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**INSTRUMENTAL ROLE OF AUDIT  
IN THE AREA OF STOCK MANAGEMENT  
IN THE CEMENT INDUSTRY COMPANY**

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**INSTRUMENTALNA ROLA AUDYTU W ZAKRESIE  
ZARZĄDZANIA ZAPASAMI W PRZEDSIĘBIORSTWIE  
PRZEMYSŁU CEMENTOWEGO**

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**Summary:** In the paper, there is discussed the problem of the use of audit in the company, indicating its impact on the efficiency of intermediate product inventory management. The first part of the paper emphasizes the definitions and identification of internal audit in the company. The second part of the paper is the response to the research question. The objective of the paper is to learn and assess the possibilities of using audit for inventory management in the cement industry company in Poland. The conclusions of the research suggest that the implementation of audit determines the efficiency of intermediate product inventory management in the surveyed cement industry company. Research methods applied to accomplish the objective are literature studies and case study.

**Keywords:** audit, inventory management, cement industry.

**Streszczenie:** W opracowaniu podjęto problem zastosowania audytu w przedsiębiorstwie, wskazując jego wpływ na efektywność zarządzania zapasami półproduktów. Pierwsza część opracowania eksponuje definicje oraz identyfikację audytu wewnętrznego w przedsiębiorstwie. Druga część opracowania jest odpowiedzią na pytanie badawcze. Celem opracowania jest poznanie i ocena możliwości zastosowania audytu do zarządzania zapasami w przedsiębiorstwie przemysłu cementowego w Polsce. Wnioski z badań sugerują, iż implementacja audytu determinuje efektywność zarządzania zapasami półproduktów w badanym przedsiębiorstwie przemysłu cementowego. Metodami badawczymi zastosowanymi do realizacji celu są studia literaturowe i studium przypadku.

**Słowa kluczowe:** audyt, zarządzanie zapasami, przemysł cementowy.

## 1. Introduction

Internal audit is the system which has developed its own methods of operation and standards which it follows. Originally, it was to deal with the verification of accounting records. However, with the economic progress and development of organizations, it has become a management tool facilitating control. The objective of internal audit is to streamline the functioning of the company and to provide value added. The evolution of audit operations over the years has brought about that the most important task of audit has become to provide information allowing for decision-making. In the counterpoint, the paper draws attention to the parametrization of the inventory management audit in the industrial company. The key research question is: does audit, constituting an important decision-making instrument, significantly affect inventory management in the company? As a consequence of this question, the objective of the paper was to find out and assess the possibilities of using audit for inventory management in the cement industry company. The research methods applied to accomplish the objective were: literature studies, case study as well as descriptive analysis and ratio analysis.

## 2. The identification of internal audit in the company

Different definitions of internal audit, adopted in the subject literature, allow for explaining the essence of audit. These definitions underline the multidimensionality of the concept of internal audit. K. Winiarska and A.J. Wołoszyn define internal audit as “an independent, objective activity, providing and advisory in its nature, conducted in order to provide the organization with value added and streamline its functioning” [Winiarska, Wołoszyn 2004, pp. 348–357]. The authors pay attention to the possibility of more efficient operations of the company when using internal audit and creating value added.

According to R. Patterson, internal audit is the mechanism of internal control operating on the principle of control and balance. Internal audit requires the systematic and comprehensive monitoring of whether staff comply with the established procedures in order to verify accounting records and detect possible cases of embezzlement/fraud [Patterson 2002, p. 34; Skoczylas, Kulczyńska 2017]. R. Patterson believes that, in internal audit, the emphasis is put on the settlement of liability, which means that employees must accept the fact of verifying their work by internal auditor. This means that audit is an internal unit of the company the task of which is to verify following the internal policy established by the company [Płóciennik-Napierała 2004, p. 384; Kabalski, Grzesiak 2017].

