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OBSERVATION OF PRODUCTION PROCESS CAPACITY BY INJECTION MOULDING

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A***bstract:*** *Paper deals with observation of production process capacity by injection moulding. According to measuring values and by software we can determine this capacity. Samples made on injection moulding machine. Next this samples was measured and values was input into the software for determination of production process capacity.*
Key words: *injection moulding, plastic, capacity, weight*

1.INTRODUCTION

It would be difficult to imagine our modern world without plastics. Today they are an integral part of everyone's lifestyle with application varying from commonplace domestic articles to sophisticated scientific and medical instruments. Injection moulding is a major processing technique for converting thermoplastic materials. The basic concept of injection moulding is the ability of a thermoplastic material to be softened by heating, formed under pressure, and hardened by cooling. Production process capacity c_p, c_{pk} is parameter, which expressed when the production process is stable or unstable.

2. PRODUCTION OF EXAMINED SAMPLES

Samples using for observation of production process capacity was made by injection moulding machine DEMAG EXTRA.
Examined samples: colour feeder in printing station
Material of samples: SICOFLEX ABS GF S 299

Fig.1. Injection *moulding machine DEMAG EXTRA*

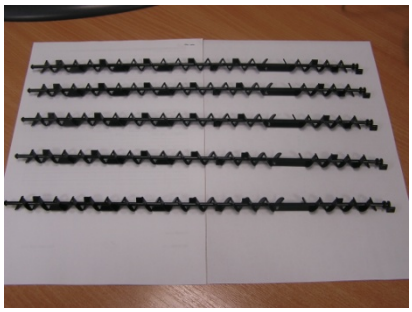


Fig.2. *Examined samples*

3. MEASUREMENTS OF SAMPLES

Measurements needed for observation of production process capacity was made at the special measuring laboratory. Figure 2, 3 shows measuring equipments using in this experiment.

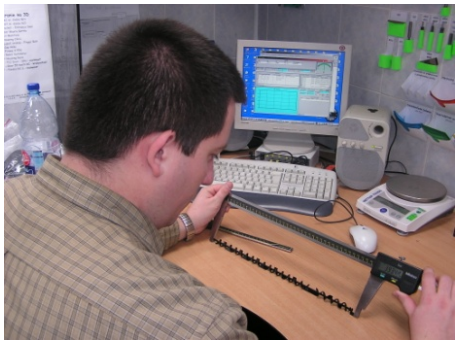


Fig.3. *Measurement of total length*

Caliper MITUTOYO ABSOLUTE DIGIMATIC 450

- Measuring range: 0 – 450 mm
- 005"/0.01 mm digital reading.
- Resolution: .0005"/0.01 mm.
- Direct inch/mm conversion.
- Zero setting at any position within entire range.

Fig.4. *Measurement of weight*

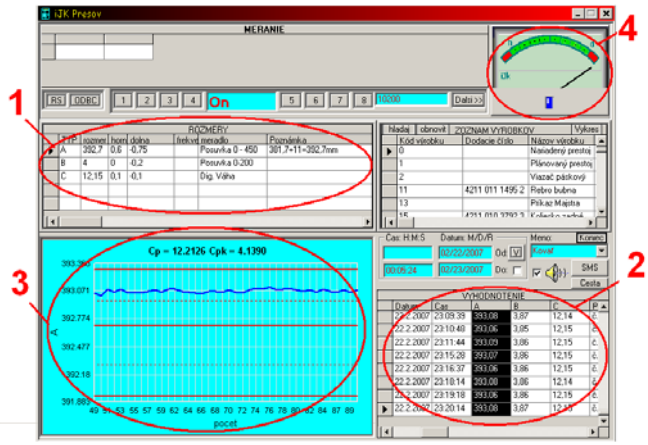
Exact analytic balance METLER TOLEDO PL 1502 S

- Maximum Capacity1510 g
- Readability 0.01 g
- Taring range 0...1510 g
- Repeatability 0.02 g
- Linearity ± 0.03 g
- Settling time (typical)3 s
- Size of weighing panø 160 mm

4. PRODUCTION PROCESS CAPACITY C_P, C_{PK}

Production process capacity C_P, C_{PK} was observed in special software using especially to this observation. This software contains some cells, used for import of measuring values.

