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CONCEPT OF PRODUCTION FACILITIES LAYOUT IN COMPANY ALUMIN, S.R.O. SLOVAKIA

Abstract: The aim of part of the solution layout processing company is an analysis of the existing system of distribution of production equipment company, identification of material flows and showing the possibility of modifying the layout of production facilities in compliance with capacity, safety and quality requirements for production.

Keywords: logistics, optimization, layout, allocation, flow.

1. Introduction

Production of aluminium castings company Alumin, s.r.o. is allocated in the reconstructed areas. The deployment of production machines and equipment was made on the basis of project documentation. The main part of production is located in side by side two manufacturing plants (Figure 1).

In the production hall 1 are located a machines and equipment for "hot production" and dressing (Figure 1 position 5) and cutting, welding and riveting of stator and rotor parts (positions 3 and 4). "Hot production" includes the production of aluminium alloy needed for casting products, position 1 and the actual casting of the elements that constitute the main product range the company, position 2.

In the production hall 1 are also located a cutting of stator and rotor components, position 3, stock of , castings, welding, riveting and , position 4 and dressing castings, position 5.

In the production hall 2 are placed in machines and equipment for manual machining of castings, dressing, drilling, milling, dyeing, drying, position 6, machining of castings, position 7, forms training, tool shop, position 8, the maintenance, position 9 and ancillary workplaces, position 10.

In terms of real recording layout of workplaces, the main material flows and for the simplification of view of workplaces in production halls has been created the simpler scheme (Figure 2).

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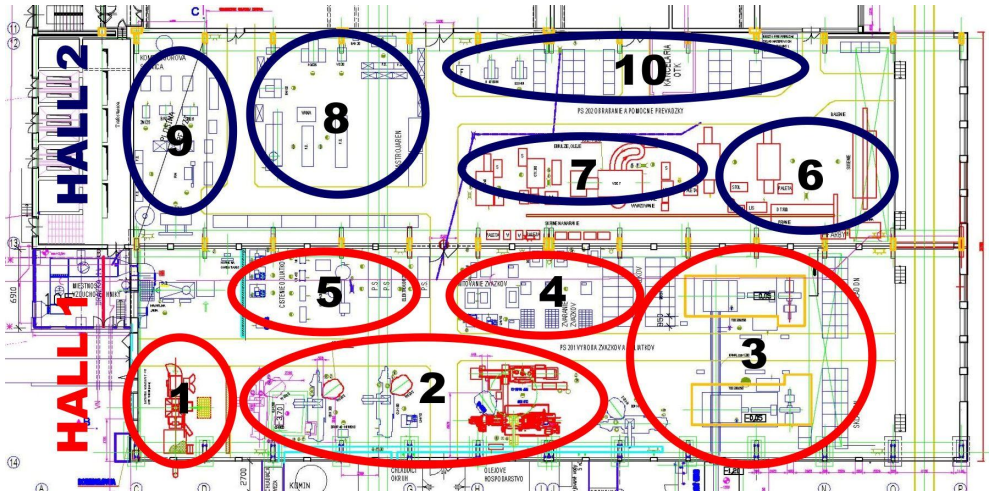


Fig. 1. The position of machines and equipment in production halls

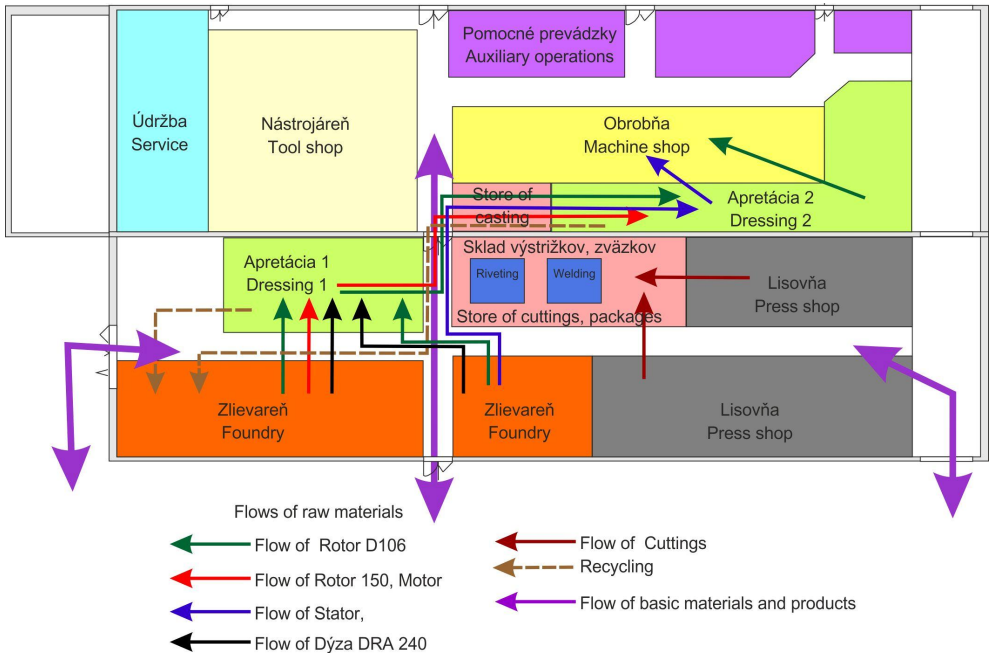


Fig. 2. The current state of allocation of workplaces and capture the main material flows

The analysis of material flows and production and allocation of auxiliary devices (Figure 2) result the following facts:

- entry of raw materials to production is mainly from the side of production hall no. 1,

- production consists of three main flows of material:
 - the flow of production of stator and rotor parts from sheet metal, cutting – welding – riveting,
 - the flow of production of castings 1, melting – casting – dressing,
 - the flow of production of castings 2, melting – casting – dressing – machine shop
- auxiliary flows in the production halls provides tool shop (development and maintenance of molds for casting) and maintenance, which takes care of functional aspect of machines and equipment in production halls,
- material incomplete production i.e. clippings and castings are placed in the box pallets at machines and to also in part of store of clipping and packing, work places of dressing store of casting and in the main stock too,
- the main traffic artery create transitional gateway between production halls of the workplaces dressing 1, tool workplace, riveting, welding, stock of casting to and machining shop , the material is transmitted mainly by high and low lift trucks,
- for transfers of materials from the part of mill, foundry, dressing 1 to tool shop, dressing 2, machine shop there is an crossing of material flows,
- molds in the tool shop section take a considerable part of the static space.

