



## COMPUTER- AIDED TRACKING OF TYPICAL MECHATRONICS SYSTEM INTEGRATED WITH LOGISTICS USING BAR CODE

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### Abstract:

Elaborating a computer-aided tracking system integrated with logistics for manufacturing and service companies and working out operational method and analyzing the theoretical background.

### Key words:

computer-aided tracking of manufacture and logistics system, bar code identification, typical a part of material flow of manufacture of cylinders and of the valve.

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### 1. PROBLEM STATEMENTS

There are a lot of identification problem in the manufacture and logistics system which render more difficult the process of storing and manufacture. These problems we necessary solve in the interest of flexibility manufacture.

**Application area:** mechatronics and logistics system and different industry.

**Research course:** The works of computer- aided tracking of mechatronics and logistics system in case of barcode identification

We need make the following works the plans of computer- aided tracking of manufacture and logistics system in case of bar code identification:

- We necessary split up a part of the complete manufacture and logistics system.
- In case of typical part of process we necessary define in the system analyze the following:
  - Which those "reference points", where we necessary represent some information with code?
  - How information we need supplement or change the code?
  - How we can change the content of the code?
  - How change the unit-load in the check-point? (For example: we break up unity the unit-load and constitute out of it a new unit-load)
  - Where we place the code on the unit-load, and if we can not it which is the type of code?

In the computer- aided tracking the code contain less proportion of necessary information this means the inspector computer store the actually data which data address the code indicated.

In the manufacture and logistics system the content of the as change (for example: data address, piece of work, the state of unit-load) so in the computer we need copy the deleted- bar code data in the new given file which we need store and archival if we would like to use this information in the future for example in the controlling- and management department.

In the manufacture and logistics system the inspector computer in contact with system of the company information (For example: SAP system) where the inspector computer able to export and import a lot of data, moreover in contact with the computers which control the part of process and controlling department of company.

## 2. PRINCIPLES OF THE COMPUTER-AIDED TRACKING WITH BARCODE

We need split up a part of process in the complete manufacture and logistics system and inside the part of process we necessary cut up elementary part.

The characteristic of the elementary part that there is the computer-aided tracking in the entrance and leave point.

There is a key-question in the computer- aided tracking with bar code forming, how happen to the elementary part definition in a part of process.

In this case there are 2 variations:

- Inside the part of process we tracking the condition -change in all operation technological equipment.
- We tracking just the condition- change in the entrance point and leave point.

But imaginable that inside the elementary part we tracking on paper which is a restriction solution, usually the optimum solution there is between those outside versions.

We necessary allow for in the optimum determine that there are the more elementary part in a part of process will be the more building expense, on the other hand that there are the less elementary part will be the less information.

So the substantial question the following which characteristic we make use of the collected and stored working -up information.

We can be seen in Fig. 1 the principle of computer –aided tracking with bar code. When the products enter the elementary part we necessary read the content of the bar code. The sign of the recognized bar code come to the inspector computer by means of computerized terminal where come in the code of the elementary part's entrance point (HBi) apart from the content of the code. The computer put the product's date of entrance down, look for in the computer the address which belong to code and from there the computer out reading and after give the instructions which intervention happen off –line mode of action which is depend on unit of elementary part, or on-line mode of action which intervention happen to through the operator.

If the prescribed operation is finish in the elementary part before the product is come out on the (FRKi) finish point we necessary read the code and this information which happen in the elementary part of followed condition –change go to the inspector computer re –write the content of the address.

In spite of everything the inspector computer give the dispose instruction which concern the produce further way after those leave the main reference point.

If the carrier –code of the pass -products are changed we would re –write a new code.

Very important the computer –aided tracking with bar code in the all situation we necessary make a contact with inspector computer in all reference and main reference and in the elementary parts.

