Integrating management systems in the energy sector: the case of the electricity industry in New Zealand

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Abstract

The New Zealand Electricity Engineers Association (EEA) asked for advice about development of a guide for a public safety management system (PSMS) for electricity distribution networks based on ISO45001 Occupational health and safety management systems. This would help eliminate overlap between legislation and standards while maintaining compliance with legal requirements. At Victoria University of Wellington we have been working on such an integrated approach and this article reports on the project and suggests how the results can be extended to include other areas of management while retaining the ability for appropriate elements to be audited and certified in accordance with systems required by legislation.

The project reviewed an earlier report and literature review on PSMS for the Electricity Networks Association. Development of the legal requirements for a PSMS were reviewed and use of the International Standards Organization (ISO) framework for all management system standards proposed to encompass ISO45001 and similar standards. Relevant management content was incorporated in the high-level structure and key stakeholders contributed technical content.

Use of the ISO Annex SL as a template enabled development of an integrated management system incorporating other management system standards, that would still support legal compliance while enabling elimination of duplication and clutter, and waste of resources at a time of technology change.

The work was carried out in New Zealand (NZ) and may not apply in other countries with different legal requirements. Auditors may resist integrated management systems although this may not be a limitation if documentation is appropriately written.

The electricity networks businesses in NZ may move to implementation of the PSMS guide but this will be an internal decision and results may take some years to declutter documentation and reduce overlapping audits under management system standards.

Over the next decade the context of the New Zealand electricity industry will undergo major shifts with the need to adapt to increasing expectations for occupational health and safety and public safety, adaptation to climate change and accelerated implementation of new technologies. The electricity industry will need to apply its resources to those changes while avoiding duplicated efforts to implement multiple management systems.

Developing an integrated management system that incorporates several management systems and public safety may aid protection of non-workers who cannot otherwise be “controlled” by a business.

Key words

Safety management system; integrated management system; public safety; ISO45001

Introduction: Problem and suggested solution

In 2021 the New Zealand (NZ) Electricity Engineers Association (EEA) considered that members working in electricity transmission and distribution might be attempting to reconcile and be audited against standards covering occupational and public safety, asset management, environmental management and quality management – as well as compliance with a range of legislation. The EEA asked this author to develop a guide aligned with ISO45001 (2018) Occupational health and safety management systems. However, this author proposed the project use Annex SL (ISO/IEC Annex SL, 2020) as the high level structure of the guide because it offered interoperability with other ISO management system standards. This was accepted and the guide was drafted over a nine-month period. The management content used guidance drawn from research and published standards based on Annex SL and technical content was developed by members of the EEA.

The PSMS guide was developed as a source of guidance for practicing engineers (Main & Frantz, 1994) with specific reference to public safety but it explicitly states it is not intended to be a standard. It was anticipated it would aid risk management (Ciocoiu & Dobrea, 2010), enhance trust in public safety networks (Kozuch & Sienkiewicz-Małyjurek, 2022), help demonstrate self-regulation at a national and enterprise level but within an international standards framework (Mattli & Büthe, 2003), and lead to prevention of injuries to non-workers and third party property damage (Hayes et al., 2022) as required by the NZ Electricity Act.

For the guide to be effective in building such "collaborative trust" (Kozuch & Sienkiewicz-Małyjurek, 2022) it would need to be acceptable to autonomous electricity network companies that already shared rules and knowledge, and that might provide mutual aid following natural disasters (eg, storms, floods, earthquakes, volcanic eruptions).

The guide would also need to contribute to compliance with the duty of care under the Health and Safety at Work Act 2015 (HSWA). This Act introduced the term, the "person controlling a business or undertaking" (PCBU), and the requirement for PCBUs that share the same duty to "consult, co-operate with and co-ordinate activities". This is applicable to electricity distribution companies that provide mutual aid or contract to another electricity distribution company for delivery of some services.

Validation of the approach: the literature

To aid validation of the PSMS guide the earlier rapid literature review (Peace, 2010) was updated using a further rapid literature review for the term "public safety management system" and similar terms. Although some relevant articles were found and used to update and expand the 2010 work, no research on a public safety management system was found.

