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Lingard, H., Warmerdam, A., & Shooshtarian, S. (2019). Getting the balance right: Regulating occupational health and safety planning and coordination in the Australian construction industry. *Engineering, Construction and Architectural Management*, 26(4), 599–617. <https://doi.org/10.1108/ECAM-02-2018-0086>
Document Version: Accepted Manuscript

Published Version: <https://doi.org/10.1108/ECAM-02-2018-0086>

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Getting the balance right: Regulating occupational health and safety planning and coordination in the Australian construction industry

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Abstract

Purpose

In Australia, national harmonisation of occupational health and safety (OHS) regulation was pursued through the development of model Work Health and Safety legislation. The model Work Health and Safety Regulations specify that construction works above a threshold cost of AU\$250,000 are deemed to be construction projects requiring the appointment of a principal contractor with duties relating to OHS planning and coordination. The research explored the effectiveness of the monetary threshold as a suitable trigger for specific OHS planning and coordination duties.

Design

Interviews were conducted with 46 Australian construction industry stakeholders, including union representatives, employer groups, construction firm representatives and regulators, as well as four international construction OHS experts, to explore perceptions about the effectiveness of the monetary threshold. Two construction scenarios were also modelled to test for variability in operation of the threshold by geographical location of works and design conditions.

Findings

The monetary threshold was perceived to be subject to two forms of capture problem, reflecting inadvertent capture of low risk works or failure to capture high risk works. Organisations were also reported to deliberately split contracts to avoid capture by the threshold. The cost estimate modelling revealed inequalities and variation in the operation of the monetary threshold by geographic location and design specification.

Practical implications

The analysis suggests limitations inherent in the use of a monetary threshold to trigger duties relating to OHS planning and coordination in construction works. Opportunities to use more sophisticated risk-based mechanisms are considered.

Originality/value

The study explores a fundamental challenge of risk-based OHS regulation, i.e., how to ensure that workers' health and safety are adequately protected without creating an unnecessarily high regulatory burden. The research provides evidence that using a monetary value as a proxy measure for OHS risk in construction projects is problematic.

Introduction

The regulation of occupational health and safety in Australia

For the most part, occupational health and safety (OHS) in Australia is regulated at the level of the state or territory, with separate legislation covering Commonwealth Government employees, self-insured companies and maritime industry workers.

Historically there has been variation in the coverage and provisions of OHS legislation in the different jurisdictions within Australia (Safe Work Australia, 2011), which has long been acknowledged to be a problem. Windholz (2013a) describes how strategies to create a more nationally consistent approach have taken many twists and turns, reflecting changing relationships between the Commonwealth and state/territory governments and prevailing approaches to federalism.

The harmonisation of OHS laws became an important policy platform of the Rudd (then Gillard) Labor government, elected in 2007. Towards the end of 2007, the Council of Australian Governments agreed a new model of intergovernmental cooperation under which a national regulation reform agenda was developed. This focused on enhancing productivity and workforce mobility by reducing the costs of regulation. The harmonisation of OHS laws was a key element of this agenda and was intended to be achieved through the enactment in each jurisdiction of a model Act, Regulations and Codes of Practice, supported by a nationally consistent compliance and enforcement policy (Johnstone, 2008).

Yet Windholz and Hodge (2012) describe how stakeholder interests and political processes within the different Australian states and territories impacted the harmonisation process. Thus, despite significant reform and the attainment of a higher level of jurisdictional consistency, jurisdictional differences persist (Windholz, 2013b). In 2012, the target date set for the achievement of harmonisation, Tooma et al. (2012) commented: *“For legislative reform that was meant to be about providing clarity to a complex area...after four years of significant effort, it appears we may have been merely gifted more confusion and simply a different set of differences”* (no pagination).

In this paper jurisdictional variation in the operation of provisions contained in the model Work Health and Safety Regulations requiring the appointment of a principal contractor with responsibility for OHS planning and coordination in construction projects is discussed. In particular the research presented focused on the specification of a threshold definition of a construction project that triggers the application of these requirements.

