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## MANAGEMENT SYSTEM ADAPTATION TO ISO 45001 REQUIREMENTS: IMPLEMENTATION OF THE GUIDELINES FOR CONTINUOUS IMPROVEMENT

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**Abstract:** *The effective occupational safety management requires of using a solutions based on continuous improvement. The simultaneously is necessary to introduce improvements that are important to ensure safe performance of work. For the successful achievement of the intended results of systemic management, the great importance is to identify factors that may adversely affect the course of the actions taken. Compliance required, nature of possible irregularities and the range of improvement actions that are necessary to ensure the safe performance of production tasks are illustrated in two companies. The article is a case study in which are identified and appropriate solutions are applied to adapt existing management systems to comply with ISO 45001 standard.*

**Key words:** *safety at work, continuous improvement, ISO 45001, safety management, the work environment shaping.*

### 1. INTRODUCTION

The fundamental aim of systemic occupational health and safety management in any organization is to ensure that workers operate in a safe work environment with no or minimal exposure to hazards and Occupational Health and Safety (OH&S) risks. Such a system will reduce accident rates and worker absences ultimately to minimize losses and improve work performance. By approaching occupational safety management as an integral part of their overall management system, organizations are in a position to embrace continual improvement in their operations [1], which in turn produces benefits in the form of a worker-friendly environment. The concept of continual improvement may center on the continual monitoring of current states and identifying any non-conformities, which need to be defined and targeted with solutions that increase the organization's capacity to improve [2].

Equally essential for the ability to improve and change current statuses is the proper identification of challenges. To benefit from conformity with the principles of systemic occupational safety

management, organizations need to identify and eliminate factors that adversely affect their operations. This approach should focus on continually improving processes with a view to achieving excellence. This is requisite for achieving conformity with any adopted management standards.

### 2. SYSTEMIC OCCUPATIONAL HEALTH AND SAFETY MANAGEMENT

#### 2.1 The idea to adopt an occupational safety management system

For a number of years, the provision of occupational health and safety and the adoption of a systemic approach to management have been viewed as mutually intertwined and as providing potential benefits derived from reduction of damage resulting from accidents, near misses and ill health [3]. The subject matter related to this has been included in many studies. Any specific efforts made to ensure occupational safety should be seen as key for the organization sustainability. Such efforts are often seen as tradeoffs between the various needs of entities participating in tasks completion [4-6]. Once it was

developed, the international standard unified the approach to occupational safety making it necessary to modify systemic occupational health and safety management to achieve the required conformity [7].

To adopt an occupational health and safety management system that conforms to ISO 45001, organizations need to identify areas that are critical for their ability to effectively complete operational tasks and provide worker-friendly working conditions. Such an effort may be viewed as instrumental to improving quality, reducing costs and boosting performance efficiency and competitiveness. Once all workers across the board are involved [8], it becomes possible to identify and measure customer expectations, improve performance, continually check progress and ultimately identify further improvement opportunities [4,8]. Therefore, strategies to improve the work environment may well provide organizations with a competitive market advantage [9].

The ISO 45001 helps increase the capacity to improve an organization by prioritizing occupational safety in its hierarchy of objectives and strategies, encouraging proactive risk management and promoting measures that facilitate risk prevention [10]. A key aim of the system is to improve the actions taken. Such improvements help organizations achieve and maintain a competitive edge and take stock of improvement activities with an eye to ensuring that the organization is better able to flexibly adapt to change. Studies show a number of factors that enable organizations that are aware of their deficiencies to achieve the intended outcomes [3]. In seeking to conform to the standard, organizations may encounter challenges that will compel them to procure and deploy additional resources, involve their leadership, develop a more mature culture, etc. [7,11].

To successfully roll out an occupational safety management system, key aspects of improvement need to be considered. These include acting proactively within organizational structures, ensuring the top management take initiative and make commitments, and overhaul planning. Proper recognition of such prerequisites is essential for effective implementation [5,10]. Once the standard has been successfully adopted, organizations may be encouraged to widen its impact and move beyond the focus on individual system components based on a better understanding of the social and technological environment and on an examination of the many interactions taking place between its elements [7].