The Institute of Internal Auditors (IIA) – Poland formulated the definition according to which “internal audit is an independent, objective activity, providing and advisory in its nature, conducted in order to provide the organization with value added and streamline its functioning. Internal audit supports the organization in

achieving its objectives through systematic and consistent actions for the assessment and improvement in the efficiency of risk management, control system and organization management processes” [Czerwiński, Grocholski 2003, p. 17]. The above definition comprehensively presents the essence of internal audit, pinpointing all of its aspects.

E.J. Saunders gives a slightly different definition of internal audit, also cited after the Institute of Internal Auditors, according to which internal audit is “an independent, objectively providing and advisory activity the aim of which is to add value and improve the operation of the specific organization. It supports the organization in achieving its objectives through the implementation of the systematic and disciplined approach to the assessment and improvement in the efficiency of the approach to risk management processes, control management and governance” [Saunders 2003, p. 47]. In this approach, internal audit becomes a professional activity which is providing in its nature [Szczepankiewicz 2017; Chluska, Czuba-Kulińska 2016].

Similarly, although more synthetically, internal audit is defined by the International Standards for the Professional Practice of Internal Auditing. According to these standards, internal audit is defined as “an independent, providing and advisory activity aimed at providing value and streamlining the operational activity of the organization” [IIA – Polska 2001]. In the Polish legislative system, internal audit is defined narrowly the act on public finance [Ustawa z 27 sierpnia 2009]. It is reduced to the advisory activity, mainly in the area of the financial economy. It does not take into account the assessment of the process of unit management, which may contribute to the improper implementation of audit procedures in the sector of public finance [Kuc 2002, p. 80; Piaszczyk 2017].

Originally, audit included the analysis and assessment of financial statements, explored the compliance of accounting records with accounting documents and the reliability of the accounting system [Dudek 2003, p. 39; Biadacz 2007]. Information needs of enterprises associated with the provision of information on the compliance of conducted activities with the objectives [Pogodzińska-Mizdak 2007, p. 143] cause that audit is to be oriented to future activities, taking into account the problem of risk [Nowak 2017, 2009]. Therefore, audit is to support the enterprise in achieving the established objectives and provide value added.

Summing up, it should be noted that extensive definitions of internal audit are the result of the multidimensionality of this concept. The conceptual volume of internal audit results from the functioning of its many types [Sawyer 1981, p. 5; Winiarska 2017]. At present, internal audit is the subsystem of the company control system. At the same time, internal audit, being an element of the control environment, is a management tool used for verifying control activities in the company, implementing improvements and generating value added.

### **3. Overall conditions of the audit in the cement industry entity**

Proper inventory management in the cement industry company requires the comprehensive implementation of audit processes. Inventories generate costs which

may have significant impact on the development of the economic and financial situation of enterprises. Audit in the cement industry company plays the role of the verifier of the accuracy of economic decisions, which contributes to an increase in the performance of the company. The implementation of audit in the case of inventories requires the synthetic and comprehensive monitoring of the established procedures. The key research question is: does audit, constituting an important decision-making instrument, significantly affect inventory management in the company?

### 3.1. Research process

Inventory management in the cement industry company is conditioned by the factors such as:

- seasonal nature of business,
- volume of demand,
- level of production capacity.

The above factors have direct impact on the development of the level of inventories in the cement industry company. The seasonal nature of the activity of these entities results from the climatic conditions which create the demand for cements in the construction industry. The demand for products of the cement sector influences the level of inventories of intermediate products and materials. The activity of cement industry companies is limited by the possessed production capacities. These constraints in the surveyed enterprises in particular refer to:

- amount and capacity of silos of raw meal, clinker and cements,
- amount and efficiency of mills of the raw material,
- amount and efficiency of kilns for clinker.

The empirical research was conducted in the cement plant belonging to one of the largest cement concerns in the world. The range of empirical data included in the research refers to: volume of production, volume of consumption and own costs of sales of inventories and level of inventories.

