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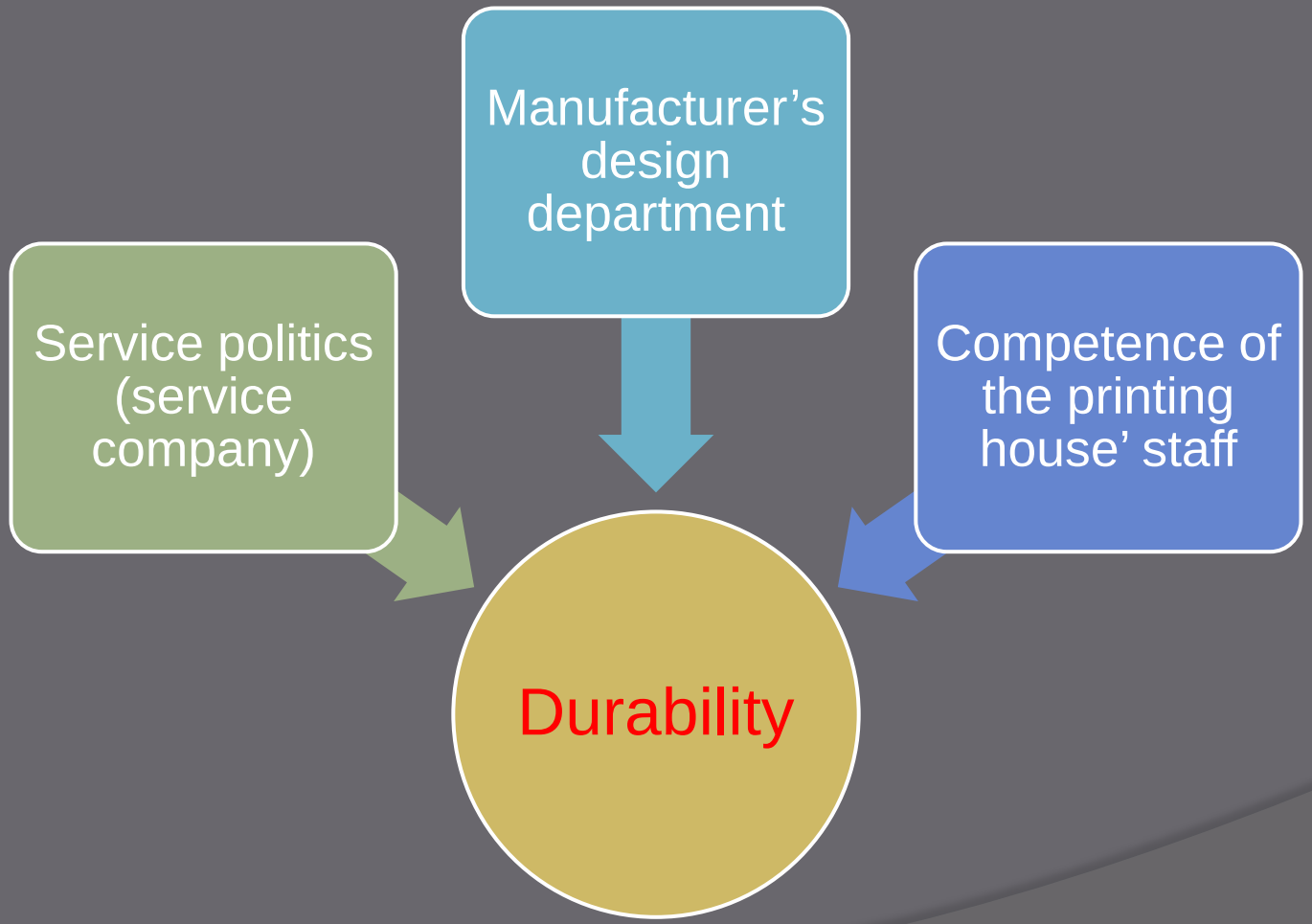
TEAR AND WEAR PROCESSES IN PRINTING EQUIPMENT

Key factors

- Modern equipment is an important and expensive part of printing production technology
- Management in a printing houses wants to be sure in a continuous work and predicted reliability of equipment
- Durability of equipment is provided not only by manufacturer’s design department