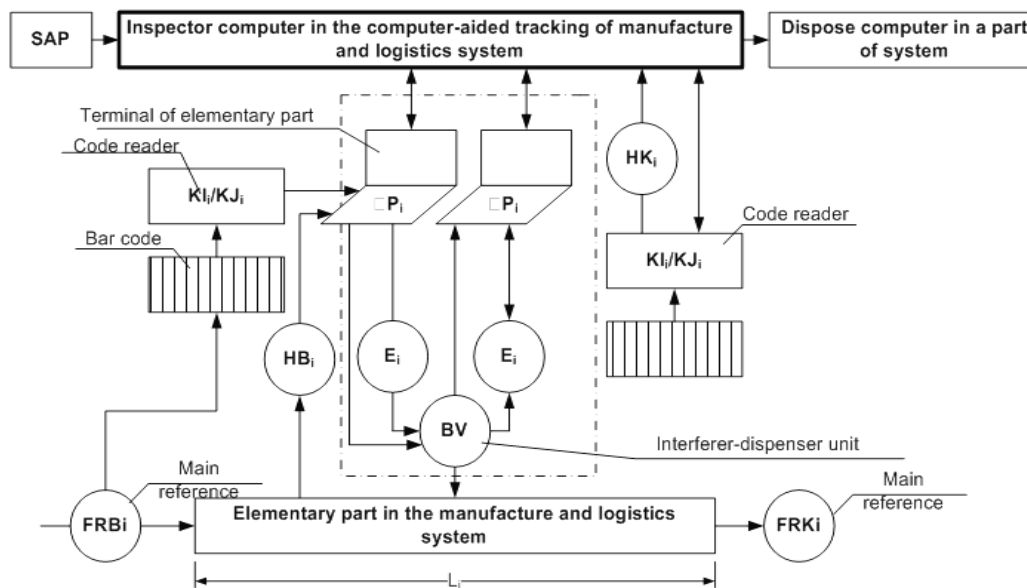


Fig. 1. Principle of computer –aided tracking with bar code

### 3. THE GENERAL CONSTRUCTION OF TYPICAL MECHATRONICS SYSTEM INTEGRATED WITH LOGISTICS

The computer –aided tracking of manufacture and logistics system to develop us necessary split up the process to a part of process and elementary part of process and we necessary open up the general construction of the researched manufacture system.

As we can be seen in Fig. 2 the purchased pieces and basic materials arrive in the basic material warehouse which basic materials necessary to the prefabrications and to the pieces manufacture.

The purchased pieces get into the assembly system and the basic materials get into the prefabrications or pieces manufacture.

The pieces get into from the prefabrication to the pieces manufacture.

The pieces get into across the Controlling Centrum to the cooperation manufacture or trimming.

The finished product gets into across the Controlling Centrum the finished product warehouse from assembly.

The coming back pieces from the cooperation manufacture get into the basic material warehouse and from here the materials come to the suitable manufacture unit. The figure does not illustrate the back –follow of the material.

In the following I show a concrete case of researched manufacture and logistics system splitted up to a part of process and elementary part.