## **2.2 Role and tasks of continual improvement of the effectiveness of systemic management**

Continual improvement is defined as recurring efforts aimed at improving an organization's ability to achieve measurable outcomes that are consistent with its adopted safety policy [2,12]. The aim of continual improvement is to achieve excellence in activities by better preventing worker injuries and ill health and ensuring safe and healthy working conditions [1]. This ties to the need for constant improvement, for supplementing and enhancing existing solutions, and for identifying new improvement opportunities. The organizations that improve continually find themselves compelled to make the changes that produce optimal working conditions, especially where modifications necessitated by technological progress end up generating risks [13,14].

A more effective occupational safety management system will be of benefit for all parties involved in production. Such benefits are conditional upon the completion of measures that reduce the occurrence and impact of disturbances. In systemic occupational safety management, one such benefit is the ability to reduce risks and nuisances, which translates into lower operating costs that result from failures to ensure the required working conditions, ineffective or insufficient workload reductions and work-related accidents and diseases.

To secure effective continual improvements, organizations need to identify issues and apply adequate improvement measures with due account taken of any external factors that may compromise their ability to achieve the intended outcomes. In particular, it is paramount to consider factors that stand in the way of securing the expected benefits and disrupt the pursuit of any adopted health and safety objectives. Regardless of project scopes, the success of any continual improvement efforts vitally depends on their efficient implementation. Disruptions that hinder project measures may make such success impossible or greatly compromised. This becomes particularly critical where the benefits are conditional upon the continual nature of an organization's efforts, which is due to mutual links among ongoing processes [15].

In view of the need for a more effective work safety function, organizations are advised to seek improvements based on the PDCA (Plan-Do-Check-Act) cycle [1]. This cycle represents a logical sequence of events from planning to standardizing a

new state once improvement measures have been taken. The measures taken contribute to [2]:

- PLAN: identifying the actions needed to determine key risks and select priority measures that should be taken first, and establishing the intended outcomes; the planning stage also includes an assessment of the capacity to deliver on the adopted objectives,
- DO: implementing improvements based on prior selections of both the objective and the type and nature of activities; this stage may include determining the steps to be taken and their results,
- CHECK: assessing the effectiveness of actions taken against selected objectives,
- ACT: Recognition of the achieved status as a standard that will serve as a basis for identifying further improvement measures.

Any improvement measures should cover all areas impacting the safety of workers operating in a work environment [12] regardless of the broader context of the organization's operation [1], and should comply with planning policies designed to aid decision-making [16]. The effective implementation of such measures requires a comprehensive identification of safety issues and a targeted improvement response that is adequate for the non-conformities discovered.

### **3. PRACTICAL IMPLEMENTATION OF CONTINUAL IMPROVEMENT**

#### **3.1. Scope and policies for assessing continual improvement delivery**

Continual improvement encompasses changes intended to enhance an organization's processes. Such changes are adopted on an ongoing basis immediately after the occurrence of symptoms that suggest adverse impacts on such processes. Any improvements that are being adopted should help create a worker-friendly environment and achieve OH&S policies. As a consequence, the impact of risks on interested parties (individuals at risk of being harmed) is reduced.

All improvement measures should be guided by the findings of an in-depth analysis of the strengths and weaknesses of the organization's performance, management system and safety policy.

In an occupational health and safety management system, adequate continual improvements require solutions that will deliver the intended outcomes. Such solutions include [1,12]:

- The formalization and continual updates of occupational safety policies and an organization's ability to deliver such policy,
- An adoption of safety indicators that will enable the organization to identify non-conformities and take effective corrective actions,
- Communication across all echelons of the organization to efficiently deliver safety improvement measures,
- Development of capacity to monitor workers' violations of safety guidelines in day-to-day operation and of assessing any corrective measures that have been taken,
- Safety audits and other activities that help identify such non-conformities as may compromise the effectiveness of the occupational safety management system,
- Improvements of systems for monitoring worker behaviors, work performance and working conditions,
- Training designed to raise the awareness of the need for proper task performance by workers,
- Ensuring that all interested parties participate in the development of internal safety policies and the guidelines for delivering on such policies and achieving intended outcomes.

The measures designed to achieve continual improvement and conformity with the adopted OH&S management systems and the ISO 45001 standard have been thoroughly assessed. Such measures are summarized in table 1.

