# Accidents at work, the effectiveness of certified management systems

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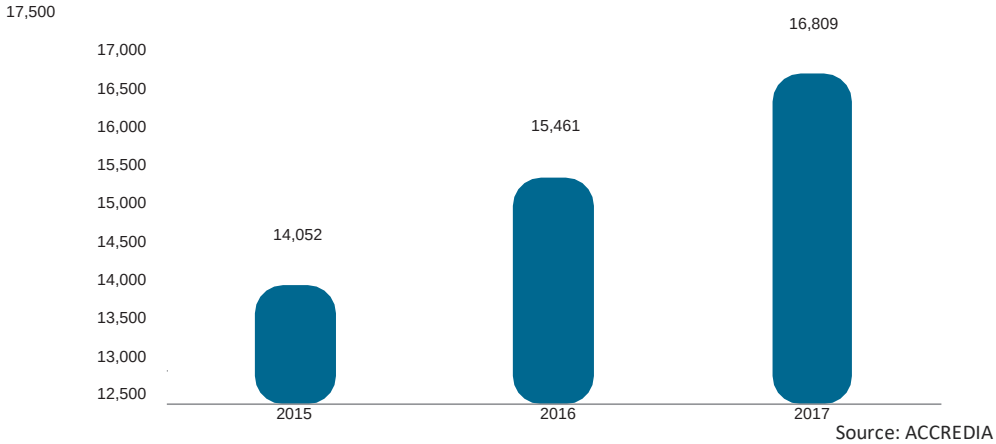
## The scenario of BS OHSAS 18001 certified companies

Since the *Guidelines for Occupational Health and Safety Management Systems - OHSMS* were published in 2001, the spread of safety management systems in companies has been increasing. A further impetus came with the issuance of the ACCREDIA Technical Regulation RT-12 on the accreditation of the certification bodies for occupational health and safety management systems, which in Italy has regulated the accreditation and certification activities of THE OHSMSs certified according to BS OHSAS 18001 standard.

The spreading of these systems has been continuously promoted and supported, including by way of legislation, including, inter alia, Art. 30 of Legislative Decree no. 81/2008, as well as the financial and insurance support initiatives put in place by INAIL.

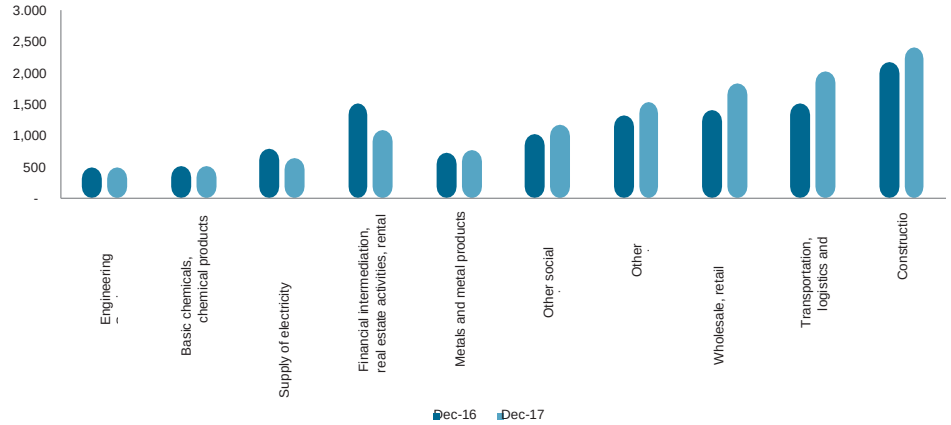
The analysis of the last three years shows a gradual increase in the number of companies that have chosen to certify their occupational health and safety management system according with BS OHSAS 18001:2007 standard. This growing trend has brought the population of certified companies to a total of 16,809 as of 31 December 2017, with a variation of +8.7% compared to 2016 (Fig. 1).