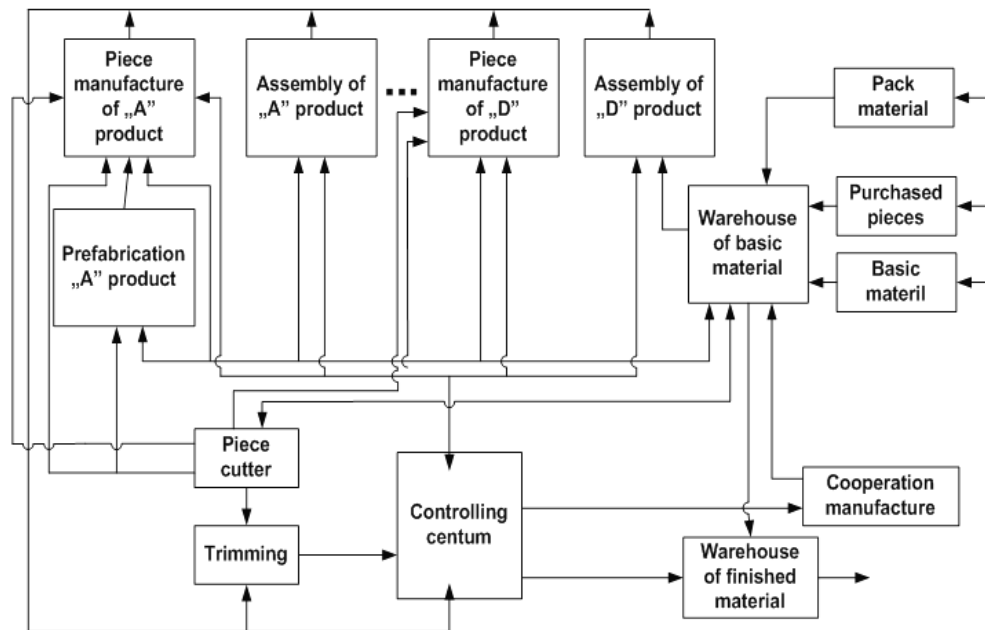


Fig. 2. Simplified figure of manufacture

#### 4. COMPUTER –AIDED TRACKING BUILDING-UP OF MANUFACTURE AND ASSEMBLY OF A PART OF PROCESS AND ELEMENTARY PART IN A TYPICAL MECHATRONICS MANUFACTURE SYSTEM INTEGRATED WITH LOGISTICS

1, The material flow of the total manufacture's process and the part of process include to the following:

- Material flow of the basic material warehouse and there carry -in and export materials,
- Material flow of piece manufacture and prefabrication,
- Material flow of assembly of finished product,
- Material flow of the finished product warehouse and there carry –in and export material,
- Material flow from basic material warehouse to all manufacture unit and to the assembly unit,
- Material flow from all manufacture unit and from assembly unit to the Controlling Centrum from where those materials carry back to the manufacture or to the finished product warehouse,
- Some materials gets into across the piece cutter to the valve manufacture or to the cylinder manufacture,
- And finally the end of the manufacture there is a washing

2, Coding work's analysis of the basic material warehouse and part of the process carry -in and export

The variation process of the material flow the following:

- Material flow of basic material warehouse entering and going-out,
- Material flow inside of the basic material warehouse,

We can be seen in Fig. 3 the material flow of basic material warehouse entering and going –out. The demand information in the tracking's reference points we divide it 2 groups:

- Information of entering materials,
- Information which concerning the store zone and the situation of unit-load inside of the zone.

The information of materials and of the type of materials recoverable the following:

- The entering unit –load which holder a code,
- Information which read –out from attestation, this information possible:
  - barcode, which printer to the attestation,
  - data, which given alphanumeric type.

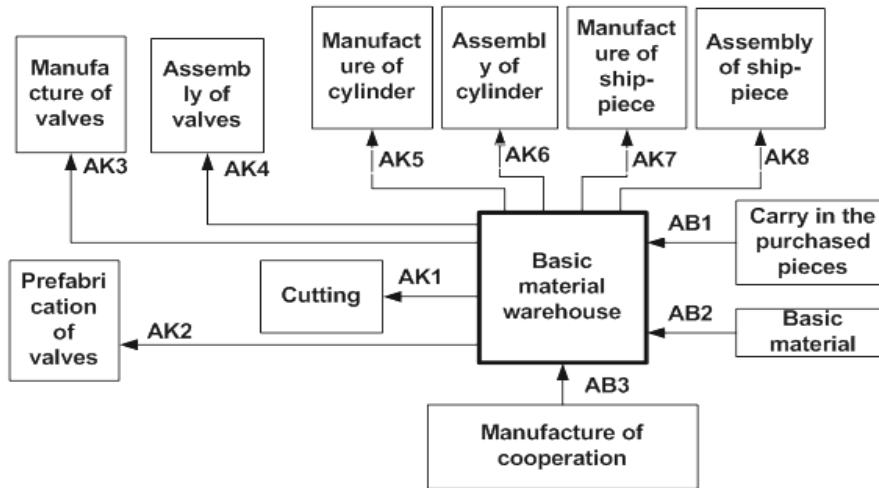


Fig. 3. Material flow of basic material warehouse

The necessary information for our, we get off–line or on–line form to the inspector computer which direct to the basic material warehouse. This information contains the store zone and the material placing inside the zone. The code of the reference point must contain the information which I write in the foregoing and we need make complete the following:

- The entering date of the materials,
- Information which rise for the taking –over,
- Information which rise for the new unit –load.