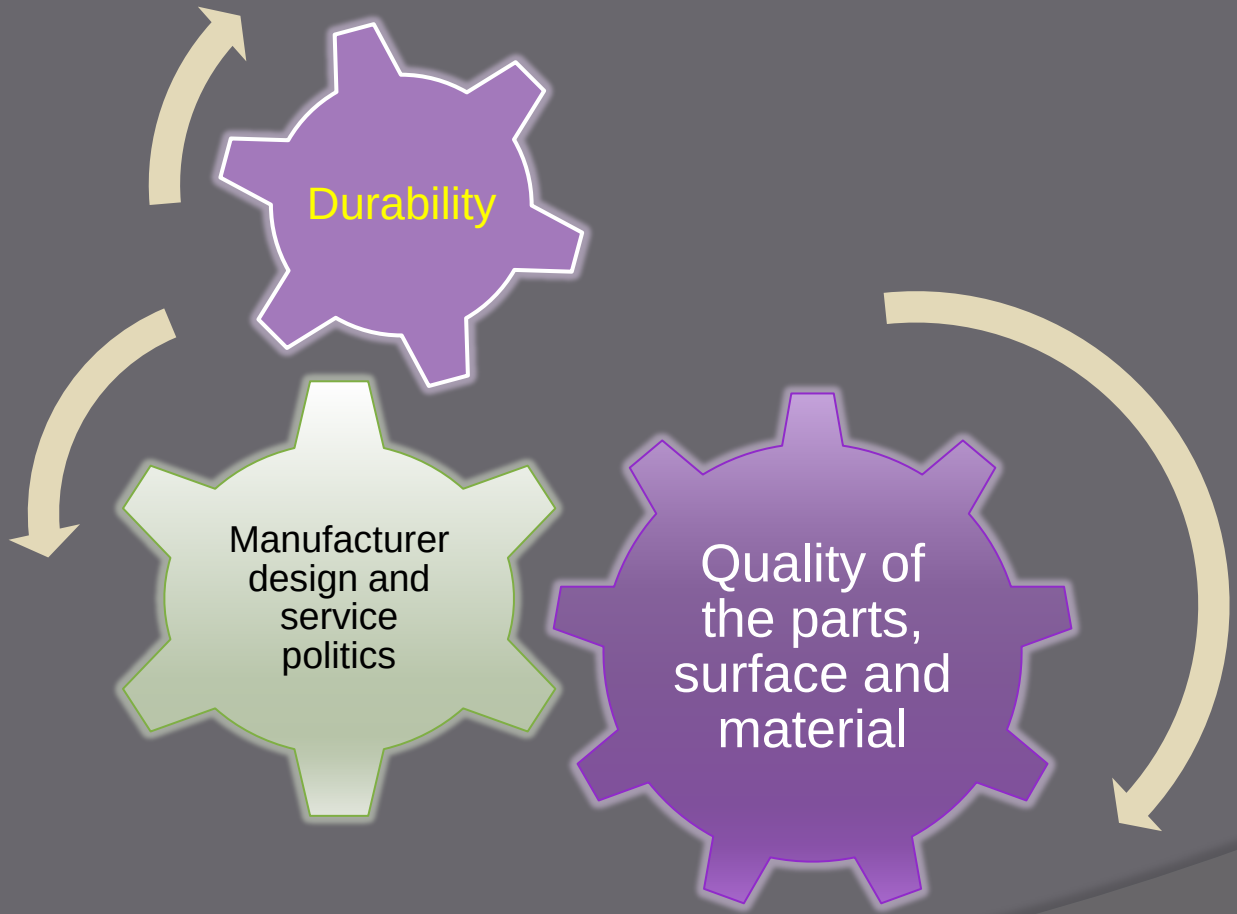
Durability of equipment



Main question

What processes do we need to analyze to predict production problems?

Main question



Main tasks of research

- To analyze of a modern tear and wear problems of details in a offset printing machines

