

## SELF QUALITY INSPECTION

**Jan Uniejewski**  
**Poznań University of Technology,**  
**Poznań**  
**Poland**

**Kazimierz Wieczorowski**  
**Poznań University of Technology**  
**Poznań**  
**Poland**

**Keywords:** quality, quality inspection, enterprise

### ABSTRACT

*In era of intensification of continuous production endeavors to reductions of production costs one from elements which surrenders to solid limitation is inspection of quality. Authors proposed return to self quality inspection driven through the worker however on a little other rules. Whole of work one leant for idea of good work of performer. One founded that prepared performer to executing of given operation produces articles in accordance with received documentation. In work one pointed on necessity of registration of measurements through performer. To registration of results one used simple supervisory cards SPC. One gave schema of connections of each function in firm in aspect of estimation of quality. In end one presented on graph comparison of each systems of inspection.*

### 1. INTRODUCTION

Problems of quality quantification in small and medium-sized enterprises in aspect of possibility of getting of certificate of compliance with ISO 9000 for quality management system are nowadays often essential barrier. Leadership of full inspection of manufacturing process in essential manner enlarges time of product manufacturing and enlarges indeed costs. In Council Directives concerning small and medium-sized European enterprises this problem is treated too generally.

### 2. MANUFACTURING PROCESS

The competitive fight on market and right of supply and demand force constant trend to costs minimization, to eliminate from manufacturing process of all units, which are cost-creative. After elimination from process or replacement of some operation with others - cheaper, future comes on analysis of costs of inspection. Some supervisory operations realized during production one brought to absurdity - qualification good-bad without indispensable analysis of reasons, which influenced on rising of defect. Examples one can multiply, e.g. at assembly of car teams, e.g. doors are checked on conveyer - adding door to model of door-opening in car and checking of covering oneself of dozen points. If red lamp will not inflame - door are good, in other case are rejected. So driven inspection does not give answer why door are defective and who carries on responsibility [1].

Primary qualification of target of enterprise realizing series of production with as least as possible costs is modified: will reach gradually also other aims, as: qualitative natures, flexibility of production, speed of showing oneself of products on market, whether at last abilities of enterprise to permanent innovation. In trace behind modification of targets follows overevaluating of accents in techniques of production: orientation on workers, work in teams, workers widely educated and with deep justification, strategists and new methods and techniques: flexible production, concurrent engineering, lean production, MRP and MRPII etc.

Manufacturing systems oriented on full automatization attempt to divide manufacturing processes on elementary acts and to unite them in systems more comfortable for inspection and effective. Great number of simple, repeatable functions provided in principle for accustomed workers is in contrast of less quantities of more complicated acts for high qualified workers realizing self-inspection.

### 3. IDEA OF THE METHOD

It causes change of approach to inspection of quality in manufacturing process. Most characteristic is passage from passive inspection, realized first of all after end of process, to active inspection, in advance of production. Greatest pressure lies down on process steering on the ground of results of inspection. Verbally it appears with exhibiting notions „statistical process control" (SPC) with disavow of name: „statistical inspection of quality" (in polish - SKJ), although both notions refer to the same. Less attentions - unjustly - sacrifices oneself to methods and of organization of inspection of quality.

One from underestimated in this aspect, and partly forgotten methods of inspection of quality is self-inspection. Use of self-inspection should give greatest effects in small and medium-sized enterprises, which are not in a position to carry costs of automatization of inspection of production. Return to idea of self-inspection appears self-evident in light of TQM philosophy. Characteristic feature is here emphasis of leading part of human factor - formation suitable attitudes of workers, their engagements and consciousnesses. It finds oneself on several practical rules in relation to workers:

- very important for people is noticing and valuing of their successes,
- needs and feelings are part of human experiences,
- success of team gives effect of a group obligations and creates sense of membership to team,
- success of team creates success,
- nobody wants to be only extension of machine, everybody wants to have circumstances to development and respects of one's own work.

Factors supporting quality thanks of self-inspection:

- identification of worker with executed work,
- consciousness about meaning of quality for assurances of prosperity of enterprise,
- quicker reaction of team of workers on events causing defects,
- higher qualifications of team of workers in target of avoidance of defects.
- improved process control through immediate system of connections and of feedbacks.

Factors reducing costs thanks of self-inspection:

- smaller outlays on planning of inspection,
- reduction of personal costs connected with supervisory acts,
- removal of next degrees of inspection,
- smaller costs of complaint through diminished quantity of defects,
- reduction of outlays lost on production of defects thanks to improved process control,
- shortening of manufacturing cycle and diminution of connected with this outlays.

