

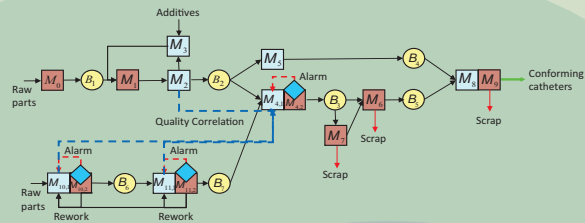


PRODUCTION OF CUSTOMIZED MICRO-INTRAVASCULAR CATHETERS AS HIGH VALUE MEDICAL PRODUCTS FOR THE AGING SOCIETY

November 2011 - October 2014

INTRODUCTION

- Manufacturing of medical devices
- Manufacturing of plastic single and multilumen, mono and multilayer tubing with external diameter $0,8\text{mm} < \varnothing < 4\text{mm}$
- Manufacturing of sintered metal tubing $1,8\text{mm} < \varnothing < 2,4\text{mm}$, 1/2/4 lumen
- Continuous process
- EOL (End-Of-Line) Visual inspections, manual cutting, in line inspections, plug inspections with passing pins/guidewires
- Inspections performed by operators are burdensome: time consuming and the number of rejected parts is evaluated only at the end of the production line



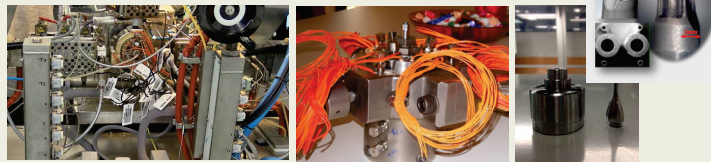
DRAWBACKS

- Continuous manufacturing
- Small production batches
- High percentage of rejected goods
- Onerous end-line inspections performed by operators:
 - Time consuming, involves high number of labor force of labor force
 - Remarkable number of rejected items

SOLUTIONS FOR CONTROL AND REDUCTION SCRAP

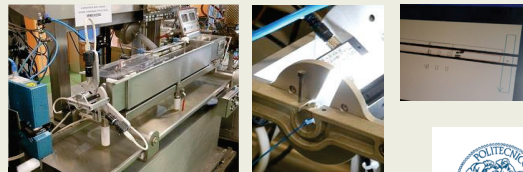
Multisensor System

- Correlation between process signals in extrusion with "active die" measurements and in-line and off-line-EOL to correct process parameters



Automatic black spots analysis

- Solution based on cameras to identify and scrap tubing that present back spot or gels



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