AND

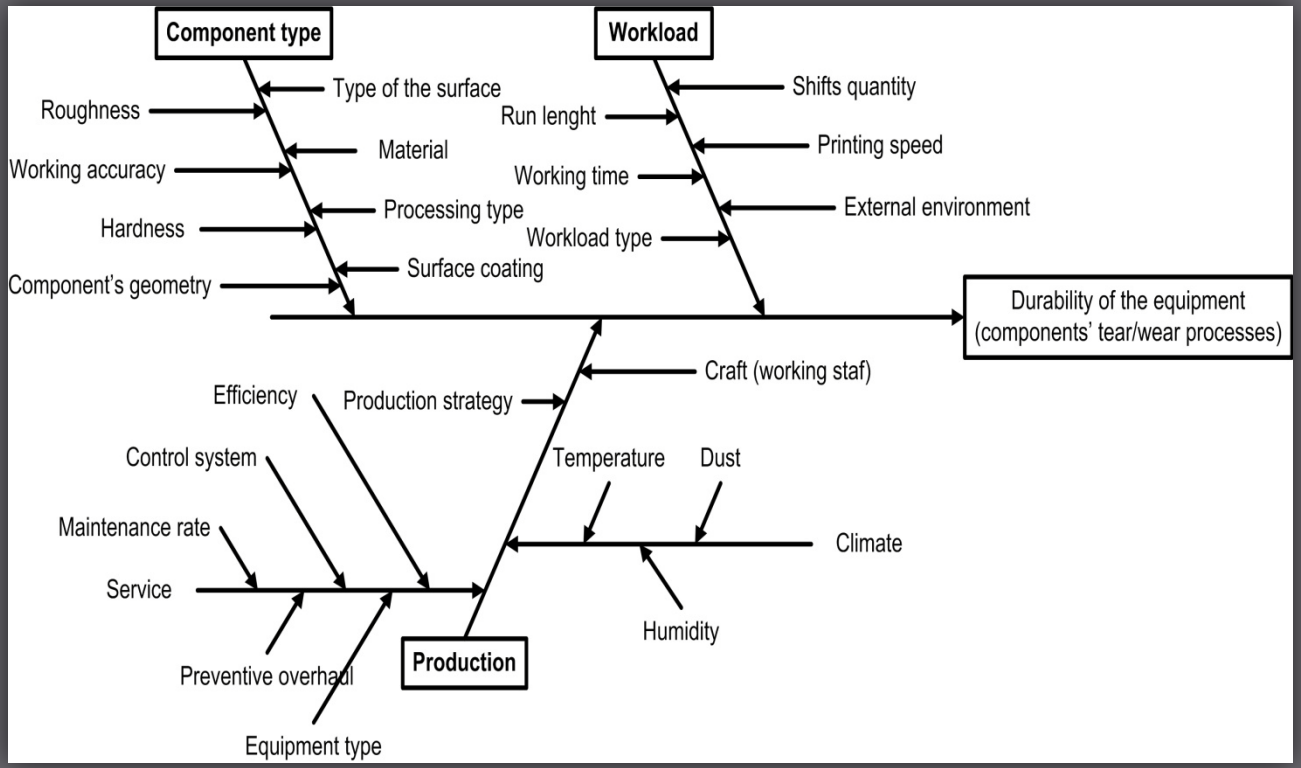
- To offer a methods of increasing machinery’s operational characteristics

Origin of destruction

- Main origin of destruction of construction elements during its working life is laying in the surface – chafed places, tear and wear, microcracks, pulldowns etc.
- When analyzing a workload, which is common for the sheetfed and web offset presses, one of the most important factors in decreasing of detail's working condition is appears. It is the processes of tear and wear, corrosion and attenuation.

Destruction in a real printing house

Mind map


Component type
Workload
Type of the surface
Roughness
Material
Working accuracy
Processing type
Hardness
Surface coating
Component's geometry
Shifts quantity
Run lenght
Printing speed
Working time
External environment
Workload type
Durability of the equipment
(components' tear/wear processes)
Craft (working staf)
Efficiency
Production strategy
Control system
Temperature
Dust
Maintenance rate
Climate
Service
Humidity
Production
Preventive overhaul
Equipment type

Methods of solving the problem

Looking only for a production factors, like service, preventive overhaul or maintenance rate, we must not forget about preventive factors – component type. To predict tear and wear printing house and manufacturer of equipment can:

- change material of the component;
- change working accuracy;
- improve surface coating;
- change type of the surface etc.