For the purposes of the parametrization of the audit process in the field of inventory management in cement industry companies, the set of empirical data was presented in quantitative terms. The audit included the period of subsequent twelve calendar months for a number of reasons. Firstly, the research into inventories in subsequent twelve months illustrates the seasonality of production and sales of inventories in the cement industry. Secondly, the volume of production, consumption and sales of inventories in subsequent years is analogical in all enterprises of the cement industry. Thirdly, audit is to provide information *ex ante*, therefore the analysis of inventories over twelve subsequent months will provide current information on the level of inventories.

The empirical research focuses on the accomplishment of the audit task and control activities in the field of inventory management in the cement industry company. The subject of the audit task is: *The efficiency of inventory management in the cement industry companies*. In the audit task, there were identified three stages constituting the organizationally isolated parts:

- I. The stage of audit preparation.
- II. The stage of audit planning.
- III. The stage of audit implementation.

The stage of audit preparation focuses on the establishment of areas and objectives of audit, identification of risk in the analyzed area as well as the analysis and assessment of risk. At the stage of audit planning, there is developed the audit program and the procedures and techniques of its implementation. The final stage of planning consists in the preliminary assessment of the internal control system. The last stage of audit implementation is the conduct of the research planned and the assessment of the analyzed area. The result of the implementation of audit is producing the final audit report in the surveyed cement industry company.

Due to the limited volume of the study, the attention will be drawn exclusively to the first stage of audit. At the stage of audit preparation, there will be indicated the impact of the rotation of inventories on making decisions concerning the development of the level of inventories in the cement industry.

– *The stage of audit preparation*

The establishment of areas and objectives of audit at the stage of preparation consists in specifying the areas of audit and requires the preliminary identification of inventories in the surveyed entities. The audit process in inventory management in the cement industry company included in the research will be conducted in the quantitative terms. Due to the quantitative share of individual types of inventories in the cement sector as the subject of the research was selected an intermediate product which is the clinker.

The research area of the audit of clinker inventories will be the processes of creation, storage and depletion of these inventories. Inventories selected as the subject of the research are created in the production process. The storage of inventories takes place in open or closed storage areas. The depletion of intermediate product inventories takes place through their release for use in the production process. The objective of the audit is to obtain reliable evidence that the clinker inventory management is conducted properly, the inventory management procedures are effective and the inventory control system operates smoothly. At the stage of audit preparation, the objectives are general, they will be detailed in the audit program.

The identification of risk in the analyzed area at the stage of preparation includes: determining the significance of risk, estimating the risk of the research and presenting the factor generating risk in inventories with the division into categories and indicating the measure of risk in inventories. General significance of risk was determined as the weighted average of partial significance. In order to determine partial significance of clinker inventories in the analyzed period the production capacity of the surveyed entity, the planned volume of production and sales and the level of inventories in previous years were taken as the basis. Partial significance for individual types of clinker inventories being the subject of the research and general significance for clinker inventories in the surveyed cement industry company is the following: clinker (+/-) 1–2 days.

Significance provides information on what identified deviation can be omitted in the assessment of inventory management. This deviation results from the difference between the planned and actual frequency of replenishment of inventories. General significance was assumed at a very high level, which limits the level of research risk. Research risk was determined using the following formula:

$$RB = RN \times RK \times RP,$$

where: RB – research risk – it is a product of inherent risk, control risk and risk of omission,  
 RN – inherent risk – means the susceptibility of the analyzed area to the occurrence of irregularities,  
 RK – control risk – refers to the possibilities of the occurrence of irregularities in the internal control system,  
 RP – risk of omission – refers to the efficiency of the applied procedures.

While determining research risk in the clinker inventory audit in the surveyed cement industry company, it was assumed that:

RN – is high and amounts to 0.75,

RK – is high and amounts to 0.50,

R – is average and amounts to 0.45,

$$RB = 0.75 \times 0.50 \times 0.45 = 0.17.$$

Research risk amounts to 17% and is assessed as average. The basic factor generating risk in clinker inventories, gathered by cement industry companies, is the frequency of their replenishment. This factor is measured with the inventory rotation rate. The categories of risks triggered by the frequency of replenishment of inventories are presented in Table 1.