The activities indicated in table 1 can be understood as a universal range of measures and solutions allowing to achieve compliance with the guidelines of system management, compliant with the ISO 45001 standard. The nature of results is a consequence the application of guidelines a practical implementation of system requirements [2]. By properly implementing the measures enumerated in table 1, organizations improve their ability to ensure worker well-being in the workplace. Such well-being results specifically from adopting solutions that enhance the effectiveness of systemic occupational safety management. With respect to the capacity to carry out tasks, due note should be taken of any factors (modes) that help ensure that improvement projects are carried out appropriately. Such factors (modes) will help boost measure and process effectiveness, conserve resources, update relationships among processes and make the deployment of measures

disruption-proof [15]. To ensure that their measures are effective, organizations should consider all measure-related aspects in keeping with the occupational safety management systems they have adopted [17]. This means that success in achieving intended outcomes is conditional on both the scope of the measures taken and the manner of their implementation.

### 3.2. Assessment of practical implementation of normative requirements relating to continual improvement

The study includes an assessment of the extent and manner of measures adopted to ensure conformity with continual improvement requirements in the occupational safety management systems of two metal processing and machine building companies.

Table 1

**Measures ensuring effective continual improvements.**

Requirements	Conformity potential
Formalization and improvement of the methods used to run occupational health and safety management system	<ul style="list-style-type: none"> <li>- All measures follow formalized rules designed to achieve intended outcomes,</li> <li>- Measures are selected in consideration of any external and internal factors that may interfere with efficient performance of organization,</li> <li>- Improvements are selected and implemented in view of the expectations of any interested parties based on the premise that due consideration of such expectations will boost the effectiveness of improvement measures,</li> <li>- Improvement measures are guided by an assessment of information on the relevant non-conformities</li> </ul>
Ensuring that measures taken to improve management system efficiency are comprehensive	<ul style="list-style-type: none"> <li>- Improvement measures are selected with due consideration of any factors that may affect OH&amp;S system performance,</li> <li>- Efficient OH&amp;S system performance is the key criterion for selecting improvements and any supplementary measures that adequately respond to needs</li> </ul>
Use of indicators for assessing existing safety levels and identifying irregularities	<ul style="list-style-type: none"> <li>- Indicators used to assess safety (effectiveness of the system in place) take account of the nature of non-conformities, their possible impact on the occurrence and aggravation of risks and the causes of their occurrence</li> </ul>
Ensuring ways to assess benefits	<ul style="list-style-type: none"> <li>- The benefits achieved by deploying improvement measures are identified against measurable criteria,</li> <li>- The benefits are assessed in terms of their scope and the extent of their impact and benefits</li> </ul>
The scope of improvement measures is extended to include solutions that promote a safety culture	<ul style="list-style-type: none"> <li>- The nature and characteristics of improvement measures take account of human aspects of management in line with the safety culture being developed</li> </ul>
Ensuring worker participation in effective implementation of safety solutions	<ul style="list-style-type: none"> <li>- Workers actively participate in selecting and implementing improvement measures</li> </ul>
Ensuring that information vital for assessing incidents and non-conformities and the need for improvement measures is available	<ul style="list-style-type: none"> <li>- Each worker has access to information relevant for his/her job, including projects designed to improve system efficiency,</li> <li>- The available information points to the need, extent, and practicability of improvement measures</li> </ul>
Records are kept to support assessments of any measures deployed and any outcomes achieved	<ul style="list-style-type: none"> <li>- Improvement principles ensure unambiguous identification of any improvement measures that have been taken,</li> <li>- The available information supports assessment of the deployment of improvement measures and the results achieved</li> </ul>
Training reflects needs identified based on management system improvement guidelines	<ul style="list-style-type: none"> <li>- The thematic scope of training reflects system improvement needs,</li> <li>- The thematic scope of training reflects the findings of improvement measure assessment,</li> <li>- Training is conducted to ensure tangible benefits post completion</li> </ul>
Improvement measures assessed externally and internally to ensure they adequately reflect needs	<ul style="list-style-type: none"> <li>- The improvement measures are subject to ongoing internal assessment of relevance for the organization's operations, and to external assessment of their impact on the external environment,</li> <li>- The assessment effectively identifies the need to deploy improvement measures</li> </ul>
Continual improvement recognized as a vital part of systemic management	<ul style="list-style-type: none"> <li>- Continual improvement is recognized as integral to the performance of management system in place</li> </ul>