Current regulatory framework

In common with some other deregulated economies, NZ has developed a state-owned national grid for the transmission of high voltage electricity to local distribution companies delivering lower voltage electricity to consumers. The distribution companies have local monopolies but are regulated by the NZ Commerce Commission and Electricity Authority. Occupational health and safety are regulated by WorkSafe NZ with public safety under the oversight of a specialist "Energy Safety" unit, previously part of the-then Ministry of Economic Development.

A need for public safety changes?

In the late 1990s the New Zealand Ministry of Economic Development (MED) reviewed the safety regime for electricity and gas work and circulated a discussion paper and options for improvement (MED, 1997). The paper was not supported by statistical evidence of injuries or deaths to show a need for change but did show the-then key statutes (Electricity Act, 1992; and Health and Safety in Employment Act, 1992 (HSIEA)) overlapped in places but left gaps in other areas. Four options for change were suggested:

"1. enhanced status quo (incremental improvement)

2. changing the way the occupations were regulated

3. regulation of electricity and gas work through alternative regulatory regimes

4. maintaining a minimum level of public and consumer safety through the electricity and gas legislation but providing for alternatives based on compliance with other legislation."

The report favoured a combination of options 2 and 4.

A subsequent review of harm to members of the public in the period 1996-2005 (Peace, 2010) found 11 fatalities and 56 injuries due to electric shock. These included: harm while climbing onto the roof of trains, committing vandalism and attempted theft of cables. This level of harm was considerably below the number of road deaths per year and the number of work-related deaths per year.

A subsequent report (MED, 1999) recommended that the HSIEA be seen as paramount governing safety when electrical and gas work was being carried out. Other legislation should be aligned with that principle but the accountabilities for electrical and gas safety should be codified in legislation. The proposed changes should ensure public safety (which was not explicitly covered by the HSIEA). Implementation of some of these changes through a requirement for a public safety management system (PSMS) began to be discussed.

While a Bill to amend the Electricity Act was being drafted explanations of the proposed changes and some definitions were made public, including (MED, 2007a):

> *"Owners of electricity and gas supply systems will be required to implement and maintain safety management systems that ensure the electricity or gas supply system does not present a significant risk of (1) serious electrical harm to any member of the public; or (2) significant damage to any property".*

A discussion document (MED, 2007b) noted that:

> *"The concept of safety management systems is relatively broad and can cover a variety of aspects from public safety to environmental safety and worker safety. The Electricity Act's requirements are specifically with respect to public safety".*

It was also noted that:

> *"This does not prevent a company from having a SMS [safety management system] which addresses more than public safety matters … for example, with respect to worker safety".*

Electricity Act 1992 and Regulations

The Electricity Act was amended in 2010 to align it with the requirement in the HSIEA to take "all practicable steps" (a requirement unique to NZ).

Regulations made under the Electricity Act required a performance-based, "risk management" approach that relied on the management of hazards (Electricity (Safety) Regulations, 2010). The Regulations required: systematic identification of new and existing hazards; taking all practicable steps to eliminate, isolate or minimise those hazards; regular assessment of each hazard identified; documentation of the safety management system (SMS); and audit of the SMS. The SMS regulations could also make additional requirements. However, following the Pike River disaster (Macfie, 2021) and subsequent implementation of a replacement for the HSIEA (the Health and Safety at Work Act, 2015 (HSWA)) these requirements were further amended to align them with the "reasonably practicable" test and duties in the new Act (Peace et al., 2019).

NZS7901 Electricity and gas industries – Safety management systems for public safety

The NZ standard *Electricity and gas industries – Safety management systems for public safety* (NZS7901, 2008) was written to align it with the requirements of the 2010 Safety Regulations. However, during a late stage in drafting it was found that the section on risk management did not conform with the-then joint standard on risk management (SA/SNZ4360, 2004) and so was removed. This weakened NZS7901, and the subsequent withdrawal of SA/NZS4360 following publication of the international risk management standard (ISO31000, 2009) left NZS7901 stranded in relation to best practice for risk management.