**Table 1.** Categories of risk in the analyzed area

Subject of research	Risk factor	Risk category	Risk measurement meter
1	2	3	4
Inventories: of intermediate products and work in progress	Frequency of replenishment of inventories of clinker	Risk of disturbances in the process of procurement, production and sales	Rotation rate of clinker stocks  (The cost of creating sold inventories / the average stocks)
		Risk of loss of financial liquidity	
		Risk of a decline in profitability	
		Risk of an increase in costs of freezing capital in inventories	
		Risk of an increase in stock warehousing costs	
		Risk of loss of value in use of inventories	
		Risk of an increase in costs of creating (ordering) inventories	
Risk of an increase in shortages or surpluses of inventories			

Table 1, cont.

1	2	3	4
		Risk of an increase in old and unnecessary inventories	
		Risk of loss of customers or suppliers	
		Risk of shortages and surpluses of inventories	
		Risk of disruption of supplies	
		Risk of an increase in inventory costs	
		Risk of freezing capital in inventories	
		Risk of weakening competitiveness	
		Risk of a decline in customer satisfaction	
		Risk of a drop in sales	

Source: own study.

The rotation rate of clinker inventories will determine the order of audit activities. The rotation of clinker stocks in the cement industry will be diversified in individual periods due to the seasonal nature of production and sales, therefore the rotation rate of clinker inventories must be established monthly.

### 3.2. Results

In order to conduct the analysis and assessment of risk in the analyzed area, there was recognized the process of creation, storage and depletion of clinker. The average rotation rate of clinker in the analyzed period amounts to 30 days. The actual average

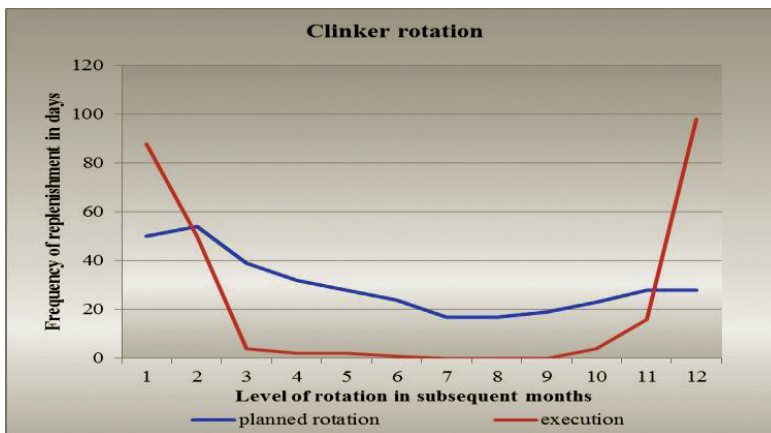


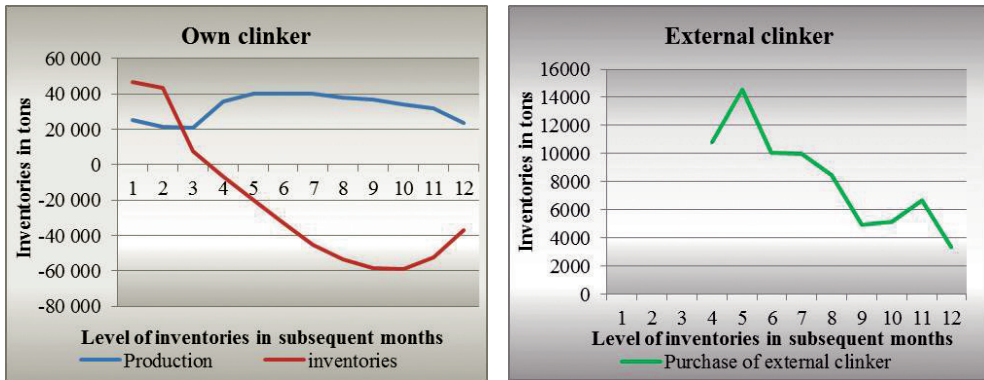
Figure 1. Development of clinker rotation

Source: own study.



rotation was 22 days (Figure 1). This means that the consumption of clinker in the process of firing cement was higher than expected.