1 – table of theoretical values with tolerances



2 – table of measuring values

3 – diagram of production process capacity

4 – indicator of production process capacity

Fig.5. Software for observation of production process capacity

After the measuring of samples, these values were imported into the software. After this software evaluated these values and created diagram of production process capacity. As we can see in figure 4, this software includes indicator which shows production process capacity.

5. SAMPLES EVALUATION

As we can see in this figure, capacity curve is situated near the upper tolerance. It comes to this, that we have to intervene into the production process and changed some technological parameter. After this the capacity curve is go back near to the required value.

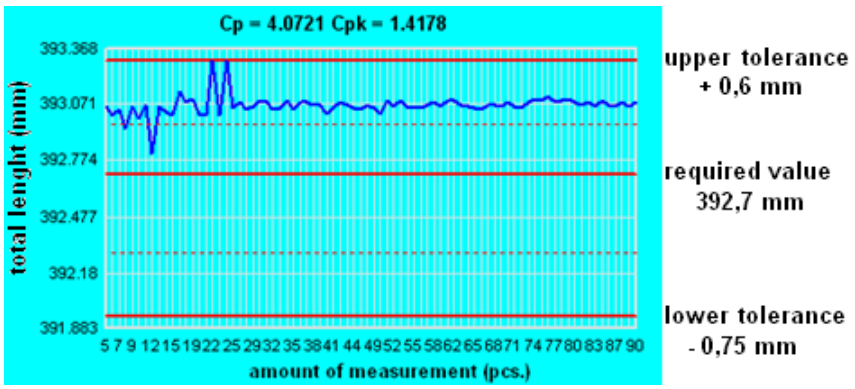


Fig.6. Diagram of production process capacity according to the total length

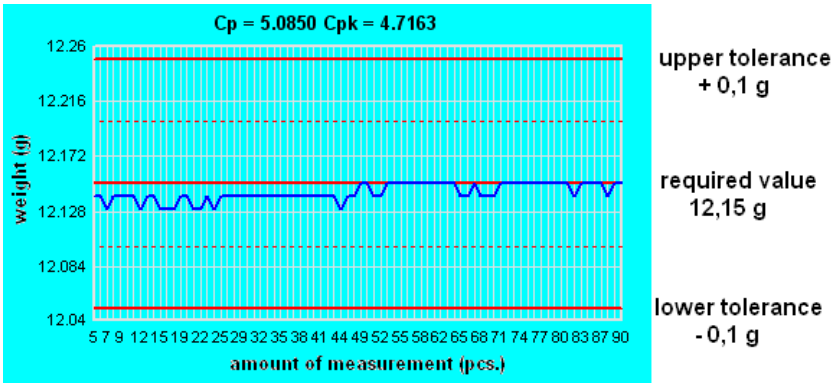


Fig.7. Diagram of production process capacity according to the weight

Production process capacity is very good. Capacity curve is situated near the required value.

6. CONCLUSION

Paper deals with observation of production process capacity. According to measuring values and by software we can determine this capacity. When the capacity curve is situated near the upper or lower tolerance, it means that we have to change some technological parameters. After this the capacity curve is going back near to the required value. These measurement is groundwork for further experiments.

7. REFERENCES

GOODMAN, S.: Handbook of thermoset plastic. Westwood, New Jersey: Noyes Publications.1998, 602s., ISBN 0-8155-1421-2

HARPER, Ch.: Plastics materials and processes. Hoboken, New Jersey, John Wiley and sons. 2003, 988 s.. ISBN 0-471-45603-9

KREHEĽ, Radoslav: The sensing system by electric strain gages. In: Scientific Bulletin : Serie C. Baia Mare : North University, 2005. s. 387-390. ISSN 1224-3264.