Aim

The aim of the research was to investigate the adoption and operation of the threshold definition of a construction project that triggers the requirements to appoint a principal

contractor, who must then engage in planning and coordination activities relating to OHS. The model Work Health and Safety Regulations adopted a monetary threshold definition (i.e., works with a contract value of greater than AU\$250,000 would be captured but those valued at less than AU\$250,000 would be excluded). The model Work Health and Safety Regulations were not adopted in all jurisdictions. Further, adjustments to the monetary threshold have been made in several jurisdictions, creating substantial variation in the nature and type of construction works that are subject to the principal contractor OHS planning and coordination duties between states and territories.

Specifically, the research sought to answer the following questions:

- What are the advantages and disadvantages associated with utilising a monetary threshold definition to trigger legal duties relating to the management of OHS in construction projects?
- To what extent does the operation of the monetary threshold vary by geographic location and design specification and what is the likely impact of this variance?

The remainder of this paper is structured as follows. First, different approaches to the regulation of OHS are described and legislative duties for principal contractors are positioned within the Australian legislative framework. The literature relating to risk-based legislation and the role played by thresholds in determining the scope and coverage of legislation related to different types of risk is reviewed. The research methods are described and the results of 46 semi-structured interviews with Australian industry stakeholders and four interviews with international construction OHS experts are presented. This is supplemented with modelling in relation to two hypothetical construction works scenarios. The implications of the choice of threshold for the operation of risk-based regulation is then discussed with specific reference to the regulation of construction OHS. This discussion also addresses issues relating to the use of cost as a proxy measures of OHS risk and trade-offs associated with balancing expectations that OHS regulation is both effective and efficient, i.e., that workers' health and safety are adequately protected without creating an unnecessarily high regulatory burden (Hale et al. 2015).

Forms of OHS regulation

Gunningham (1996) identifies three approaches, which broadly reflect phases in the implementation of preventive OHS legislation. These are *specification* standards, *principle-based* standards, and *systems* standards. The requirements of early OHS legislation were expressed in the form of specification standards, which clearly informed duty holders how to achieve an outcome by describing in precise detail what must be done in order to comply. Gunningham (1996) suggests that specification standards are easy to interpret and understand. Also, in the absence of specification standards, a failure to comply may be evident only after an injury has occurred or an illness becomes evident. However, specification standards have been criticised for lacking flexibility, being ill-suited to certain types of occupational hazards (such as psychosocial hazards), and failing to provide an incentive to improve OHS performance above a minimum level of compliance.

As a result, OHS legislation Australia now reflects what Gunningham calls principle-based standards. Under principle-based standards, legislative responsibilities are expressed as general duties to eliminate or reduce OHS risk so far as is reasonably practicable. Framed in this way, general duties are sufficiently broad to cover emerging hazards and ensure that no new hazards fall 'between the cracks.' The general duties are adaptable, can accommodate

technological changes occurring within industrial processes and are concerned with creating a positive attitude towards the prevention of work-related injury and ill-health.

An additional feature of contemporary OHS legislation in many countries, including Australia, is the inclusion of systems standards or *process requirements* (Frick and Wren, 2000). Process standards require that a duty holder must follow a certain process in managing particular hazards or OHS generally. Similarly Coglianese and Lazer (2003) argue that management-based approaches intervene at the planning stage in productive processes requiring organizations to improve internal management to increase the achievement of public goals, e.g., the prevention of occupational death, injury or ill-health. This type of requirement goes further than establishing the general duties of obligation holders, and focuses attention on how OHS is being managed. Since the end of the 1980s, Walters (2001) observes that regulation of the management of OHS has been a prominent feature of legislation within the European Union (EU) and describes such requirements as ‘regulating self-regulation’. Gunningham and Sinclair (2009a; 2009b) suggest that management based regulation can be seen as a form of meta-regulation or meta-risk management in which, rather than regulating directly, Governments seek to “risk-manage the risk” of enterprises or activities (p. 4-5).

The requirements contained in the model Work Health and Safety Regulations for the appointment of a principal contractor with responsibility for OHS planning and coordination are an example of process requirements or management-based regulation. These are described below.