**Figure 1 - Companies with a management system certified according to BS OHSAS 18001 standard**




Source: ACCREDIA

**Figure 2 - Top 10 IAF sectors by number of companies certified according to BS OHSAS 18001 standard**




Source: ACCREDIA

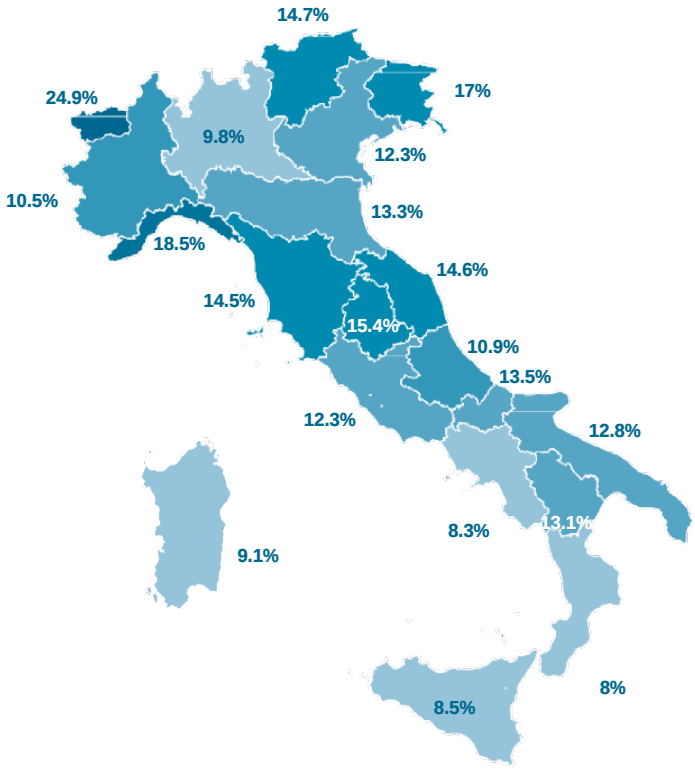
Consistently, over the last year the number of certifications has increased in the activity sectors (IAF sectors) that concentrate most of the certified companies. In particular, three economic activity sectors are growing more than the others are (fig. 2), namely construction (+10.2% certified companies), transport, logistics and communications (+34.5% certified companies), as well as wholesale and retail trade (29.6% certified companies).

The analysis of data on certified companies by region shows that greater attention is paid to occupational safety management in Valle d'Aosta (24,9%), Liguria (18.5%), Friuli Venezia Giulia (17.0%) and Trentino Alto Adige (14.7%) in northern Italy, Umbria (15.4%), Marche (14.6%) and Tuscany (14.5%) in central Italy, and Molise (13.5%), Basilicata (13.1%) and Puglia (12.8%) in southern Italy. These figures are derived from the share of companies whose management system is certified according to BS OHSAS 18001 standard, compared to the total number of companies with a certified management system (fig. 3). The indicator neutralises the distortion caused by the concentration of companies in the northern regions.

However, this progressive spread, albeit very positive, concerns a lower percentage of companies than would be desirable.

It is necessary to increase awareness that workplace improvements are an investment and not a cost, and that occupational health and safety must be managed in a way that is integrated with the overall management of the company, in order to tip the balance towards greater sensitivity to these issues. Indeed, improving the health and safety of workers can bring interesting financial benefits for both the company and society as a whole. However, it is not always a simple task to convince employers – as well as decision makers – that improving working conditions may increase their profits. To effectively convince them, it is therefore useful to support these statements with quantitative estimates.

**Figure 3 - Share of companies certified according to BS OHSAS 18001 standard, out of the total number of companies with certified management systems**




Source: ACCREDIA

## Studying the effectiveness of management systems: analysis and data

To this end, in 2012 INAIL conducted a first study on the effectiveness of occupational safety management systems, aimed at quantitatively measuring the benefit that companies obtain from adopting a management system certified according with BS OHSAS 18001:2007 standard by ACCREDIA-notified bodies. That study showed that the certified companies obtained a clear advantage in terms of reducing the number of injuries. The reference data used by the said study concerned the certified population

in the years 2007-2009, and despite the number of the certified companies included in the sampling was small, the results were very encouraging. A few years later, the question that gave rise to the previous study once again comes to the fore: do certified management systems really have an effect on the injury performance of companies?