NZS7901 was revised to overcome some weakness (NZS7901, 2014) but the International Standards Organization had begun to develop guidance on management system standards (ISO draft Guide 83, 2011) that led to a Directive for such standards (ISO/IEC Annex SL, 2012), now replaced by open access publication of a framework (ISO/IEC Annex SL, 2020) for such standards. This forms the basis of widely used management system standards (eg, ISO9001, 2015; and ISO55001, 2014) and the more recent standard for occupational health and safety management systems (ISO45001, 2018).

Content of a public safety management system

In 2010 in anticipation of an industry-led standard for a PSMS the Electricity Networks Association asked for guidance from this author leading to a rapid literature review to identify necessary content and how to develop a document that showed how to make a PSMS effective. The results (Peace, 2010) found no research about, or definition of, PSMS and a mixed picture of SMS effectiveness, issues discussed below.

What is a public safety management system?

In the absence of a definition for a PSMS it was necessary to draw on definitions for OHSMS, such as "A structured systematic means for ensuring that both general and particular aspects of what the organisation does are effectively managed to meet high standards of safety" (Waring, 1996, p. 17).

A systematic review of the effectiveness of voluntary and mandatory OHSMS interventions (Robson et al., 2007) suggested the following inclusive definition of an OHSMS.

> *"An OHSMS is the integrated set of organizational elements involved in the continuous cycle of planning, implementation, evaluation, and continual improvement, directed toward the abatement of occupational hazards in the workplace. Such elements include, but are not limited to, organizations' OHS relevant policies, goals and objectives, decision-making structures and practices, technical resources, accountability structures and practices, communication practices, hazard identification practices, training practices, hazard controls, quality assurance practices, evaluation practices, and organizational learning practices."*

Five basic characteristics of any OHSMS were identified as (Zwetsloot & Kuhl, 2013):

> *"(1) It includes all components of OSH that are relevant to the members of the organisation and the business process.*
>
> *(2) In principle, its functions are to: increase the effectiveness of OSH management; guarantee compliance with existing legislation; improve OSH performance. The OSH MS objectives are to be defined by the organisation and may include ethical, economic, legal, and organisational goals.*
>
> *(3) It is a holistic approach, specifying and requiring implementation of a series of elements and (positive) interactions between them.*
>
> *(4) It has provisions for system maintenance and continuity. The functioning of an OHS MS is evaluated on a regular basis (through OSH audits). A periodic review of its objectives and effectiveness is necessary to ensure continuous improvement.*
>
> *(5) Its outputs (OSH performance) are important to the evaluation of the management system."*

When the report commissioned by the ENA was completed in 2010, the joint Australia/New Zealand standard SA/SNZ 4804 (2001) *Occupational health and safety management systems - General guidelines on principles, systems and supporting techniques* and the associated SA/NZS 4801 (2001) *Occupational health and safety management systems – specification with guidance for use* defined occupational health and safety management system (OHSMS) as:

> *"That part of the overall management system which includes organisational structure, planning activities, responsibilities, practices, procedures, processes and resources for developing, implementing, achieving, reviewing and maintaining the OHS policy, and so managing the risks associated with the business of the organisation."*

These standards have now been replaced by ISO45001 (2018, since adopted in New Zealand as AS/NZS ISO45001) which defines an OHSMS as a "management system or part of a management system used to achieve the OHS policy".

Replacement of "occupational health and" with "public" in these definitions and analysis of ISO45001 suggested a PSMS needed to be structured and integrated with relevant policies, goals and objectives, decision-making structures and practices, technical resources, accountability structures and practices, communication practices, hazard identification practices, training practices, hazard controls, quality assurance practices, evaluation practices, and organizational learning practices. The 2014 edition of NZS7901 did not meet these requirements.

Characteristics of successful safety management systems

Early work on successful occupational safety management programmes was based on a sample of businesses in Wisconsin nearly 50 years ago (Cohen, 1977; Cohen et al., 1975; Smith et al., 1978) and, while some of the success factors may be less relevant, management commitment to safety and engagement with workers (the "tone from the top") remain critical factors and help to manage "people" variables (Bornstein & Hart, 2010; Lindhout & Reniers, 2021).