Methods of solving the problem

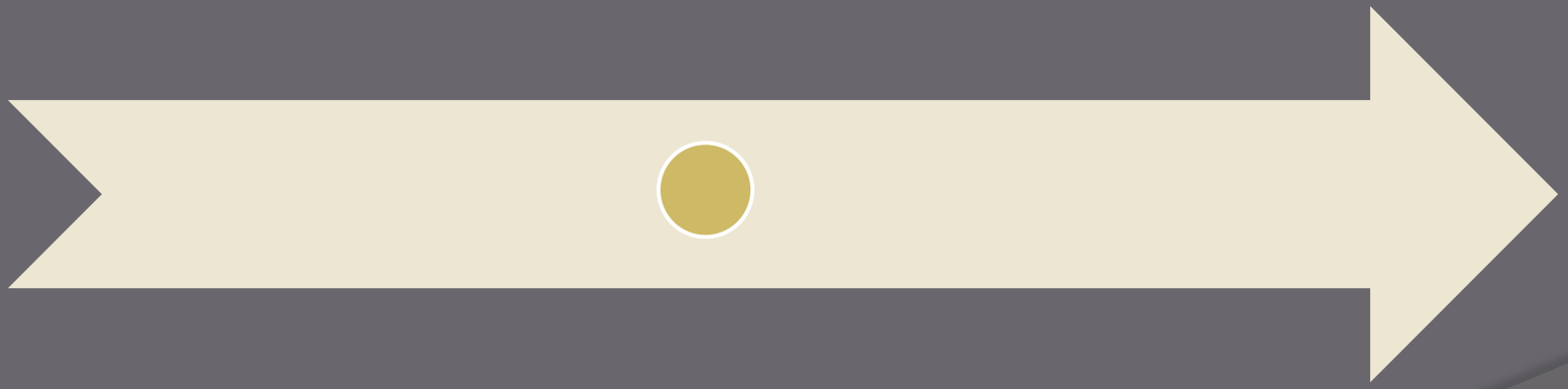
There are a lot of different methods for obtaining a trouble-free operational cycling. Some of them are based on the component's surface dynamical strengthening, other are offering the complex system of printing machinery control. But one of the most universal and modern methods is strengthening with a help of vibration roll burnishing.

What is vibration roll burnishing?

- The method is based on strengthening of surface with a help of micro deformation of material's top layer.

Research first results

During the analysis which was made in the Ukrainian printing houses some main problems were found.



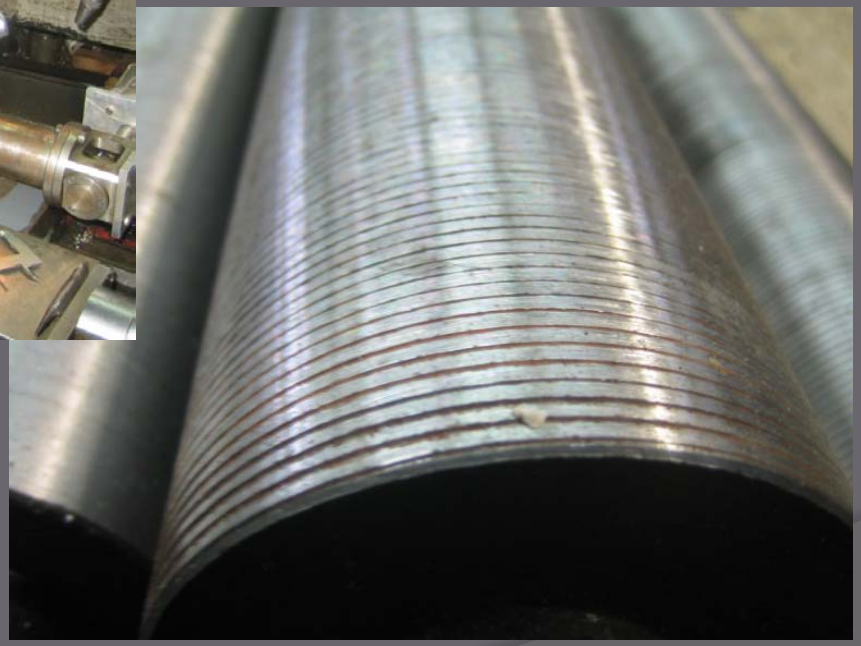
Research first results

- The main – is dependence between workload for printing machinery and tear/wear rate, control system which is working at production, preventive overhauls and quality of printing. In the same time, paper dust, aggressive chemistry, dampening solutions and other factors are lead to progressive declining of printing equipment and its components.