Today, the business environment is completely different compared to those years: outsourcing has become more important, the use of the internet and smartphones has led to a profound evolution of business activities, and the financial crisis took away resources from companies; at the same time, the number of certified companies has increased significantly.

Therefore, it is important to repeat this type of study after some time.

In order to avoid misleading results it is essential to compare *similar sets* whose only difference, if detected, is definitively attributable to the phenomenon under investigation. For this reason, a counterfactual approach was used.

This approach answers questions aimed at proving the extent and sign of the net effects of an intervention: does the intervention produce positive or negative effects? To what extent? Are the changes observed really attributable to the intervention? It is not necessary, on the other hand, to give answers regarding the mechanisms that can generate effects or circumstances in which greater effects may be produced.

Answering these questions necessarily requires access to the data of two well-defined types: on the one hand, the possibility should be taken into account of investigating the accidents of companies with a basic level of safety; on the other hand, it is necessary to construct a set of companies that are compatible with the first ones and have adopted a *certified* workplace accident management system.

The construction of the two samples must be linked to the type of phenomenon that is being investigated; the results we aim to identify are not at all clear because of the uniqueness of the phenomenon being the subject of our study. An accident is fortunately a rare event and its characteristics are often also fortuitous and not only depend on the type of company involved.

In particular, when investigating accidents in *virtuous* companies, we are faced with certified companies that have an injury rate very close to zero. This implies that by intersecting the two sets made up of the *certified* company data and the characteristic of *accident infrequency*, it is should be expected that in some types of companies included in this intersection, when there is even just one accident, the injury rate of the company involved suddenly gets worse.

By way of example, the increase from 0 to 1 accident in a virtuous company, equal to a 100% increase, affects the overall average to an extent that is proportionally higher than the effect of a decrease from 100 to 75 accidents in another company.

This is because the analyses take into account the accident incidence by company and not the total number of accidents.

The analysis on the two reference samples was carried out by highlighting two accident indexes for both samples: the *accident frequency* index, which accounts for the average number of accidents that occur out of a total of 1000 employees, and the *severity ratio*, which measures the percentage of serious and fatal accidents out of the total number of accidents.

They were taken into account the occupational injuries recognised by INAIL, net of accidents occurring on the home-workplace-home route (commuting accidents). ACCREDIA has provided a list of the VAT ID numbers of companies certified in 2012, 2013 and 2014.

The next step was to extrapolate, from this list, as much information as possible on accident characteristics as well as the related INAIL classification.

**Table 1 - Comparison between the accident indexes of certified companies vs non-certified companies by INAIL's tariff Large Group.**

| | Accident frequency indexes | | | Percentage of serious accidents out of the total of defined accidents | | |
|---|---|---|---|---|---|---|
| | Certified companies | Non-Certified companies | Percentage variation | Certified companies | Non-Certified companies | Percentage variation |
| Large Group 0 | 17.1 | 18.8 | -9.0 | 3.9 | 5.1 | -23.5 |
| Large Group 1 | 23.1 | 26.2 | -11.8 | 4.0 | 7.4 | -45.9 |
| Large Group 2 | 13.1 | 19.4 | -32.5 | 2.6 | 5.0 | -48.0 |
| Large Group 3 | 25.4 | 28.3 | -10.2 | 8.3 | 11.2 | -25.9 |
| Large Group 4 | 16.6 | 21.1 | -21.3 | 1.8 | 5.8 | -69.0 |
| Large Group 5 | 30.1 | 32.4 | -7.1 | 3.6 | 9.4 | -61.7 |
| Large Group 6 | 17.4 | 23.6 | -26.3 | 1.7 | 5.6 | -69.6 |
| Large Group 7 | 17.8 | 33.1 | -46.2 | 4.8 | 8.7 | -44.8 |
| Large Group 8 | 9.6 | 10.7 | -10.3 | 5.1 | 7.3 | -30.1 |
| Large Group 9 | 25.9 | 31.4 | -17.5 | 2.2 | 6.7 | -67.2 |
| All sectors | 18.1 | 21.5 | -15.8 | 3.5 | 5.8 | -39.7 |

