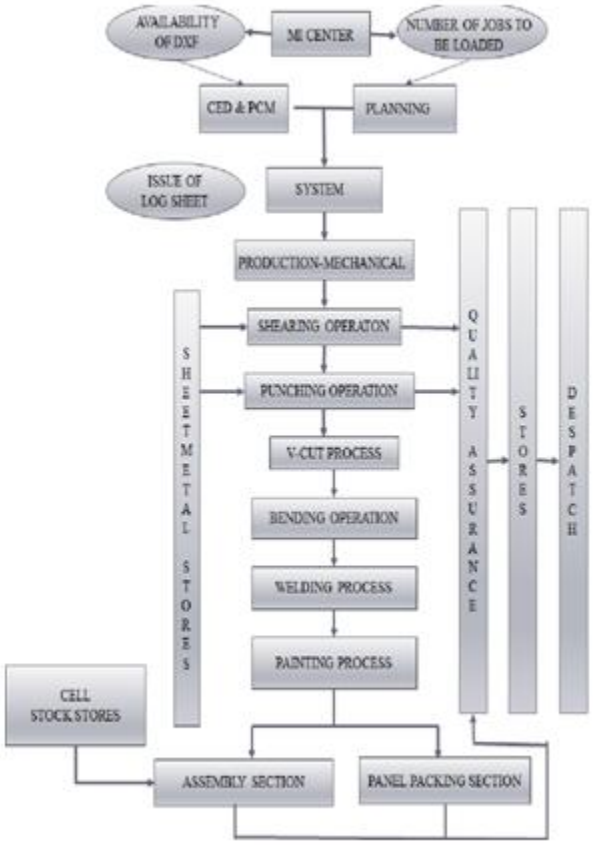
2.2.3 Kone Vision

KONE will recognize as the company that sets the standards in our industry, marking us the most desirable supplier partner, employer and company in which to invest.



2.2.4 Kone Location

KONE Elevators India factory is situated in at Ayanambakkam, an industrial belt, a suburb a Chennai. Factory is located in total land of 8.67 acres, out of which 5400 sq. ft. is used for machine shop and 13000sq.ft. is used for office. This is equipped with latest CNC machines for major operation like shearing, bending, punching, balancing, drilling etc…, imported and used.

2.2.5 Kone Products

KONE's products are design and engineered to meet the competitive world and customer . The products are

1. Mono space standard
2. Mono space special
3. X mini space
4. Mini space
5. Classic standard
6. Classic special
7. Swift (adv.)

8. Swift (MDS/MDV)
9. Scenic elevators

III. Literature Review

A number of additional interesting publications are available for those who wish to pursue or increase their knowledge of the many aspects of vertical transportation. A listing of those familiar to the author will be given below.

An additional source is the promotional publications and magazine article reprints available from the various manufacturers, which can usually be obtained by a written request. The Otis Elevator Company publishes two excellent booklets designed for laypeople. They are entitled Tell Me About Elevators and Tell Me About Escalators. Single copies can be obtained free of charge by writing to The Otis Elevator Company, Public Relations Department, 10 Farm Springs Rd., Farmington, CT. 06032.

The Elevator EscalatorSafetyFoundation was establishedin1991 toeducatethe public on the safe and proper use of elevators and escalators through educational programs. To that end they have prepared two programs consisting of informational videos and booklets: one for school children, "Safe-T-Rider," and one for seniors, "A Safe Ride." These are available to those who are interested by contacting the foundation at P.O. Box 6273, Mobile, AL 36660–0273 (phone 334-479-2199).

Elevator World Magazine, P.O. Box 6507, Mobile, Alabama 36660 (phone 800-7305093 or 251-479-4514), William Sturgeon, founder,andRiciaS.Hendrick, publisher. This is a monthly publication published continuously since 1953. It contains articles and picture stories of unique, timely, or technical aspects of elevators and escalators, as well as articles about the people and companies in the vertical transportation business. Once a year, "The Elevator World Source" is prepared and describes, in detail, the participants in the elevator industry and other related activities.

William "Bill" Sturgeon is the founder and former editor and publisher of Elevator World Magazine, and its publication has been his pride since he gave up his own elevator repair and service company. He is still active, and I value him as a good friend and am proud to have worked for many years with him and served as a member on Elevator World Magazine's board of directors.

Most of the following publications can be obtained from Elevator World Magazine, through their educational division. Over the years, they have expanded their service by retailing books related to vertical transportation and republishing significant books that were out of print. A brief description of some of these follows. The complete Elevator WorldMagazine catalog of publications can be obtained by contacting them at the address given above. 585The Vertical Transportation Handbook, Fourth Edition Edited by George R.Strakosch and Robert S. Caporele Copyright © 2010 John Wiley & Sons, Inc.

IV. Introduction

Car-sill is a one of the component used in the elevator which is placed in the lower deck of the car.

It is used to bridge the gap between floor landing in the car and which theComponent is used to energy to both or straight doors are guiding way with .in a single component is a car sill assembly.

In which we do our project with focusing on the reduction of production timing and also the cost in this car sill manufacturing process.