The early research also showed that a workforce subject to less turnover, older workers with significant lengths of service in their jobs, and training and advancement were positive variables. It is conjectured here that these are characteristics that may be found in electricity transmission and distribution businesses where workers are subject to mandatory skills training and certification. Further research is needed to show if these are relevant to occupational health and safety and significant for public safety.

Characteristics of a successful OHSMs will also include (Bornstein & Hart, 2010): proactive, rather than reactive, risk management; integration of the OHSMS with other management systems; long-term focus on targets other than occupational safety alone; broadly-based monitoring processes rather than narrow auditing focused on short-term, easily counted outcomes.

Effectiveness of OHSMS

An Australian review of the effectiveness of OHSMS (Gallagher et al., 2001) found no conclusive evidence in favour of OHSMS. The researchers noted that methods for evaluation of an OHSMS need to take account of method of establishment (voluntary or mandatory); principal OHS control strategy (safe person/safe place); management structure and style (innovative or traditional); level of system development (meeting basic specifications or stakeholder needs); and degree of implementation (introductory or fully operational). The researchers concluded that barriers to successful implementation of any OHSMS were system design faults including failure to consult with employees and lack of integration with general management functions and systems; inappropriate use of audit tools, which can induce system design faults; contextual constraints on OHSMS; sections of business or the workforce where implementation encounters special difficulties.

Research in the UK (Walker & Tait, 2004) found improvements in safety management in 24 small and medium enterprises that volunteered to be part of the study. However, the authors believed many of the components of each OHSMS were already in place before the study and the intervention worked mainly to bring them together in a system, perhaps another aspect of systems integration.

A systematic review of voluntary OHSMS studies (Robson et al., 2007) found one showing no improvements and six with some improvements, with reservations about methodologies in all but one of the studies. Two key concerns were: (1) bias on the part of the authors as some appeared to be advocates of OHSMS implementation; (2) bias on the part of organisations participating in the studies as they volunteered and may have had a bias towards success. Robson et al concluded that:

> *"… despite the generally positive results on the effectiveness of OHSMS interventions in the published, peer-reviewed literature, the evidence is insufficient to make recommendations either in favour of or against OHSMSs. This is not to judge these systems as ineffective or undesirable; it is merely to say that it would be incautious to judge either way in the present state of our research knowledge".*

Other research shows (Bornstein & Hart, 2010): "off-the-shelf" voluntary management systems may not fit specific workplaces; "off-the-shelf" systems produce apparently impressive results that are not supported by detailed analysis (an issue identified by other researchers); conventional auditing systems tend to look for predefined "programmes, policies and barriers" rather than questioning if the OHSMS is adequate in design and assumptions; some OHSMS produce a façade of self-regulation and a reduction in employee involvement.

In New Zealand such perceptions led to the development of SafePlus (WorkSafe NZ, 2017) which sets out performance requirements for more effective occupational health and safety. Although SafePlus was not developed using the Annex SL structure and is not a management system much of the content could be adapted into such a system. However, to date there has been no independent research validating SafePlus or comparing it with Annex SL or ISO45001.

Successful introduction of OHSMS into organisations is highly dependent on the institutional environment of the country (Rocha, 2010). Failure to recognise differences between countries may result in the "law of unintended consequences", for (p. 222):

> *"… firms in different countries have distinct possibilities to deal with the requirements of OHSMS, which in turn demands distinct institutional enforcement regimes for OHS: For instance, institutional mechanisms which compensate for the weak abilities of workers to interfere in OHS issues must be established".*

That is, the consultation and collaboration arrangements within a country need to be conducive to effective engagement with the people on whom the safety management system is focused. These findings were echoed in a paper on the effectiveness of OHSMS in SMEs in Spain (Arocena & Núñez, 2010) that concluded there was good evidence in favour of the use of OHSMS to help reduce workplace injuries and ill-health but that the effectiveness of an:

> *"… OHS system is determined by the quality of industrial relations, rate of unionization, intensity of price-based competition, access to public aid and training activities provided by the OHS public agencies, technology intensity, and the manual nature of workers' tasks".*

Thus, an apparently good proposal for mandatory safety management systems might result in no improvements or unexpected outcomes.