Duties in relation to the appointment of a principal contractor with responsibility for WHS planning and coordination

Section 6.4, Regulation 292 of the model Work Health and Safety Regulations contains the definition of a construction project. The model Regulations state that construction works which cost \$250,000 or more are construction projects. The operation of this definition imposes additional duties on the principal contractor, mostly related to planning and coordination of construction activities to ensure that OHS is effectively managed. These include:

- providing signage identifying the principal contractor (regulation 308),
- preparing a written work health and safety management plan, to be produced before work commences on site (regulation 309),
- ensuring (so far as reasonably practicable) that each person who is to carry out construction work in connection with the project is, before commencing work, made aware of the content of the work health and safety management plan and their right to inspect the plan (regulation 310),
- reviewing and updating the work health and safety management plan as necessary and ensuring (so far as reasonably practicable) that each person each person carrying out construction work in connection with the project is made aware of any revision to the work health and safety management plan (regulation 311),
- taking all reasonable steps to obtain a copy of the safe work method statement relating to high risk construction work before the high risk construction work commences (regulation 312),
- ensuring that a copy of the work health and safety management plan for the project is kept until the project is completed or, if a notifiable incident occurs in connection with the construction project, that the work health and safety management plan is kept for at least two years after the incident occurs (regulation 313), and

- ensuring compliance with other divisions of the Regulations (regulation 314) and for dealing with specific risks, such as the storage, movement and disposal of construction materials and waste, the storage of plant that is not in use, the management of traffic in the vicinity of the workplace and essential services (regulation 315).

Differences in thresholds used to trigger these duties in different Australian jurisdictions are shown in Table 1.

Table 1: Variation in threshold definitions applicable in different Australian jurisdictions

Jurisdiction	Threshold definition (trigger for principal contractor OHS planning and coordination duties)
Commonwealth	\$250,000
Northern Territory	\$500,000
Victoria	\$350,000
South Australia	\$450,000
New South Wales	\$250,000
Queensland	\$250,000
Australian Capital Territory	\$250,000 or more; or demolition or refurbishment of a structure containing loose-fill asbestos
Tasmania	\$250,000
Western Australia	‘five or more persons’ working or likely to be working at a worksite

Victoria and Western Australia chose not to adopt the model Work Health and Safety legislation. While the Victorian legislation has similar duties relating to the appointment of a principal contractor and development of an OHS management plan, from 2014 these duties were applicable to construction works costing greater than AU\$350,000. In Western Australia an alternative non-monetary threshold is used in Western Australia to trigger specific construction project-based management responsibilities. Thus, if ‘five or more persons’ are working or are likely to be working at a construction site, it is deemed to be a construction project for the purposes of the legislation. The threshold determining applicability of the principal contractor duties for OHS has also been increased in South Australia and the Northern Territory.

Risk-based regulation

Black (2005) states that ‘risk-based regulation’ has two distinct meanings that are sometimes confused. The first meaning refers to the regulation of risks to society. These can be risks to

health, safety, the environment, finance or privacy issues (Rothstein et al., 2006). Black argues, “*risk-based regulation has long been used by, for example the Health and Safety Executive, to determine whether or not an activity should be regulated, or what level of preventative measures firms should take*” (p. 514). The second (and newer) meaning of risk-based regulation identified by Black (2005) relates to the development of decision-making frameworks and procedures within public sector agencies to cope with resource limitations and to prioritise regulatory activities, e.g. inspection and enforcement, in response to an assessment of risk posed by certain types of activities or within certain types of organisation.

The discussion of the operation of the monetary threshold definition of a construction project in this article, is primarily dealing with the first meaning of risk-based regulation identified by Black (2005). However, policy decisions about inspection and enforcement of OHS regulation are also important. Tombs and Whyte (2013) argue that current regulatory orthodoxy positions enforcement and prosecution as a strategy of last resort for regulators and link this policy to a prevailing disillusionment with state-based regulation of OHS that has been perceived as heavy-handed, stifling and in need of reform (Hutter, 2001).

Deciding what should be regulated and the level and scope of regulation is a key function of government and an important public policy issue. Almond (2009) describes how the exercise of regulatory control over the conduct of individuals and organisations is a social process in which multiple messages are communicated to different audiences within society. Almond (2009) describes how regulation does not only have a directive function in requiring people to behave in a certain way, but it also communicates moral messages about behaviour that is desirable and acceptable within a society. Thus, these symbolic and expressive functions are important for a regulatory regime to maintain legitimacy. When law is believed to be excessive in its reach or overly bureaucratic, its legitimacy is questioned (Rothstein et al. 2006). In some instances widespread media discussion of heavy-handed regulatory intervention, for example the banning in schoolyards of the traditional game of ‘conkers’ without the wearing of protective eyewear, has created an antipathy towards OHS that undermines the credibility and effectiveness of regulation. Almond (2009) suggests that notions of ‘health and safety gone mad’ reflect a wider political agenda and vested business interests focused on reducing red tape and eliminating regulatory impediments to innovation and economic growth.