As is known, in the INAIL archives the same VAT ID number may refer to several 'PAT' local insurance codes (PAT, *Posizione Assicurativa Territoriale*) which can also belong to different regions and have their own tariff classification.

In particular, a total of 25,362 PATs were identified in the 2012-2014 three-year period. The comparison of the accident data of such a large population has led to the results shown in Table 1.

The data was grouped by INAIL's tariff Large Group (LG)[6].

The type of study carried out attempted to measure the so-called *effect* of preventative policies on the nature of accident trends.

In this case, the so-called *effect* is the consequence of an intervention, i.e., certification.

The work carried out upstream of the calculation of indexes is essential to ensure that the results are as much as possible comparable between the two samples. The construction of completely homogeneous samples is at the basis of producing non-misleading results.

[6] *Ministerial Decree 12/12/2000.*

In the two samples used, the only difference (*unknown*) on which differentiation was measured was the type of effect attributable to the company being certified or not. Therefore, the vector of the *frequency* and *severity* indexes specularly obtained in the two samples is no other than the quantitative measurement of the effect produced by the intervention.

In particular, it is found that in all sectors, shifting from a basic level of safety to a certified level of safety results in a reduction in the *accident indexes* by about 16%. This value is diversified according to the INAIL tariff classification considered.

On the other hand, as regards the *severity indexes*, accident severity is 40% lower in certified companies.

The following statement simplifies the combined reading of the two indexes:

> "16% less accidents occur in certified companies; and when an accident occurs in a certified company, this is, in 40% of cases, less severe than the same accident occurring in a company with a basic level of safety".

The data on the reduction of accidents confirm the effectiveness of the organisation management approach and of the OHSMSs recognised with accreditation certificates as a forecasting methodology, but still some differences emerge which deserve some reflections.

## Comments and conclusions

Firstly, it is important to note that the reduction is lower for the *accident frequency* index than for the *accident severity* index. This may be attributed to the fact that the preventive and protective measures put in place by an organisation are sometimes less effective in preventing those small, minor injury that mainly occur not because of hazardous operations or use of specific equipment, but because of trivial accidents, such as slipping on floors, bumps, and the like.

In this sense, it is realistic to think that a greater effectiveness in the prevention of major accidents translates into a tangible impact on the reduction of the *severity* index, whereas the *frequency* index includes a certain number of minor accidents. This is particularly evident in certain sectors such as that of wood (LG 5) - characterised by a reduction by just 7% of the *frequency* index, while the *severity* index reaches 61% - and that of textiles (LG 8) - which records a 10% reduction in the *frequency* index and 30% in the *severity* index. To support these hypotheses, a study was carried out that investigated the causes of accidents in the said sectors. The INAIL data for the four-year period 2012-2015 showed a considerable percentage of accidents related to the following ESAW causes[7]: *Fall of a person and movement without physical effort*, both in textiles and wood. In the latter there is also a significant number of accidents related to the *total or partial loss of control of the tool/object* which, together with accidents due the other cause mentioned, constitute 63% of the causes of accidents in the sector.

[7] *European Statistic of Accidents at Work.*

This phenomenon probably can be explained differently in other productive sectors. It is in fact well-known that in general, the certification system under some aspects is de facto a system for classifying companies. This is obviously not the system provided for by the Legislator in Art. 27 of Legislative Decree no. 81/2008, but there is no doubt that holding of certificates is more and more frequently included in the parameters used for selecting and/or assessing perspective goods suppliers and service providers[8].