Advantages of the "current" state of layout:

- layout of machines and equipment follows technological processes of production,
- short respectively appropriate sections of transport between workplaces.

Disadvantages of the "current" state of layout:

- large material flows crossing,
- quantity of material and uncompleted production are located in welding and riveting part,
- inadequate use of space in the part of tool shop,
- separation of workplaces dressing.

Opportunities of the "current" state of layout:

- space reserve in part of production hall 1 dressing 1 , to further development of hall such shoulder next furnace for possible increase performance,
- the possibility of placing casting molds in the main stock of company,
- substitution of some operations (e.g., hand abrading, drilling), by automating,
- the possibility of reconstruction of a third production hall and the transfer of some workplaces.

Limitations of the "current" state of layout:

- main production flows go through one door,
- some products must mature before being machined about 40 days,

- a significant part of production machines and equipment necessary for their safe operation of large space,
- when melting of aluminium and casting must be ensured quality ventilation,
- machine of "hot production" need enough space for ensuring safety of workers.

2. CONCEPTS OF LAYOUT IN PRODUCTION HALLS COMPANY ALUMIN, S.R.O.

In terms of possible solutions of layout manufacturing machines and equipment of company, Alumin, s.r.o., in compliance with the safety, quality and technological requirements of production are appropriate the following concepts:

- exchange of tool shop with dressing 1,
- the possibility of using space for storing of castings at tool shop,
- the possibility of using space for storing of castings at dressing 1,
- the possibility of using space for storing of castings at dressing 1 and separation of workplace welding and riveting store into two parts,
- the possibility of using space for storing of castings at dressing 1 and cancellation of warehouse of castings between machine shop and dressing 2,
- substitution of the tool shop by dressing 1 ,moving of tool shop outside the hall 1 and 2, the abolition of stock castings in hall 2 and build a dynamic store castings in hall 1,
- separation of the tool shop in the part of tool shop and dressing 1, and place in hall 1, dressing part used to casting store and workplace of riveting.

3. Conclusions

In terms of the proposed concepts of layout of production facilities in production halls of Alumin, s.r.o. firm is necessary reflect several criteria that will affect the total layout of equipment in production halls and warehouses. Strategic criteria i.e. possible future development of the company (reserve space for future equipment), risk equipment, i.e. machines whose failure means the failure of the whole production (e.g. furnace for the preparation of aluminum is only one). Safety criteria i.e. followed of safety standards distances from the walls and space around the machines. Criteria of technological sequence i.e. organize equipment so that their sequence corresponded to technological process that material flows to the least crossed. Criteria of requirements workplaces i.e. workplaces need to work the required handling and work equipment such some of workplaces can not work without gantry crane, without ensuring of appropriate of engineering connections etc. It is also important the time criteria i.e. move of intermediate product and products not to be too long and time and economically exacting.

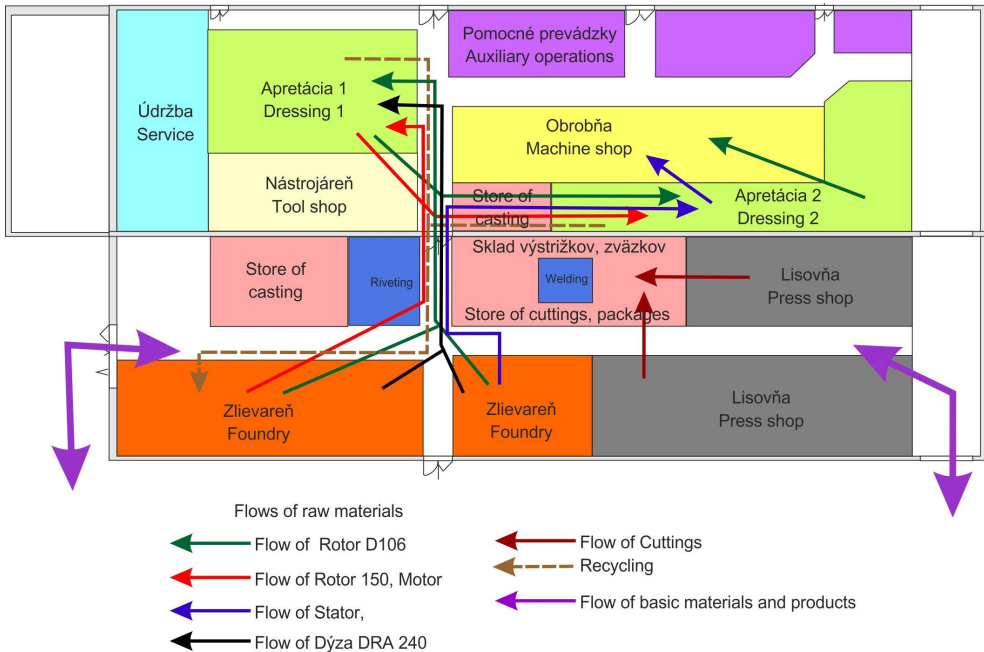


Fig. 3. Project of concept

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