



FORMING LINE SUGGESTION FOR BEARING HOOKS PRODUCTION

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ABSTRACT:

The article showed innovation of bearing hooks production by suggestion of forming line. Bearing hook creates component of trough system, it considered with hooks production from original zinc coated strip in form of roll, it insures higher surface quality in comparison with production from surface without treatment and follow galvanic zinc coating, suggested forming line enables automation of production, that manner of production enables decreasing faulty of pressed parts, increasing number of produced parts per hour.

KEYWORDS:

forming line, bearing hook, innovation of production

1. INTRODUCTION

Technology of sheet metal forming appertains into progressive manufacturing technologies, because decreases consumption of material at possible improvement mechanical properties of final product, enables low production time, high productivity and enables decrease of mass products and constructions, big advantage is possibility of automation. The aim of sheet metal forming process automation is increase steadiness of technological process, increase of productivity and productivity of work, decrease physical work, abbreviated cycle of operation time, abbreviation from material inlet into production into output of finished products, lesser intermediate operation supplies, bigger turn-over current resource.

Using of individual simple tools with manual attendance is characterize with lowest initial costs, but in conditions production in large series and mass production is such solving economic unsuitable (requirements for number of machine, tools, workers). In many cases in production in large series and mass production is the most effective using of properly of forming line.

Comparison of production options relieves to rationalize production of parts, it attaches in prepare phase of production, make possible optimal manner of production of parts and innovation of established manner of production. The base demands, whose is needed to respect in suggestion of production: to decrease workability of production, to disallow decrease quality of parts, to reach decrease of production costs. It contemplates also unquantifiable factors, such improvement of working conditions, improvement of quality indicators, whose make possible to evaluate indirectly.

2. DEVICES FOR AUTOMATED FORMING PROCESSES

In technical praxis is processed usual and special sort of metallurgical semi-product. Operative factor of elements selection is shape and form of initial semi-product. The more advantage is processing of roll sheet steel in comparison with table of sheet, because it allows simpler operation and follow-up simpler automation of production. Processing of roll sheet by forming in line is applied especially at mass production of smallish till middle large

pressing parts, or in preparing of pieces semi-products. Structure of most such forming lines has standard character, it consist of one till three forming presses, eventually other main production device, uncoiler, coiler, feeder and another mechanization and automation devices. Example of forming line for processing of sheet in roll is on the FIGURE 1.

Advantages of forming lines in comparison with classic production process involves:

- ✚ time shortening of production cycle,
- ✚ higher productivity , lesser manual works,
- ✚ decrease of working out,
- ✚ little worked places,
- ✚ better work organization of work

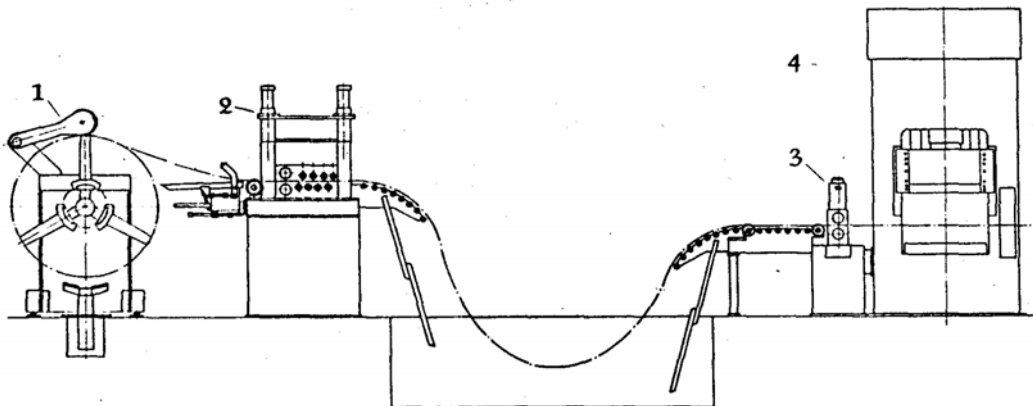


FIGURE 1. Universal scheme of forming line

Produced part and previous technology of its production

Semi-product for bearing trough hook production is from zinc-coated strip of sheet from usual construction steel. The hook serves for tack and as support of hung gutter. It is component of hung system, it consists of hung head, hung corner, hung kettle and hung gutter. Length of pressed part before roll bending is 620 mm, radius of roll bending is R100, pressed part has five holes with diameter 5 mm, width of trip is 30 mm, thickness of trip is 4 mm.