There appear to be differences between adopters and non-adopters of certified OHSMS (Uhrenholdt Madsen et al., 2022) with better OHS performance in certified workplaces than non-certified workplaces. This substantial study supported the assumption that certified OHSMS adopters provide a higher level of OHS management than non-adopters. However, some cases appeared to be "whitewashing" to apparently improve OHS performance and disguise performance failures, an issue reported in earlier research (Fernández-Muñiz et al., 2012).

Integration of management systems

As anticipated earlier (Asbury, 2014) Annex SL (ISO/IEC Annex SL, 2020) now provides a common framework for management system standards published by ISO with emerging evidence for the effectiveness of integration of management systems. Such an integrated approach to management systems is supported by the UK Institution of Occupational Safety and Health (IOSH, 2003) and might lead to a core management system supported by specialist systems for risk, safety, quality, environment, etc.

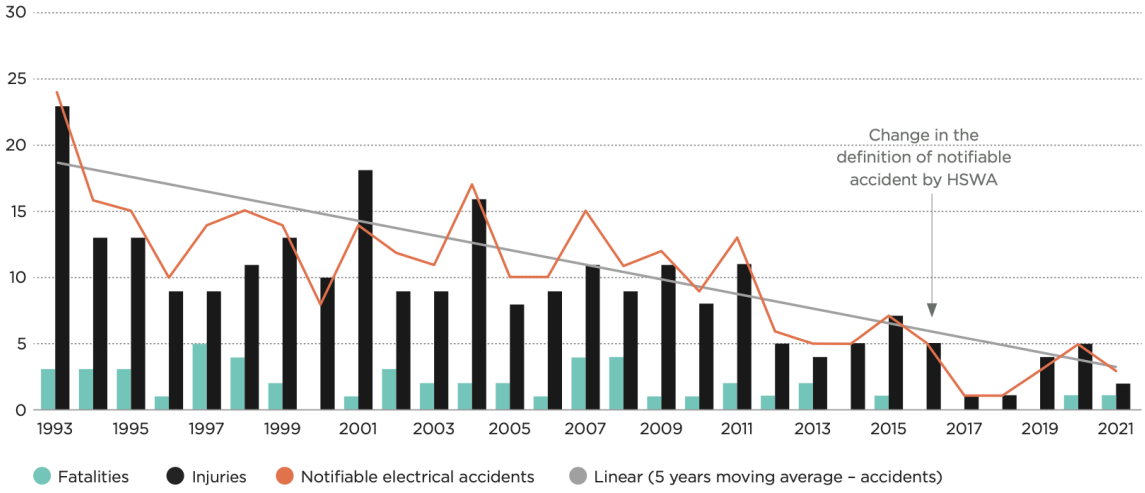
For example, three standards (*Quality management systems* (ISO9001, 2015), *Environmental management systems* (ISO14001, 2015), and *Occupational health and safety management systems* (ISO45001, 2018)) are often used in larger organisations (Zutshi & Sohal, 2005) with each based on the current or an earlier version of Annex SL. Integration of the three standards into a single standard might seem a logical step (Labodova, 2004) but could be fraught with difficulties for standards writers and users. Instead, such management system standards could be used to develop a single management system within an individual business or undertaking, or a sector. This would enable integration with other business management systems (Pojasek, 2006; Zutshi & Sohal, 2005), so reducing costs, and resulting in a more consistent and harmonised management process (Ferreira Rebelo et al., 2017), leading to "Total Safety Management" (Kontogiannis et al., 2017). Such an integrated management system could be extended to include corporate social responsibility (Asif et al., 2013).