Inspection of quality should guarantee, so that product answered on qualitative requirements. Rule „zero-defects" will demand returns of activities of production and of inspection in one hand. Self-inspection binds to high degree of responsibility and understanding in enterprise. This does not succeed everywhere. Self-inspection can work there, where basic organizational foundations are worked out and where proper technological methods are used. Man is found here in center of attention. Every worker possesses rich knowledge about one's own place of work and one's own assignments, possesses ability of self-assessment of one's own activities.

One can ascertain, that self-inspection does not work there, where responsibility is stretched on many of degrees („after me is after all inspection of quality"). That's why worker in self-

inspection has to understand, how changes in course of production and specially errors, are reflected on next operations in production.

Change in relations between workers realizing self-inspection demands not only encouragements to proposal of improvements, but also consistent supporting of this type of activities and transformations. Then, when worker shapes one's own place of work and has influence on its equipment, will identify oneself with one's own enterprise. He will be ready to take over responsibility in leadership of self-inspection. At this effective workers have to receive in one's own hands methods, which are in a position to rate results of executed production in range of fulfillment of qualitative requirements and, what is more important, to be able to introduce indispensable corrections.

Starting point to process of self-inspection is schedule of process of technology and of inspection, in which course of production of each product or part is divided in regard of estimations of quality in suitable stages of production – operations and cuts in which self-inspection is realized are marked.

Technology is worked out with assigned activities and means of quality assurance. Many possibilities of supervisory means in process differ, but most important is, that self-inspection mostly makes possible usage of simply and cheaper supervisory means [1].

During process planning with quality control one should take into account such concentration of operation, so that self-operation could be passed without losses of time-covered with machining time.

In the plan of enterprises assuring the quality the activities leading to avoid the defects and the essential parameters for quality are defined, devices and means for supervision of process are considered.

Efficiency of processes of optimization is dependent from different influences, as shows fig.1. Control of process concentrates on estimation of process workability, with regard of rule of worker.

For guarantee of stable or steady course of process one should supervise estimations of influence of different factors influencing on process and resulting from this conducts in relation to definite positions in enterprise. Responsibility has to be brightly defined and assigned.

Qualification and analysis of possible factors influencing on course of process how as their influence on result of production create base of process management and risk managements.

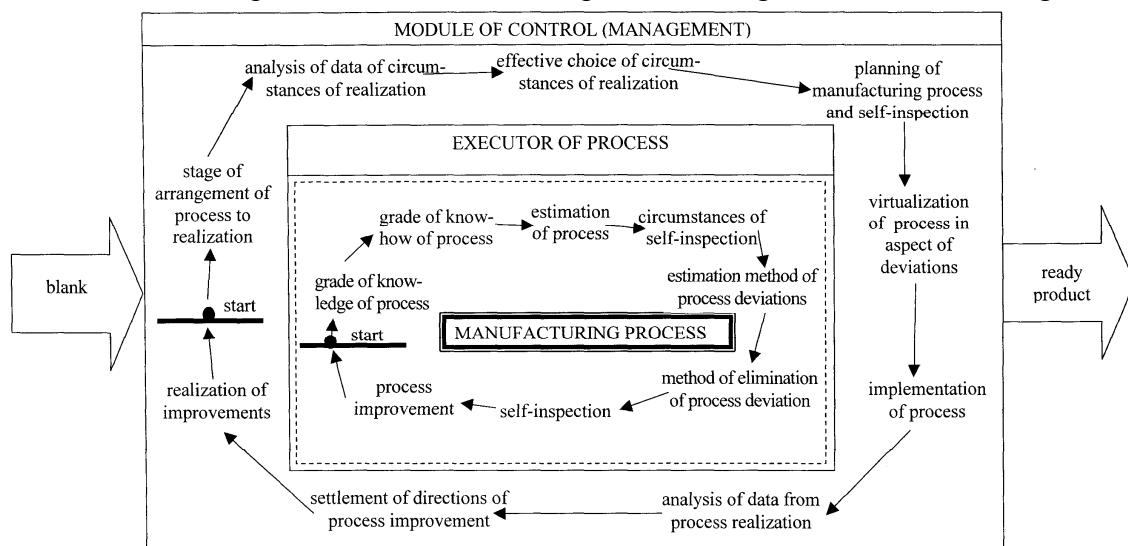


FIGURE 1. EFFICIENCY OF PROCESSES OF OPTIMIZATION [2]

Useful is here following distribution of assignments:

- accidental factors are related with assignments of departments of planning or managers,
- special factors are superintended and observed by operator. In chance of their pronouncements correcting activities are introduced without delay,
- systematical factors are assigned oneself to different services or to work places in accordance with condition of process.