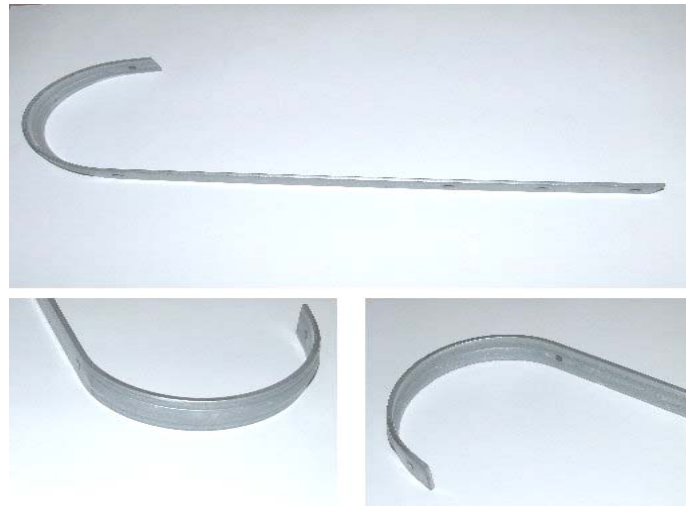


FIGURE 2. Produced part – bearing trough hook

Previous manner of production

Initially unfinished surface of semi product in form of roll sheet was galvanic zinc-coated, it was thereafter sheared at needed length on shear, following punching in fixture, roll bending by sequence bending by help of fixture. It was needed at production four workers.

Disadvantages:

- ✚ different quality of zinc coated (creeping of zinc coat, different thickness of zinc coated layer)

- ✚ quality of shearing and bending is influenced by human factor
- ✚ low productivity of work (300 – 350 pieces/hour)

Suggest of production and description of suggested device

Automation of production was fixated in first place on ablation of inscribed defects of previous job production. It was enhanced production from zinc coated roll semi-product. Next it was suggested new technological job of production; it was suggested automation work flow:

- ✚ uncoiling of strip
- ✚ feeding and leveling of strip
- ✚ punching of holes and shearing of strip
- ✚ roll bending of pressed part
- ✚ repeated feeding of strip by leveler

Description of suggested device

Device is dedicated for processing zinc coated roll strip in automation production cycle. It enables production of bearing hooks by using of technology roll bending; it is possible to set production of hook according to required dimensions. Scheme of suggested device is on FIGURE 3.

Device consists of follow parts:

1. two-sided uncoiled without drive
2. feeding leveler
3. block of forming tools
4. rotary roll head

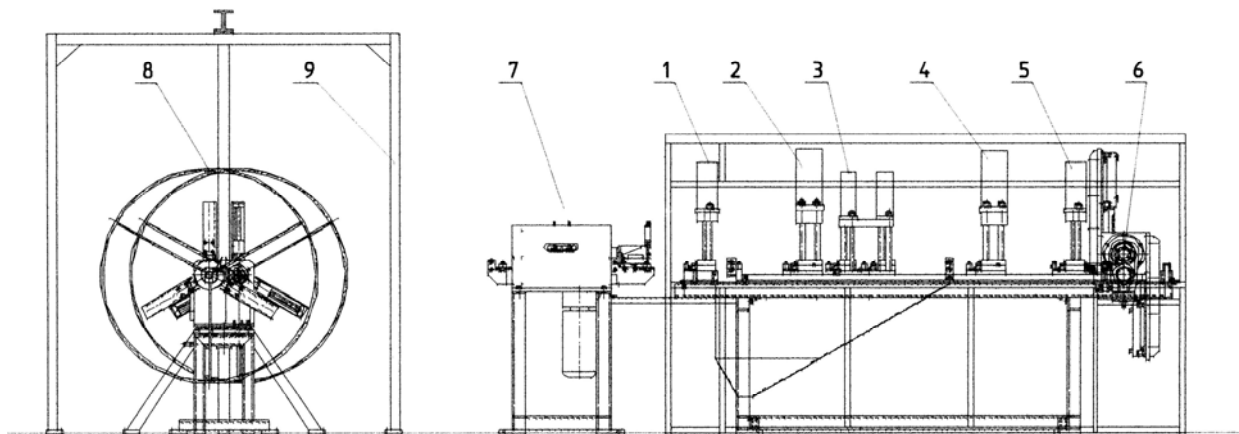


FIGURE 3. Scheme suggested automation line

1,2,3,4,5 – forming tools for punching and shearing, 6- rotary bending head, 7- feeding leveler, 8- two sided uncoiler without drive, 9 - frame