This process includes reduction of welding costs and also the elimination of supporting column in facia plate.

The car sill is one of the most important component in the elevator in which the car sill assembly are located in the car.
The total set-up of the car sill component are fixed in the car in which it moves in vertical direction towards upward and downwards inside the buildings

V.Car Sill

Car sill system for an elevator car, comprising a sill profile, a lower door guide movable in a slot in the sill profile and a guide holding bracket for connecting the lower door guide to the door. The guide holding bracket is passed to the lower door guide from below surface level of the car floor.

A guide holding bracket for connecting the lower door guide to a door of the elevator car , the sill profile being located below a floor surface of the elevator car and being out of sight from above, the guide holding bracket extending to the lower door guide below the floor surface.

5.1 Types Of Car Sill

Types of car sill components are divided depends upon the total entrance length of the elevator system.

- 700 mm
- 800 mm
- 900 mm
- 1000 mm
- 1100 mm
- 1200 mm

VI. Various Processes In Car Sill Assembly Section

The branch of physics that is concerned with the analysis of the action of forces on matter or material systems.

Types of process

- Punching
- Bending
- Assembling

6.1 Punching

A Power-driven machine used to cut, draw or otherwise shape material, especially metal sheets with dies under heavy pressure or by heavy blows.

Principle of operation;

After programming the work pieces and entering length of bars the control automatically calculates the max no of pieces to be punched.

Once the desired number of work pieces is entered the bar is

pushed towards the stopThe machine is fully automated once the production process is launched.

6.2 Bending:

A Bending is a manufacturing process that produces a V-shape or channel shape a along a straight axis in ductile.

A Bending machine is a forming machine tool. Its purpose is to assemble a bend on a work piece.

A Bending is manufactured by using a bending tool during a linear or rotating module**.**

6.3 Assembling:

A group of people gathered together in one place for a common purpose. The action gathering together as a group for a common purpose.The action of fitting together the component parts of a machine or other object.

The conversion of instructions in low level code to machine code.

VII. Process Of Car Sill Operation

Basically car-sill is a one of the component used in the elevator which is placed in the lower deck of the car.

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VIII. Existing Operations

First operationPUNCHING.
Second operationBENDING.
Third operationWELDING.
Fourth operation PAINTING.
Fifth operationASSEMBLING

IX. New Operations

First operationPUNCHING.
Second operationBENDING.
Third operation ASSEMBLING

X. Fish Bone Diagram

Fishbone diagram is also called cause-and-effect diagram , herringbone diagrams, Ishikawa diagram are causes diagrams are created by kaoru Ishikawa (1968) that show the causes of a specific event. Common used of the cause-and-effect diagram are product design and quality defect prevention ,to identify potential factors causing an overall effect. each causes are usually grouped into major categories to identify there sources of variation. The categories typically include:

- People : Anyone involved with the process

- Methods : How the process is performed and the specific requirement for doing it, such as policies, procedures, rules, regulations and laws
- Machines : Any equipment, computers, tools, etc. required to accomplish the job
- Materials : Raw materials, parts, pens, paper, etc. used to produce the final product
- Measurement : Data generated from the process that are used to evaluate its quality
- Environment : The condition, such as location, time, temperature, and culture in which the process operates

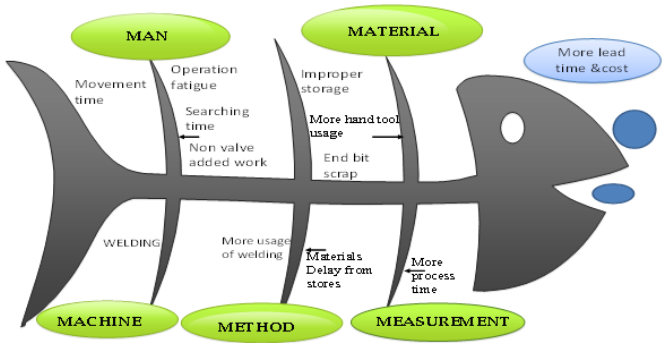
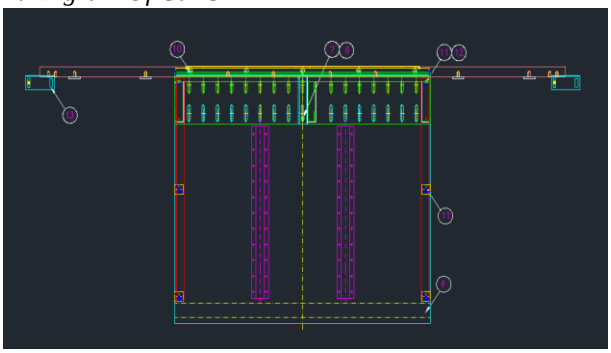