The assessed companies have adopted safe working conditions on the basis of systemic guidelines conforming to the OHSAS 18001 standard [18] (Company A) and its Polish equivalent, the PN-N-18001 standard [19] (Company B). The assessment was aimed at identifying changes, if any, needed to achieve conformity with systemic requirements of ISO 45001. Continual improvement was deemed essential in view of the role it plays in all aspects of systemic management, and specifically its role in ensuring efficient use of resources, cost reduction, and

a better business environment. Having existing systems adapted to the new standards was found to be particularly critical where non-conformities were likely to occur.

The above assessment was based on questionnaire surveys with questions on the conformity of ongoing operations with systemic guidelines, possibly indicating a need for improvement measures. Each thematic area was assessed separately. The range of possible responses to the survey questions is shown in table 2.

Table 2

**Guidelines for an assessment of the conformity of existing solutions with ISO 45001 and suggested improvement measures.**

Conformity status	Level of conformity	Necessary improvement measures
Non-conforming	The requirement is not satisfied (no evidence for conformity with normative requirements).	Changes are required to ensure that the existing management system conforms to ISO 45001.
Partial conformity	The requirement is fulfilled, but the solutions in place do not support effective improvements of the adopted system.	Improvements are advised that will enhance system operation and make benefits more likely and the use of resources more efficient.
Full conformity	The requirement is properly satisfied.	No changes to the solutions in place are needed.

The survey was conducted among employees responsible for the efficient functioning of management systems in their respective organizations. The study authors participated in the study as experts who supported solutions and assessed their adequacy. The outcomes underwent a thorough examination to ensure the assessment reflected actual

circumstances. Where any discrepancies arose, the final determinations were made by the study authors who took due account of the views of the study participants. The issues used to assess conformity and summarized collective responses are provided in table 3.

Table 3

**Issues assessed for conformity with continual improvement principles and results of assessments of the need for improvement measures to achieve continual improvement.**

Issue assessed	Assessment results and suggested improvements	
	Company A	Company B
Does the formalized functioning of the OH&S management system take due account of changes in the organization's operating circumstances (changing external and internal factors and changing needs of interested parties)?	Partial conformity (1.1)	Partial conformity (2.1)
Are the measures taken appropriate and do they ensure effective operation of the management system in place?	Partial conformity (1.2)	Partial conformity (2.2)
Do the adopted safety indicators account for non-conformities (issues) and help select adequate improvement measures?	Full conformity	Partial conformity (2.3)
Do the improvement measures include promoting a culture that supports the functioning of the OH&S management system?	Full conformity	Full conformity
Do the improvement measures affect success in securing occupational safety benefits?	Full conformity	Full conformity
Do the improvement measures recognize workers' role in improving OH&S management system effectiveness?	Partial conformity (1.3)	Partial conformity (2.4)
Are information flows sufficient to ensure that all interested parties have access to knowledge about incidents, non-conformities, and the	Full conformity	Full conformity

need for improvement measures, and is the scope of such information sufficient to ensure the efficient deployment of such measures?		
Do workers have access to information that they can use to make correct decisions in selecting and applying measures designed to make safety management more effective?	Partial conformity (1.4)	Partial conformity (2.5)
Does the organization keep records to evidence having taken adequate improvement measures?	Full conformity (in relation to the actions taken)	Full conformity (in relation to the actions taken)
Is the thematic scope and execution of training sufficient to equip workers with abilities that will allow them to efficiently implement tasks and achieve objectives?	Partial conformity (1.5)	Partial conformity (2.6)
Do auditors examine the way in which requirements are fulfilled to achieve conformity with continual improvement guidelines?	Full conformity	Full conformity
Are failures to ensure continual improvement deemed to violate systemic conduct principles?	Full conformity	Full conformity

#### 4. CONCLUSIONS / DISCUSSION OF FINDINGS

Ensuring continual improvement should be viewed as a key prerequisite for the effective improvement of any existing OH&S management system that forms an integral part of the overall system of managing decisions in a business organization. Continual improvements enable organizations to adapt to change and to factors affecting their operation. The scope, nature, timing, and effectiveness of measures are of essential importance. They are vital for achieving conformity with ISO 45001 guidelines.