Research first results

The main answer is

vibration roll burnishing



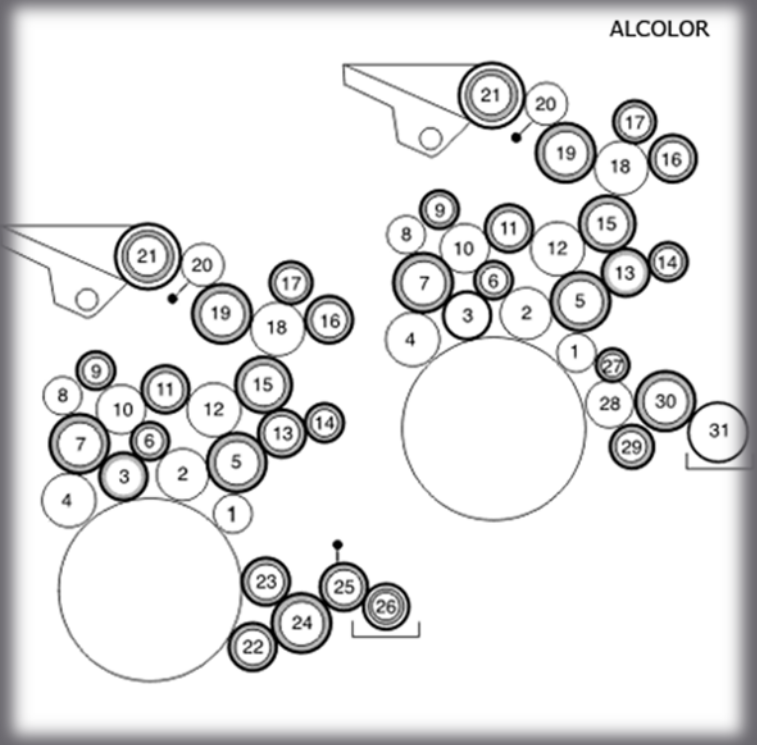
Parameters:

$n_з$=25-40 rev./min.,
S=2,0-3,0 mm/rev.,
$n_{подв.х}$=1250-1400 $min.^{-1}$,
e=0,5-1,5 mm,
i=35, P=50-100 kg