In making choices about the scope and coverage of risk-based regulation, policy-makers and legislators balance choices between making what Black (2005) calls Type I and Type II errors. Type I errors reflect an assumption that something is risky when it is not (i.e. erring on the side of caution). Type II errors reflect an assumption that something is safe when it is not. Regulatory regimes typically include or exclude activities from regulation by way of specifying thresholds. The development of the threshold is subject to the possibility of Type I and Type II errors depending on how it is framed.

The specification of thresholds in regulatory regimes

Thresholds establishing criteria for capture or exclusion in legislative provisions must also be established in such a way as to achieve the objectives of regulation without creating undesirable consequences. Sometimes achieving this balance is not easy. For example, Noonan (2010) discusses considerations in framing law to protect schoolchildren from cyberbullying without stifling schoolchildren’s rights to free speech. This required the formulation of a case law-based definitional threshold specifying at what point schools should intervene in a possible cyberbullying case.

Because societal risks are difficult to quantify, thresholds specified in regulatory regimes are often expressed using proxy indicators of risk. The use of proxy indicators to express regulatory thresholds has been criticised for failing to reflect the actual risk that a regulatory regime is intending to address. For example, European environmental regulation of nitrate in soil is specified as a maximum fertilisation rate, rather than a measure of nitrate concentration in ground water (Bouma, 2011).

The specification of thresholds in regulatory regimes can also have important economic and social consequences aside from impacting on the effectiveness of regulation. For example, in Germany the extension of the threshold for application of laws protecting employees against unfair dismissal to include businesses employing up to 10 persons (from an original threshold of five persons) from October 1996 to January 1999 resulted in a higher probability of persistence (in employment numbers) and a lower probability of growth in employment.

Thus, the specification and operation of thresholds in determining the scope and coverage of risk-based regulation are important public policy considerations.

Methods

Interview data collection and analysis

Semi-structured interviews were conducted with 46 Australian construction industry stakeholders and four international construction OHS experts. The latter were included to provide important insights into the benefits and disadvantages alternative regulatory mechanisms used outside Australia. Australian participants were recruited through Safe Work Australia, a national policy body representing state and territory government regulators, trade unions and employer groups. As a national policy body, Safe Work Australia does not regulate or enforce OHS legislation, yet is ideally suited to the recruitment of participants representing key stakeholder groups. A stratified sampling approach was developed by the research team to capture participants from all stakeholder groups and state/territory jurisdictions. Safe Work Australia then provided a list of contacts of potential participants identified through their membership. Potential participants were contacted up to three times to schedule an interview. If, on the third attempt, no contact was made, Safe Work Australia was asked to identify alternative participants in the appropriate stakeholder/jurisdictional group.

The interviews lasted between 60 and 90 minutes. Interview questions explored participants' perceptions of the effectiveness, advantages and disadvantages of the current financial threshold definition for a construction project. In particular they were asked whether any unintended consequences arose from the application of the monetary threshold.

The interviews were audio-recorded, transcribed and coded using NVivo 11. An initial coding list was developed and agreed between three researchers before data were subjected to thematic content analysis. The analysis was an iterative process that allowed new themes to emerge and, when necessary, triggered the refinement of original themes. As themes and sub-themes emerged, consensus between researchers was reached through group discussion. Inter-rater reliability was examined with a researcher external to the core team independently coding ten per cent of the transcripts. This initially resulted in 80 per cent agreement in coding, however, subsequent consensus was reached through a discussion relating to differences in interpretation of data.