An increase in the production of cement in II quarter of the year resulted in a drop in clinker inventories in III quarter of the year to the zero level. It should be noted that the company took advantage of the external clinker (Figure 2). The low level of inventories of own clinker would run out in April, which would result in stopping the cement production.



**Figure 2.** The level of inventories of own and external clinker

Source: own study.

The clinker rotation in the winter season was slower than expected (planned – 37 days, actual – 43 days), however, the deviation of the actual rotation of the planned rotation falls within the normal range. In the summer season, the actual rotation of clinker inventories was faster than planned. The average rotation in the summer season amounts to 1 day with the planned rotation of 23 days. In III quarter of the year clinker inventories were consumed on a regular basis in the cement production process, exceeding the limits of safety stock.

Admittedly, the low level of clinker inventories reduces the risk associated with stock maintenance costs or freezing capital in inventories but it generates a very high risk of the occurrence of disturbances in the continuity of the cement production process. The assessment of the rapidity of rotation of inventories classifies clinker as the main area of the occurrence of disturbances in the process of cement production and sales.

### 3.3. Discussion

The rotation rate of clinker stocks in the surveyed cement industry company indicates many threats which occur during the management of production stocks in this industry. The characteristic feature of the surveyed company is the necessity of possessing inventories of clinker in order to maintain the continuity of production and sales processes.



The presented research indicates that clinker inventories pose a serious risk. The shortage of clinker brings about the occurrence of such risk categories as: risk of the occurrence of disturbances in the process of production and sales, risk of weakening competitiveness, risk of productivity loss, risk of reduction in inventories.

The authors' research suggests that the application of the rotation rate of inventories for the analysis and assessment of risk of clinker inventories allows the auditor to make a choice in the field of the order of the research into the audit objects. The parametrization of audit decisions supports the assessment of risk in clinker stocks. Defining the rotation rate of clinker inventories in the surveyed cement industry company increases the efficiency of intermediate product management and allows for making right decisions.

#### **4. Conclusions**

Enterprises functioning properly in market relationships must pursue many different objectives in the accomplishment of which the auditor participates. Audit processes in enterprises allow for improvements in enterprise management in order to improve its efficiency. In search of the areas of optimization there are often indicated inventories as one of many factors generating costs. In this context, audit provides information on the rationalization and efficiency of the inventory management system.

The objective of the paper was to learn and assess the possibilities of using audit for inventory management in the cement industry company. The main contribution of the paper is the in-depth understanding of audit processes in the specific conditions of the operation of the cement industry company, with particular emphasis on intermediate product inventory management. A clear implication from the theoretical and empirical assumptions of the conducted case study is the fact that audit may be very important in increasing the efficiency of intermediate product inventory management in the surveyed company, which is compliant with the results of the previous research [Kościelniak 2011]. The research process was carried out using the case study, which allows for the presentation of the accurate picture of the analyzed phenomena and relationships [Czakon (ed.) 2015, pp. 189–209]. However, there should be remembered the limited possibility of the scientific cognition using the case study method [Lachiewicz, Matejun 2010, pp. 88–90]. Therefore, it should be pinpointed that the constraints of the case study are: small representativeness of results, intuitiveness and subjectivity of judgements as well as high costs of the conducted research [Skorek et al. 2010, pp. 549–556].

The study supports the current view that the rapidity and quality of audit determines the efficiency of management in the surveyed cement industry company, allowing for making right decisions in the area of intermediate product management. In order to accomplish the objective of the paper, there were mainly used literature studies, descriptive analysis and ratio analysis. The problem of audit in the area of inventory

management is not new but very up-to-date due to the economic and legal conditions in which cement industry companies operate.

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## **Part 2**

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# **Management control for start-up and innovation management**