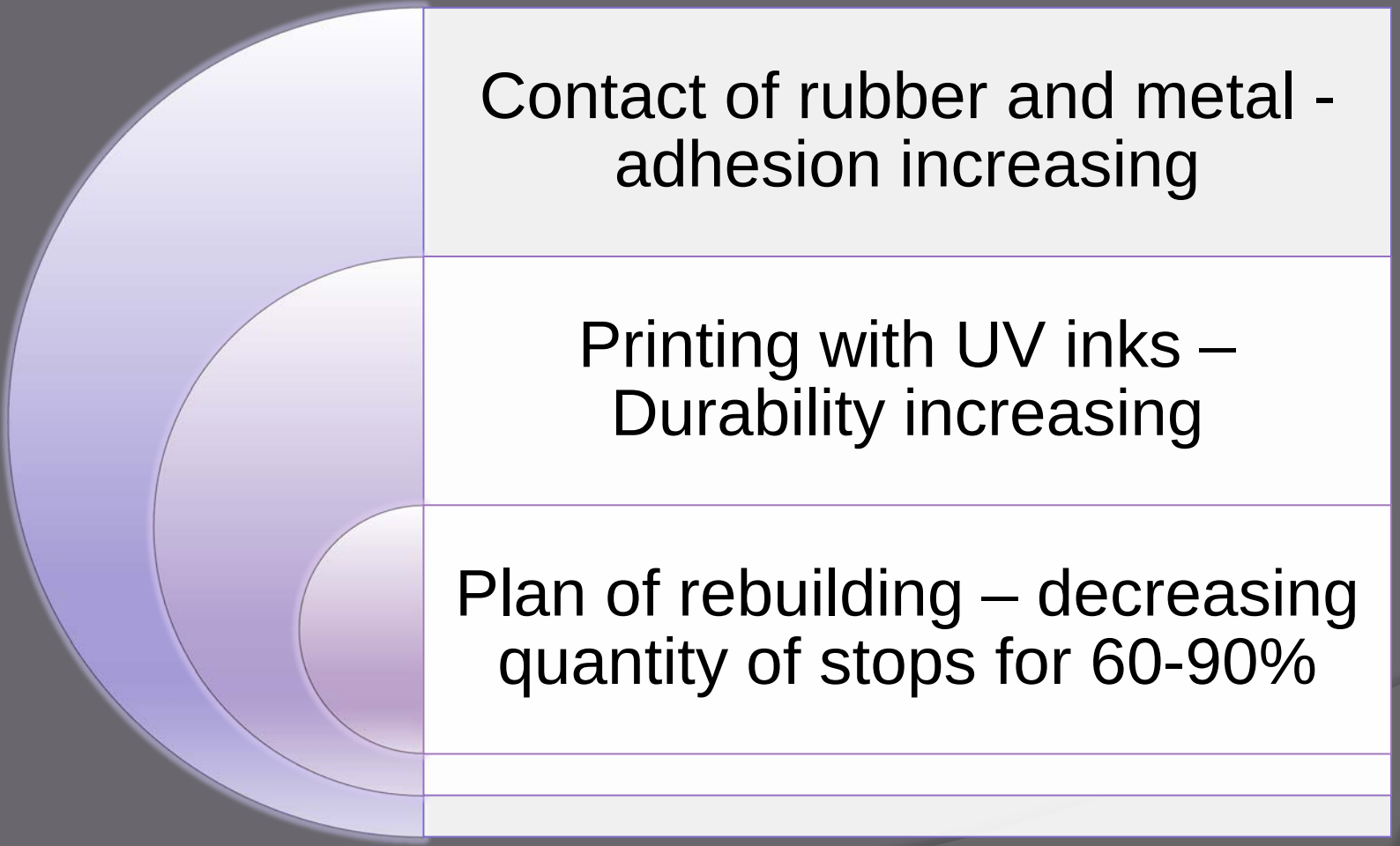
Roll rebuilding

Heidelberg

SM 102

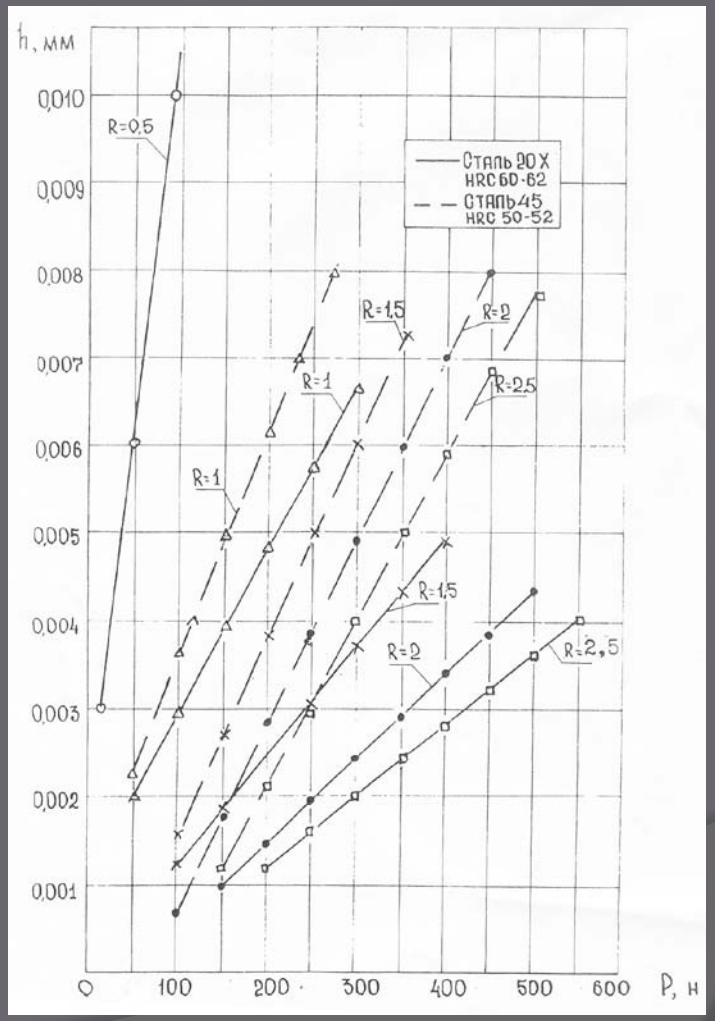


Roll rebuilding



Additional parameters

- Dependence of the deep parts of micro relief from strength of push (h/P): different radius' of deformation element



Main results

- To prevent listed defects and problems the model of technical ensuring of printing machinery detail's rebuilding; the processes and algorithms of additional strengthening processing is offered with a help of application of fully regular surface microrelief (IV type).

- THANK YOU FOR ATTENTION!