Scenario cost estimation/modelling

Two case study scenarios were developed and subjected to cost-estimate modelling to determine the sensitivity of the monetary threshold of \$250,000 to geographic differences and design specifications. Scenarios were developed with reference to examples that were cited by interview participants and included the construction of a 2.5km long fence adjacent to a road and the construction of a ‘one-off’ single-storey dwelling. Cost estimates were developed based on the assumed gross floor area/length and the unit cost for the specific construction activity. The cost estimates were generated using the latest edition of Rawlinsons’ *Australian Construction Handbook* (Rawlinsons, 2017), which presents an extensive and detailed analysis of building/construction costs across different facility/structure types and regional variations. Where prices were presented in the form of a range for a given construction activity, the average price was used to estimate the estimated cost. Regional costs were estimated by adjusting the building price index (BPI) to the costs estimated for the capital city in each state/territory. The BPI reflects the potential higher logistics/transport and wage costs associated with construction in regional areas.

Results

Interview sample characteristics

A total of 46 representatives from the construction industry in Australia were interviewed. Four international construction OHS experts were also interviewed. The Australian stakeholder results are presented below as a separate data set before the international perspective is provided.

The Australian industry stakeholders had an average tenure of 12 years’ experience in construction and/or OHS roles. Each state and territory in Australia was represented in the sample. The majority of respondents were male ($n = 39$, 84.8%) with a mean age of 50 years (ranging from 31 to 64 years). Stakeholders and jurisdictions represented are presented in Table 2.

Table 2: Demographic characteristics of Australian construction industry interview participants

Sample characteristics		
Stakeholders represented	n	%
Employer/industry association	16	34.8
Regulator or government agency	14	30.43
Union	7	15.2
Private construction organisation	6	13.0
Union	7	15.2

Other	3	6.5
Jurisdiction represented		
Victoria	15	32.6
New South Wales	8	17.4
Australian Capital Territory	7	30.4
Queensland	4	8.7
Western Australia	3	6.5
South Australia	3	6.5
Tasmania	2	4.3
Northern Territory	2	4.3
Commonwealth	2	4.3

Perceived advantages of a monetary threshold definition

Table 3 shows the frequency with which participants identified particular advantages associated with the use of a monetary threshold definition to trigger the principal contractor duties for OHS planning and coordination in construction projects.

Participants perceived that the monetary threshold is simple, clear and easily understood. For example, one construction employer explained: “... *it’s construction work, it’s of a certain value, and then it triggers a certain requirement, it’s nice and simple.*” Participants also regarded the monetary threshold definition as being objective and not reliant on subjective interpretation. A representative of an industry association commented: “...*the problem is a lot of construction people are very black and white, so they’ll read things literally and not sort of consider it in a broader context. So you’ve got to keep it [the threshold] pretty simple.*”

Participants believed that the monetary threshold is easy to communicate to duty holders and also relevant to small businesses. An industry association representative explained: “...*and for the people like me who have to explain the responsibilities and what is the law to ‘Mums and Dads’ and just normal people who are trying to make a dollar and do business, this is applicable to them.*”

Participants expressed the view that construction industry stakeholders are comfortable with and accustomed to the monetary threshold definition. Participants commented that the requirements relating to the appointment and duties of a principal contractor are now well established and understood within the Australian construction industry. A regulator explained: “*There’s a monetary threshold and builders know what a contract value is and nobody seems to have any issues with it.*”

Twelve participants expressed the view that the monetary threshold of AU\$250,000 (i.e., that specified in the model Work Health and Safety Regulations) is an appropriate threshold to trigger the construction project OHS planning-related duties. Some suggested that AU\$250,000 is a reasonable value at which the OHS risk involved in a construction project could be expected to require additional planning and coordination effort. For example, a union representative commented: “...as far as we’re concerned, \$250,000 as a sort of a marker, is adequate.”

A representative of an industry association also observed that: “You can’t define it by the size of a block of land or the tallness of a building...so I think from that point of view it’s good to have a reasonable [monetary] figure.”

Participants also believed the monetary threshold to be easy to enforce. They argued that the definition is clear and it is therefore easy for a regulator to determine whether construction works fall within the scope of the legislative requirements for a construction project. It was suggested that this inclusion/exclusion could be easily verified by checking contract documentation. One regulator described the benefit of “being able to collect the evidence to establish that that project is indeed above the threshold if someone’s saying, ‘No it’s not’”.

Participants noted the salience of a monetary threshold definition, observing that defining a construction project in monetary terms is meaningful and relatable in the construction industry. An OHS specialist commented: “People would take notice of money in a way they will not of, five people in the construction, you do not think to stop and count, but you do think about the money.”