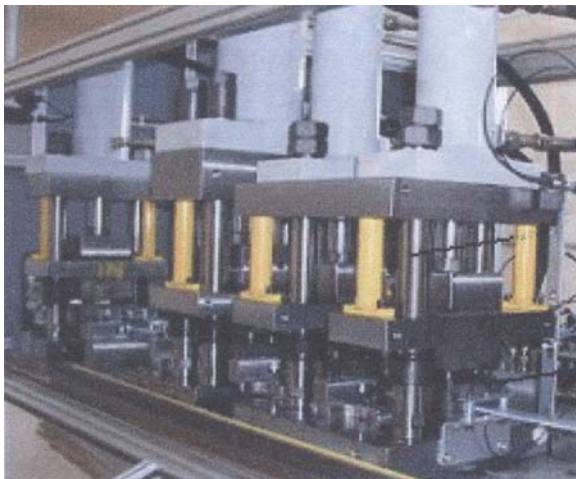


FIGURE 4. Block of tools for punching and shearing of trip

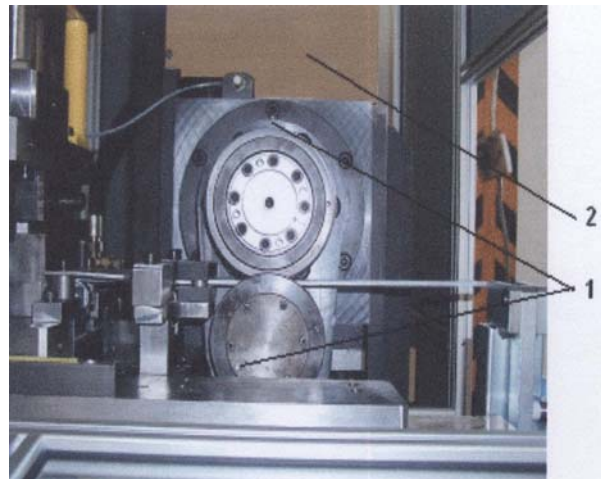


FIGURE 5. Rotary bending head. 1 – rotary bending disks, 2 – body of rotary bending head

On the FIGURE 4 is photography of hydraulic controlled tools for punching (maximum 5 holes) and shearing of required length from trip semi-product for hook production. On the FIGURE 5 is photography of rotary bending head.

Productivity and advantages of devices

Work automation of production device is possible to achieve big economic gain, especially in area effectively of work, decreasing of production costs and increasing quality production. Expected economic gain of suggested automated production line is possible to summarize into following areas:

- ✚ increasing of work production - device enables according to sizes of hooks to produce 6 to 8 pieces per minute
- ✚ production innovation by automation feeding is reached in comparison with previous savings of 4 till 5 workers
- ✚ achievement repeated pressed part precision - system minimize possibility of human invention into quality of production. In previous manner of production created 25% faulty of pressed parts caused by displacement of backstop at shearing, inaccurate embedding at bending noises at bending and so incorrect shape of pressed part
- ✚ increasing safety at work, minimized noise level, increased possibility of occupational accidents.

3. CONCLUSIONS

The producers in aspiration to sustain their market positions or acquire new markets for their production are forced to increasing of production quality and minimize the production costs and time. In the same time must offer several of their products. The way to achieve these aims is using the new modern automated flexible production lines.

Today production is characterized by implementation of flexible automation in all production levels. By using of flexible forming lines as is introduced is possible a significant production quality and effectivity increasing and at the same time decrease the production costs and shortening of production time.

Introduced automated flexible forming line is able produce several dimensions of hooks by several number of holes and different length. These hooks will be used to gutter systems assembly.

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