This approach seems to be supported by research on integration of an OHSMS based on the International Labour Organization OHSMS guide (ILO, 2009) into an existing quality management system that was found to enable integrated controls, improvement in service delivery, reduction in work disruption, and reduced overheads (Peralta Cruz Daissy & Schneider Guataquí, 2018). In a Canadian study, organisations that had shared or joint management systems for OHS and operational practices were found to have better outcomes than organisations without joint systems (Tompa et al., 2016). Similar research using a single case study showed how management of safety, workers' compensation, short-term disability, long-term disability, health care, and absenteeism could be integrated, yielding benefits for the employer and workers (Bunn et al., 2001).

Current data on deaths and injuries due to electric shock

Energy Safety, part of WorkSafe NZ the main health and safety regulator, publishes an annual report that includes accidents, injuries and deaths involving electricity. The report for 2021 (Energy Safety, 2022) reports "an average of 1.7 fatalities per year" for the period 1993-2021 with no fatalities in the four years 2016-2019. Figure 1 is reproduced from the report for 2021. Using a five-year rolling average, it shows the number of notifiable accidents roughly halved between 2010 (when the requirement for a PSMS was introduced) and 2021. This was a continuation of the trend from 1993 (when the average was about 18.0 per year) to 2021. Over that 29-year period the population of New Zealand increased by 30% from 3.572 million to 5.084 million with a similar increase in construction of new buildings and infrastructure, suggesting factors other than the requirement for PSMS were involved in the reduction of accidents at least before 2010. These might include replacement of older network equipment with modern equipment having better safety built in.

Figure 1. Notifiable electrical accidents involving the public 1993-2021



Source: reproduced from figure 1A in the 2020 annual report of Energy Safety (2022)

The 2021 report also commented on differences between age groups with people under 17 being highly represented in injuries and fatalities over the 29-year period.

Summary of research evidence

OHSMS are applied with a controlled population (workers), often in controlled situations (the workplace) with inducements and sanctions available to enable desired behaviour. If OHSMS are effective, there ought to be a body of reliable research showing they work in such defined situations, yet Robson et al (2007) found only one describing voluntary OHSMS with positive benefits that met their standards for academic rigour. None of the mandatory OHSMS studies met their standards.

As noted, no peer-reviewed, published research on public safety management systems has been found. This leads to the conclusion there may be no such research evidence (not even negative or dubious evidence) that is comparable to that found by Robson et al. That is, there is no evidence in favour of a mandatory SMS for any type of public safety.

This is not to say that such an SMS will not work, rather the benefits may be hard to detect due to “noise” and variability in reporting. Statistics for the period 1993-2021, using the data gathered by Energy Safety (part of WorkSafe NZ, the regulatory agency), show that fatalities of members of the public who encountered electricity networks under the circumstances now covered by the statutory requirements for PSMS ranged from 0 to 2 per year with an average of 1.7 fatalities per year (Energy Safety, 2022). Such small numbers make it difficult to demonstrate any effect a PSMS may have on the number or severity of harmful events, especially with increases in population, changes in the economy, and updating of electricity distribution assets.

It is therefore uncertain whether implementation of safety management systems conforming with NZS 7901 and complying with the Electricity Amendment Act have produced any demonstrable benefit. It is possible (but by no means certain) that smaller, more focused interventions, integrated into each network company OHSMS, might reduce harm to members of the public due to unintended contact with electricity networks.

The Electricity Act requires either an audited PSMS or audited compliance with the Regulations. It does not prohibit integration of the PSMS into a larger or holistic management system. Despite the absence of evidence for OHSMS, the guide required by the Electricity Engineers Association was developed using Annex SL with additional guidance from ISO45001.

The published Public Safety Management System Guide

The PSMS guide was developed for and is published by the Electricity Engineers Association; the content (but not the structure) is copyright © the EEA. It is not a standard but is closely based on the structure of Annex SL and so is aligned with ISO14001, ISO9001, and ISO55001, and especially ISO45001. The guide incorporates features of successful safety management systems (eg, leadership) identified in research over much of the last

50 years, some of which were not in NZS7901 (2008, 2014), and was made available to EEA members in early 2022.