When assessing solutions in place and estimating possible benefits, organizations should bear in mind that effective improvements are critical for the proper functioning of their system. This makes improvement measures indispensable in adjusting an organization's management system to changing circumstances. Such measures are crucial for the effective operation of the system in place and specifically for reducing accident rates and accident severities.

The assessment shows that despite conformity with prior systemic guidelines (attested to with relevant OHSAS 18001 and PN-N-18001 certificates), it is critical to improve procedures to achieve full ISO 45001 conformity. This is necessary to ensure that organizations can maintain their occupational safety management system.

The changes suggested to achieve conformity with Continual Improvement Guideline require that:

- Company A (which has in place a health and safety management system that conforms to OHSAS 18001):
  - (1.1) Better recognizes the expectations of all interested parties regarding the selection of improvement measures, especially with respect

to outcomes to be achieved by ensuring the efficient operation of the existing management system,

- (1.2) Identifies the improvement measures required to remedy any characterized non-conformities, complete with detailed improvement measure rollout scopes and schedules,
- (1.3) Applies solutions that ensure the participation of workers and that utilize their involvement in measures that help improve the effectiveness of the existing management system,
- (1.4) Ensures that data and information are accurately interpreted to find which improvements are desirable, which usually requires identifying the root causes of non-conformities,
- (1.5) Acquires abilities that are necessary for the efficient implementation of system activities. In particular, abilities that meet the needs should be acquired by persons whose responsibilities and execution methods impact the organization's success in achieving systemic management objectives.
- Company B (which has in place a health and safety management system that conforms to PN-N-18001):
  - (2.1) Increases the scope and the ability to utilize the information that it acquires. In particular, this applies to information relating to the key factors for the organization's growth and its relations with interested parties,
  - (2.2) Takes measures to preempt the occurrence of non-conformities, which requires identifying

- improvement opportunities based on indications of potential non-conformities,
- (2.3) Extends descriptions of safety indicators by the addition of information on possible improvement measure outcomes,
  - (2.4) Applies solutions that enhance worker participation in searching for and adopting improvements in the existing management system,
  - (2.5) Gains the capacity to acquire, extend the scope of and ensure the correct interpretation of information that is vital for the rational use of acquired knowledge to improve ongoing activities,
  - (2.6) Extends the thematic scope of training and ensures that training is offered to all persons linked with the organization whose responsibilities and execution methods impact the organization's success in achieving systemic management objectives.

The assessment shows that greater conformity with ISO 45001 is achieved by the organization that follows the OHSAS 18001 guidelines. Where the scope of change is much larger, any OH&S management system that was originally adopted on the basis of the PN-N-18001 standard will require modification. Since independent auditors have found that both of the organizations conform to applicable standards, one should presume that improvement measures conforming to the indicated guidelines will render their management systems more effective. As a result, measurable benefits for all stakeholders of the company can be obtained.

It should also be noted that although the study conclusions identify certain trends, such conclusions should only be applied to circumstances found in the organizations assessed by the authors. The conclusions may not be viewed as universal improvement advice.

However, they can be considered as the recommended course of action. Thereby, the scope of solutions specified in table 1 should constitute a guideline for further proceedings, depending on the systemic activities implemented so far. The information obtained may guide rollouts of health and safety management systems carried out "from the ground up" in organizations that have not previously performed such activities, in order to help them achieve a satisfactory level of conformity with relevant requirements. In addition, such information

will enable them to grasp the significance of solutions that are adequate to their needs and that will enable them to deliver safe working conditions and reduce burdens caused by non-conformities.