Fig 10.1

XI. Design And Implemention

2d Digram Of Car Sill



XII. List Of Components

Item	*Qty*	*Description*	*SPECIFICATION*
1	1	SILL BACK PART ASSY	75mm
2	1	SILL FRONT PART ASSY	
3	1	SILL ASSY	SS SOLID SILL
4	1	CARPET PROFILE	
5	1	SUPPORT PLATE	
6	1	FACIA PLATE ASSY	
7	25	SCREW WITH WASHER	M8x16
8	25	M8-SPL.NUT-WITH WASHER	M8
9	6	CSK SOCKET HD SCW-SS	M4x16
10	6	CHEESE HD.SCREW 5X12	AM5x12 P4.6 IS:1366
11	13	CSK HD SCREW	M6x16 P8.8 IS:6761
12	13	PLAIN WASHER A6.6	A6.6 ST IS:2016
13	6	SPECIAL SCREW	M6X20
14	2	COL FIXING BRACKET	
15	6	HEX SCREW	M8x20-HT IS:1364-8.8
16	6	PLAIN WASHER A9	

12.1 Sill Assembly

An elevator door sill assembly for used in elevator systems that have sliding doors. The door sill assembly comprises a sill plate having rail that presents an in board sliding surface an outboard sliding surface. The assembly also comprises a first guiding surface that engages that in board sliding surface and a second guiding surface that engages the outboard sliding surface.

12.2 Support Plate

The halbach array of permanent magnets has an advantage of increasing the magnetic field but it produces significant internal stress inside the PM array on the other hand. The paper deals with the magnetic analysis of the PMs and the mechanical analysis of the support plates to fix the PM array. The deflection analysis of the support plates is made in two different ways to confirm the validity of analysis and analytical approach and a finite difference method. In order to establish a maximum deflection of the plate below 1mm some materials for the support plate are considered to compare the deflection and the necessary plate thickness.

12.3 Carpet Profile

A thick heavy covering for a floor, usually made of woven wool or synthetic fibers, especially one covering the entire surface of the floor.

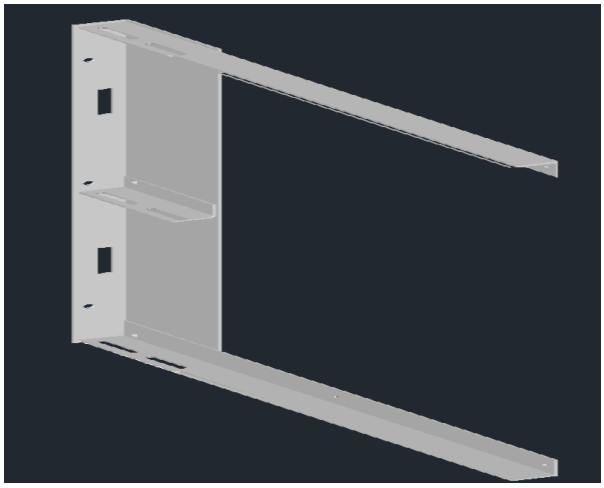
12.4screw

The simple machine of the inclined plane type consisting of a spirally grooved solid cylinder and a correspondingly grooved hollow cylinder into which it fits. A nail-shaped are rod shaped pieces with a spiral groove and a slotted or recessed head designed to be inserted into material by rotating and used for fastening piece of solid material together.

12.5 Washer

A thin flat ring that is made of metal, plastic, or rubber and that is used to make something fit tightly or to prevent rubbing. A flat thin ring or performed plate used in joints are assemblies to ensure tightness, prevent leakage, or relieve friction.

XIII. 3D Digram Of Car Sill



XIV. CAR SILL PROCESS IMPROVEMENT

Existing Design New Design

- Material: Existing – 2 mm GI
  New – 2mm GI
- The Welding & Painting process eliminated from the existing design

XV. LIST OF ELIMINATEDCOMPONENTS

- Facia plate supporting column
- Small welded components

XVI. TOTAL SHEET METAL REQUIREMENTS

Total amount of sheet metal required for this car sill production process. .2500*1200

XVII. BENDING CALCULATION

Bending allowance = Angle *(PI/180)*(Radius+ k-factor*thickness)

XVIII. COST ESTIMATE

DETAILS	PART NUMBER	PRICE in rupes.
Existing car sill	KM5019602V001	2583.80
Proposed car sill	KM1243125	2030.75
Saving per sill		553.05

XIX. FEATURES AND BENIFITS

There are various advantages occurs in new car sill improvement process at which the production timing for car sill components are reduced. In which the process focus on guide ways at which it gives a smooth and comfort movements for elevator doors for opening and closings.

19.1 Cost:

In cost section the each car sill components are reduced due the new car sill improvement process at which the materials are changed according cost level savings for each components.

19.2 Process:

In this new car sill improvement process two other mechanical operations are eliminated from which this process undergoes only punching ,bending, and assembling process.

19.3 Size:

In existing car sill assembly it occupies a large space at which the new car sill improvement shows the reduced size of the car sill assembly.

19.4 Strength:

According to the existing car sill assembly process the strength have a low strength and in which the new car sill improvement have high strength when comparing to the existing car sill component .At which the galvanised iron is used instead of mild steel to increase the strength of the material.

XX. CONCLUSION

From the various observations of car sill assembly and time studies taken in order to increase the productivity rate .And this project also reduces the 21.34% of cost in each car sill. This project helps us to earn lot knowledge about production system in a company

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