When adopted by electricity network businesses, it is hoped this will reduce the number of reportable accidents, injuries, and fatalities, and reduce compliance costs. Its close alignment with other management system standards will allow such businesses to choose how best to integrate public safety into its overall management system.

Corporate governance

Effective management of risk forms part of corporate governance. An integrated management system should therefore require verification by "top management", defined in Annex SL as the "person or group of people who directs and controls an organization". The NZ Health and Safety at Work Act 2015 makes relevant requirements for "officers" (directors and senior managers) to use due diligence to ensure that the PCBU complies with its general duties and obligations under the Act (Peace et al., 2017). The PSMS guide includes guidance covering top management and officers whereas NZS7901 gives no guidance.

Advantages of the Annex SL/ISO45001 framework

Use of the Annex SL/ISO45001 framework helped to identify content that should be included in the guide. For example, clauses 6.1.1 and 6.1.3 in ISO45001 refer to legal requirements, prompting consideration of legislation that might not obviously relate to public safety in relation to electricity generation and distribution. This helped identify the NZ Civil Defence Emergency Management Act (2002) which sets out post-event duties for the electricity sector in relation to public safety.

Audit issues

The Electricity Act and Electricity (Safety) Regulations require that a safety management system either complies with Regulations 49 and 50 or conforms with NZS7901. Although implementation of the guide will exceed the guidance in NZS7901, it will not enable certification by an auditor against that standard. However, certification under Regulations 49 and 50 can use the framework in the guide. Provided each of the components of an integrated management system are tagged to indicate which standard they conform with, auditors should find little difficulty seeking documents to review and stakeholders to interview relevant to a specific audit.

Further, because the guide is based on Annex SL, it is also possible for auditors to conduct audits under ISO19011 (2018) *Guidelines for auditing management systems*, so avoiding the need to develop "one-off" audit tools for the small number of businesses subject to NZS7901. It is hoped this will enable combined audits and assurance mapping (Gorrie, 2010; Paterson, 2009). Assurance mapping helps ensure "there is a comprehensive risk and assurance process with no duplicated effort or potential gaps" and to "understand where overall risk and assurance roles and accountabilities reside" (Paterson, 2009) and so may help to further reduce compliance costs.

Discussion

The PSMS approach required by the Electricity Act 2010 was not supported by a review of (1) the effectiveness of such systems or (2) whether the already low numbers of accidents, injuries and deaths involving the public would be further reduced by mandating a PSMS. Data from 1993-2020 (see Figure 1) suggests such mandatory PSMS, introduced in 2010, have had little discernible effect of the long-term trend of declining numbers of injuries and deaths 1993-2020.

It took more than 13 years (1997-2010) for the initial proposals to change from regulation of electrical workers to the requirement for PSMS. Were the utility for such PSMS to be successfully challenged now it might take the same length of time to repeal those requirements. Thus, the requirements should now be seen as giving rise to one aspect of an overall management system within the electricity generation and distribution sector rather than regulatory "clutter".

Early work (Cohen, 1977; Cohen et al., 1975; Smith et al., 1978) suggested that a workforce: subject to less turnover; with older workers with significant lengths of service in their jobs; training and advancement were positive variables in successful OHSMS. That research needs to be followed up in the New Zealand electricity industry as it has implications for New Zealand with a workforce that is changing to include foreign-trained workers having different cultural norms.

The statutory requirement for public safety management systems in the electricity industry (and parallel requirements in the gas industry) came into force in 2010 just before the Pike River disaster triggered a major review of occupational health and safety legislation (Macfie, 2021; Peace et al., 2019). The review led to repeal of the Health and Safety in Employment Act 1992 and its replacement with the Health and Safety at Work Act 2015 which includes requirements for public safety in section 36. Arguably, this removed the need for the statutory requirement for public safety management systems in the Electricity Act.

Implementing an integrated management system that incorporates the EEA guide described here should reduce compliance and conformance systems and enable better internal and external assurance systems, helping to move the focus from compliance to achievement of organisational objectives. It should also facilitate more oversight at a governance level at a time of considerable changes in technology owned by electricity businesses and their customers. This will allow appropriate oversight and decision making at a time of change in the sector.

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