Use of control cards permits on estimation of influence of different factors. Analysis of symptoms of features of controlled sums important for quality, by different influencing factors, is base to estimations of ability of method and of idea of use of supervisory activities to concurrent process. Supervisory activities attended to process are realized with help of statistical methods, for proper and variable supervisory features (SPC) so, to a maximum diminish outlays on inspection [3]. At small series profiting from specific gatherings of features is useful for inspection. Self-inspection realized during operation does not lengthen time of realization of product - time of the leaderships could be covered with machining time, and cost of product grows only for classification of worker to higher groups, as that he has to have higher qualifications. It permits also on reductions of employment - workers of technical inspection are not necessary (indispensable in traditional variant).

## 5. CONCLUSIONS

On the end one should underline, that self-inspection is covered with times of realization of operation and is best for small and medium-sized enterprises, gives possibility of maintenance of level of quality of production on constant level. Technology should be so worked out – with such concentration of operation, so that worker had time on leadership of self-inspection during realization of operation. In this aspect will only slight height of costs of production, connected with higher appraisals of worker - usually about two groups of classification.

Analysis introduced on fig.2 three manners of inspection [4] permitted on ascertainment essential reductions of costs of self-inspection in relation to remaining two manners.

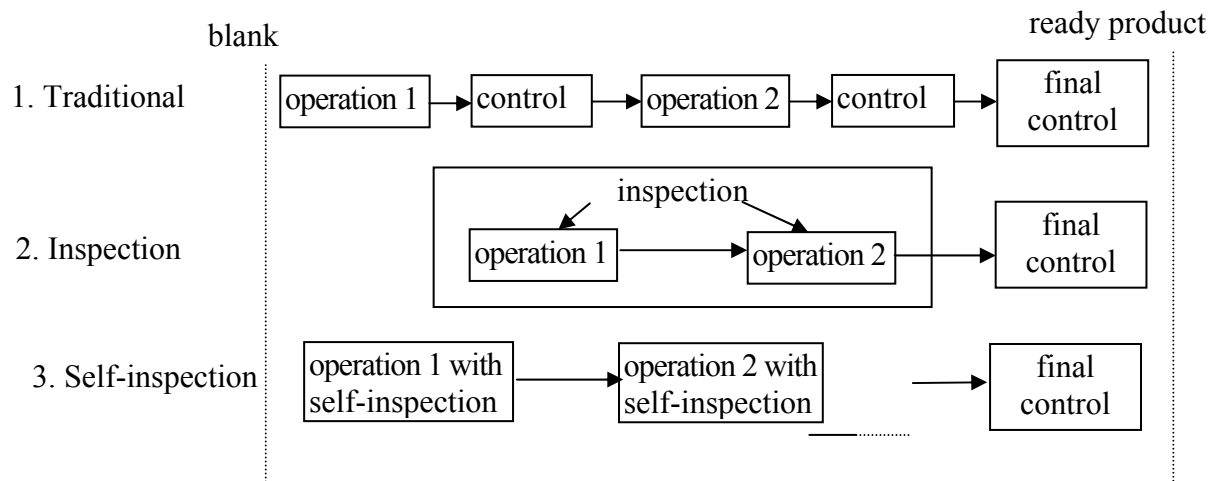


FIGURE 2. SCHEMA OF CONTROL SYSTEMS [2]

## 6. REFERENCES

- [1] Wieczorowski K., Legutko St., Tobis S., Problems of stability of manufacturing (in polish), ZN Inżynieria maszyn, R6 - Z2 pt. Maszyny XXI Wieku, Wrocław, 2001,
- [2] Wieczorowski K., Uniejewski J., Quality control in manufacturing and self quality inspection, materials of the conference: Control and controlling in management: tendencies, conceptions, instruments, part 1, Wyższa Szkoła Zarządzania i Marketingu w Warszawie, Warszawa 2002,
- [3] Uniejewski J., Statistical procedures in quality control (in polish), jubilee edition on 40 years of work of prof. K. Wieczorowski, Archiwum Technologii Maszyn i Automatyzacji, Vol. 16 nr spec., Poznań, 1996,
- [4] Uniejewski J., Wieczorowski K., Aspects of quality assurance in technological process planning and quality inspection (in polish), material of conference: „Quality in machine building and technology of machines”, Politechnika Krakowska, Kraków, 1995