With regard to certification of occupational health and safety management systems, this is particularly important when it comes to supplies specifically referring to in-house services. Companies are increasingly using use outsourcing for activities such as maintenance, warehouse management, general services, etc., not to mention the companies of productive sectors that are physiologically characterised by a mixture of businesses, as is the case for construction sites. Therefore, there are sectors such as those of the LG 0 (services) or LG3 (construction) that make a wide use of contractors. It is realistic to think that in these contexts some organisations resort to certification not so much due to a conscious decision consistent with their corporate policies, but simply due to market needs.

It is believed that in these sectors, due to the wide use of outsourcing, attention should be focussed on ensuring utmost seriousness and credibility of certification, in order to generate a virtuous flow between companies in the contract chain and improve the indexes shown in the table (table 1).

It is not by chance that the ISO 45001 standard devotes an entire paragraph to outsourcing safety management, which is completely neglected in the BS OHSAS 18001 standard. These aspects will therefore be particularly important in the imminent migration phase of certificates from BS OHSAS 18001 to ISO 45001, and especially in view of the probable and realistic appearance on the Italian market of companies from any part of the world that can boast ISO certificates.

This is a completely new scenario, which will facilitate Italian and European companies on the global market, but at the same time will also protecting the competition of both European or non-European companies in our market. It will therefore be necessary for the certificates issued in different countries to maintain a comparable level of credibility. Actually, certificates issued according to ISO 45001 standard cannot risk also becoming a laissez-passer for companies which, despite their boasting this certificate, may not guarantee the same level of occupational health and safety that we expect from our employers and companies.

For this reason, the publication of the international accreditation and certification documents on occupational health and safety management systems - EA 3/13 and IAF 22:2018 – together with that of the ISO/IEC 17021-1 standard can only be positive. These new documents, drawn up on the basis of the experience gained in Italy with SINCERT-ACCREDIA Technical Regulation RT-12, are the beginning of a process aimed at regulating the certification market in a unique way in the EU and worldwide, in a context that has never been regulated before.

[8] *Actually, certification if often required by public calls for tenders issued pursuant to Legislative Decree no. 50/2016, by private and formal selection procedures, or simply by the selection criteria used by organisations. Certification is required in particular of the quality management system according to ISO 9001, the environmental management system pursuant to ISO 14001, in addition to other more specific certificates depending on the type of goods or services to be purchased.*

# Conclusions

Thinking about growth in terms of sustainability today means implementing policies that are compatible with a long-lasting economic impact.
The level of consensus on sustainable development issues has grown over the years and the *Global Sustainable Agenda* approved by the United Nations in September 2015 set 17 goals - *Sustainable Development Goals, SDGs* - to follow the path of sustainability. These are goals shared between countries and aimed at achieving higher standards of economic productivity "with particular attention to labour-intensive sectors". Among the sustainable development goals, the UN agenda provides the incentive for "lasting, inclusive and sustainable economic growth, full and productive employment and decent work for all".

The issue of occupational health and safety in the global context therefore becomes the impetus for an increase in productivity and for the promotion of a production model that protects the worker.

Over the years in Italy, the approach to safety has shifted from a formal-legislative approach to the promotion of a more organic system, involving the company at all levels, paying close attention to actions aimed at preventing accidents. In this context, it is essential to involve the entire company structure, so that sensitivity to and awareness of safety issues increase and the company promotes a preventative approach that is increasingly targeted and directed towards the workers, putting them at the centre of the protection.

Legislative Decree no. 626/1994 was already a step towards a comprehensive regulation of occupational safety, but it was actually with Legislative Decree no. 81/2008 that the whole matter of occupational health and safety was arranged into an organic body.