Have on interest in easier well arranged, practical we give a summary of the following:

- The content of complete encode information,
- Where get from the demand information,
- Where and how appearance the complete information.

3. Typical a part of material flow of manufacture of cylinder

We can be seen in Fig. 4 a part of material flow of manufacture of cylinder.

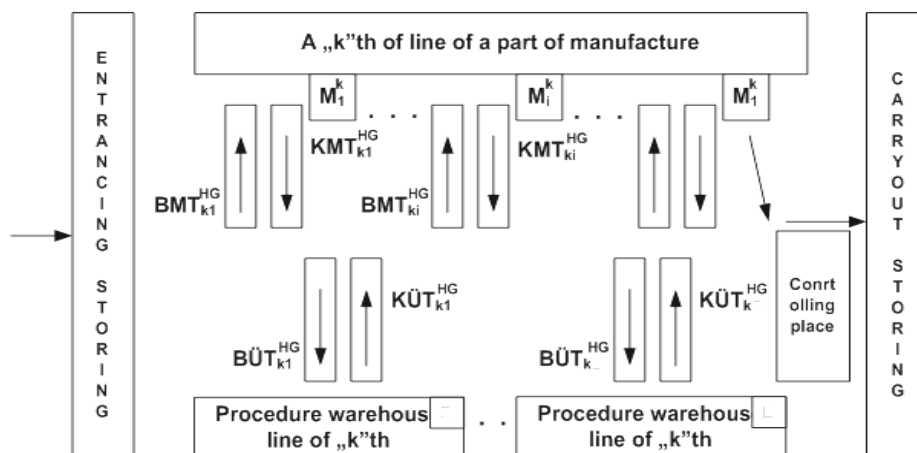


Fig.4. A part of material flow of manufacture of cylinder

We can make a group of material flow in the manufacture of cylinder:

- Material flow of entrancing warehouse,
- Carry out material flow of the entrancing warehouse,
- Carry out material flow of produce warehouse,
- Carry out material flow of place of work of manufacture,
- Material low of carry out warehouse

All material flow of reference point we need clearing up the following:

- Which information we need and where we can find this?
- Which content of code we need make depend of type of code?

#### 4. Typical a part of material flow of manufacture of valves

We can be seen in Fig. 5 a part of material flow of manufacture of valves.

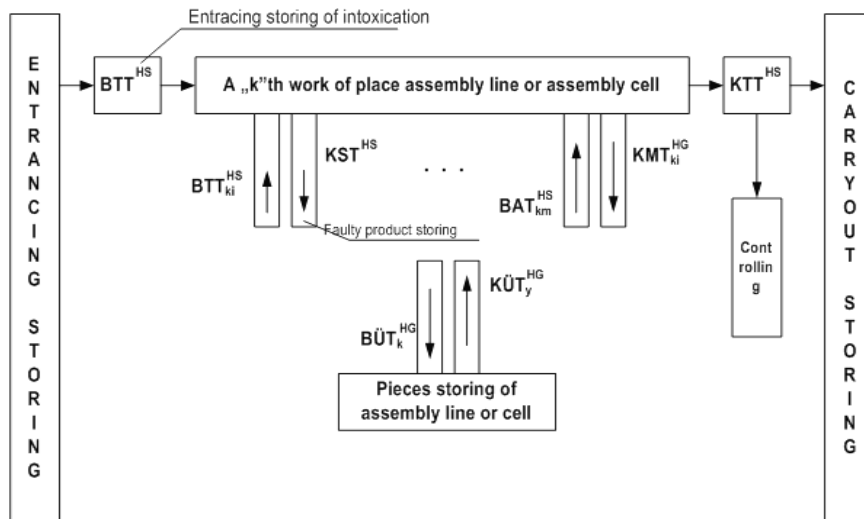


Fig. 5. A part of material flow of manufacture of valves

Typical a part of material flow of manufacture of valves researched of assembly line and assembly cell of material flow there are following part of material flow:

- Material flow of entrancing storing,
- Carry out material flow of entrancing storing,
- Carry out pieces storing of material flow of assembly line or assembly cell,
- Carry out storing of intoxication,
- Entrancing material flow of carry out storing,
- Carry out material flow of carry out storing.

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