## 8. REFERENCES

- [1] ISO 45001:2018, *Occupational health and safety management systems. Requirements with guidance for use.*
- [2] Hillmer, S., Karney D. *In support of the assumptions at the foundation of Deming's management theory.* Journal of Quality Management, 6(2), 371-400, 2001.
- [3] Dziegielewska, P., Konarkowska, O., Górny, A. *Adapting an OHS Management System to ISO 45001 Requirements: Ensuring System Management Effectiveness.* European Research Studies Journal, XXV(1), 809-19, 2022.
- [4] Górny, A. *Man as internal customer for working environment improvements.* Procedia Manufacturing, 3, 4700-07, 2015.
- [5] Hrenov, G. *Conceptual Model for the Development of OHS Management in SMEs,* Proceedings of the 32nd European Safety and Reliability Conference (ESREL 2022), M.Ch. Leva, E. Patelli, L. Podofillini, S. Wilson (Eds), pp. 2718-2725, ISBN: 978-981-18-5183-4, Dublin, 8th of August to the 1st of September 2022, Published by Research Publishing, Singapore, 2022.
- [6] Neri, A., Cagno, E., Paredi, S. *The mutual interdependences between safety and operations: A systematic literature review.* Safety Science, 153, 105812, 2022.
- [7] Karanikas, N., Weber, D., Bruschi, K., Brown, S., *Identification of systems thinking aspects in ISO 45001:2018 on occupational health & safety management.* Safety Science, 2022, 148, 105671.
- [8] Sanchez, L., Blanco, B. *Three decades of continuous improvement.* Total Quality Management & Business Excellence, 25(9-10), 986-1001, 2014.
- [9] Zwetsloot, G., Schmitt-Howe, B., Nielsen, K.T. *Success factors for OSH implementation. Opening the black box of OSH realization.* Policy and Practice in Health and Safety, 18(2), 196-210, 2020.
- [10] Neag, P.N., Ivascu, L., Draghici, A. *A debate on issues regarding the new ISO 45001:2018*

- standard adoption*. MATEC Web of Conferences, 305, 00002, 2020.
- [11] Granerud, L., Rocha, R.S. *Organisational learning and continuous improvement of health and safety in certified manufacturers*. Safety Science, 49(7), 1030-9, 2011.
- [12] EN ISO 9001:2015, *Quality management systems. Requirements (ISO 9001:2015)*.
- [13] Darabont, D.C., Bejinariu, C., Ionita, I., Bernevig-Sava, M.A., Baciuc, C., Baciuc, E.R. *Considerations on improving occupational health and safety performance in companies using ISO 45001 standard*. Environmental Engineering and Management Journal, 17(11), 2711-8, 2018.
- [14] Górný, A., Mrugalska, B. *Application of SMART criteria in planning improvements to the operating conditions of machinery*. Communications in Computer and Information Science, vol. 374, part II, pp. 494-8, Springer, Cham, 2013.
- [15] Górný, A. *Work Environment as a Factor in the Conduct of Manufacturing Processes*, Innovations in Industrial Engineering, Lecture Notes in Mechanical Engineering, pp. 432-40, Springer, Cham, 2022.
- [16] Çalış, S., Yeşim Büyükkakinci, B. *Occupational Health and Safety Management Systems Applications and A System Planning Model*, Procedia Computer Science, 158, 1058-66, 2019.
- [17] Summers, A.E. *Continuous improvement and existing safety systems*. Journal of Loss Prevention in the Process Industries, 22(6), 685-8, 2009.
- [18] BS OHSAS 18001:2007, *Occupational health and safety management systems. Requirements*.
- [19] PN-N-18001:2018, *Systemy zarządzania bezpieczeństwem i higieną pracy. Wymagania (Occupational health and safety management systems. Requirements)*.

#### **ADAPTAREA SISTEMULUI DE MANAGEMENT LA CERINȚELE ISO 45001: IMPLEMENTAREA GHIDURILOR PENTRU PERFEȚIONAREA CONTINUĂ**

*Managementul eficient al siguranței în muncă necesită utilizarea unor soluții bazate pe perfecționarea continuă. În același timp, este necesar să se introducă îmbunătățiri care sunt apreciate ca importante pentru a fi îndeplinite cerințele de siguranță a muncii. Pentru atingerea cu succes a rezultatelor dorite de către sistemul de management, problema cea mai importantă este cea de identificare a factorilor care ar putea afecta negativ desfășurarea demersurilor inițiate. Conformitatea solicitată, natura unor posibile nereguli și setul de acțiuni de perfecționare sunt aspecte necesar a fi abordate pentru a se asigura îndeplinirea în siguranță a sarcinilor de producție și ele sunt ilustrate în cazul a două companii. Articolul este un studiu de caz în care sunt identificate și aplicate soluții adecvate de adaptare a sistemelor de management, pentru a fi în concordanță cu cerințele standardului ISO 45001.*

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