The current approach takes into consideration the continuous changes and evolution of the context, providing for the identification of factors and sources of risk, also through the constant monitoring of the preventative measures implemented. Corporate risk management strategies for occupational health and safety of workers must consider all the factors that affect their means of production, from the technology used to corporate organisation. The responsibilities and figures involved in safety management are also clearly defined. The individual is put at the centre as the recipient of a protection which is aimed not only at occupational health and safety, but goes further to include the occupational well-being of each party involved.

A dynamic and evolutionary approach is required which takes into account, inter alia, the economic and financial context of reference of the company.

It emerges the importance of a management system in which safety is a permanent approach and prevention is a corporate value that involves all parties and takes into account the growing complexity of the markets. This complexity should be tackled with management models that integrate prevention within production processes as a factor of organisational impulse and competitive advantage for companies.

The positive evolution of the regulatory framework makes it necessary for companies to immediately be able to use efficient and authoritative tools to effectively support preventative safety management actions, while ensuring legislative compliance.

The certification of occupational health and safety management systems, also supported by INAIL with various forms of incentive, issued by ACCREDIA notified bodies, guarantees the authority necessary for the international recognition of these tools.

In this sense, management systems certified according to BS OHSAS 18001 –especially when accreditation certified - have

set the course to follow. Since the certification was established in the early 2000s, and subsequently with the 2007 edition of the standard, management aspects of risk assessment have been strengthened, enhancing worker participation. The possession of a management system certified in this way by notified bodies is aimed at increasing the effectiveness of preventive actions through the involvement of the entire company structure and reducing the accident indexes. The INAIL study on *Infortuni sul lavoro, l'efficacia dei sistemi di gestione certificati (Accidents at work, the efficiency of certified management systems)* quantifies this effect, confirming lower incidence and severity of the accident event in accreditation certified companies.

The survey on *Certificazione per la salute e sicurezza sul lavoro, l'esperienza delle imprese (Occupational health and safety certification, the experience of companies),* carried out with AICQ, analysed a sample of certified companies and confirmed the improvement of accident management following certification of the management system. Performance was improved, in most cases, through a reorganisation of the governance and thanks to greater involvement of personnel, which led to a significant increase in safety skills. The correct safety management and investment in a certified management system also led to an increase in competitiveness linked to the improvement of the corporate image.

In additions, questionnaires demonstrated a greater efficiency of internal processes, due to the integration with other management systems, typically those of quality and the environment. This integration has generated virtuous processes of continuous improvement in a business context in which economies of scale and the interrelations between management systems have changed face of the organisational context. These aspects were particularly useful to promote the increase in productivity necessary to compete on a global scale.

The new ISO 45001 standard takes into account integration of the OHSMS with other management systems, thus facilitating them and supporting the consultation and participation of workers in the management system, aiding the affirmation of a company culture of prevention based on active involvement and participation of all protected parties. Moreover, the international recognition guaranteed by an ISO standard allows easier recognition of safety values among companies operating in integrated markets.

The participatory approach to safety, which is achieved through the management system, leads the company to surpass a merely *technical* vision of safety in the workplace, and takes root in a culture of the necessity of prevention, not only for the protection of the health and safety of workers, but also for greater productivity. This therefore creates a culture of safety and leads to its stable inclusion in corporate strategies, thus abating to accidents.

In this framework, INAIL, the only authority of reference in the Italian institutional system for this specific kind of issues, builds and spreads the culture of prevention and safety at the national level, in the belief that this is the necessary and indispensable ground for the implementation of any preventative practice, with the aim of directing individual and collective behaviour toward the reduction or elimination of risks.

Safety means not only the application of rules for the protection of people's health, but also entails the construction of intervention strategies focussed on training, the organisation of work and incentive systems for the improvement of working conditions, as well as an efficient social security and insurance system that favours the rehabilitation and reintegration into the civil and labour of occupational accident victims and technopaths.

Health and safety can no longer be considered only as an opportunity or simple elements of business management. They must become the norm in production activity, and the latter must consider the health of workers as an essential factor for business development.