Table 3: Perceived advantages of the monetary threshold

Frequen cy	Perceived advantage
13	Simple/clear
13	Accepted by industry
12	An appropriate threshold to trigger OHS planning and coordination needs
7	Easy to enforce
6	Salient (because it is monetary) to construction industry participants

Perceived disadvantages of a monetary threshold definition

Table 4 shows the frequency with which participants identified particular disadvantages associated with the use of a monetary threshold definition to trigger the principal contractor duties for OHS planning and coordination in construction projects.

The most frequently cited disadvantage associated with the monetary threshold was the arbitrary nature of the threshold. For example, a representative of an industry association

questioned: “...so why does a \$244,000 project not have the same requirements as the \$252,000?...That is the problem with the arbitrariness of any dollar threshold...what comes under and what comes above?”

Participants observed that the cost of construction work does not reflect the level of OHS risk posed by the work. A representative of an industry association expressed this point as follows: *“If the consumer price goes up... let’s take the price of copper. So all your plumbing fittings and your electrical or the cabling and Bill and Ben are going to unload a bunch of reels with copper off the back of a truck, doesn’t mean it gets any lighter...the inherent risk is still there. If they don’t use a proper lifting device they’re going to break their backs...or drop on their feet they’re going to cut their toes off. Concrete can go up as well but the risk to place the concrete doesn’t change.”*

The lack of association between OHS risk and cost led some participants to favour a more sophisticated risk-based approach to expressing the threshold. For example, a regulator commented: *“A risk is a risk regardless [of] whether it’s \$450, \$250 or \$10 [thousand dollars]. It doesn’t matter...you should be looking at risk and basing everything on risk not on a monetary value.”* An industry OHS expert also succinctly pointed out that the cost of construction can vary as a result of factors that are unrelated to OHS risk, creating inequality in the operation of the monetary threshold: *“So if you build a less than average house, you’re allowed to be less safe?”*

Some participants expressed the view that the current monetary threshold specified in the model Work Health and Safety Regulations (i.e, AU\$250,000) is too low, resulting in the capture of construction works that are perceived to present a low level of OHS risk.

An industry association representative commented: *“Here in New South Wales, You’d be flat out building a garage for that, based on the Sydney property market.”* A regulator also commented on the impact of selection of materials on cost and potential capture of single-story residential house construction works by the threshold definition: *“...if you’re using building materials that are quite high value but just to build a single-storey residential house, the project may very well be covered.”*

Another situation arose in which minor works are captured by the monetary threshold definition because they are contracted over an extended period of time. A regulator explained: *“You can get some very low risk projects that are captured because a contract runs over a long period of time...so you will have a contract for road management that’s over a period of multiple years being captured because of the cost of that contract is over AU\$250,000, but the amount of work actually being done at any one point in time, or at most points of time is quite small.”*

However, other participants expressed the view that the current monetary threshold can fail to capture some high risk construction work. Participants commented that construction works could have a relatively low contract value, yet still involve high risk work (for example working at height or in an environment contaminated by asbestos) or be conducted in a high risk environment, for example adjacent to public roads or in close proximity to members of the public considered to be vulnerable (schools, hospitals, aged care facilities etc).

A representative of an industry association observed: *“Well perhaps not in housing construction but perhaps in civil construction maybe there might be some roadwork that*

don't come close to that value but you know they might involve working next to [a] major road. And it's got pretty high risks." A union representative similarly observed: *"...90 per cent of Australian state schools had asbestos in them and so the contractors [engaged in removal works] would be working on those sites. Some might be big jobs and some might be small... there could be multiple contracts."*

Other examples of potentially low value yet high risk work cited by participants included works involving excavation, demolition, scaffolding or abseiling. A construction company representative explained: *"You can have a scenario [like] removing the gutters on a factory, and replacing them with bigger gutters. Now that job was a hundred and fifty thousand dollars. But to me, there was more risk involved in doing that, because we're working at ten metre heights and walking on roofs, than actually doing a million dollar fit-out job."* A regulator also commented: *"It's reasonable to assume that there would be projects under the threshold that would be of high risk or significant risk."*

Some participants also identified anomalies associated with construction costing methods as being a disadvantage associated with the monetary threshold definition. An industry association representative suggested that the monetary threshold is open to manipulation: *"Once you put a dollar threshold then you start to think about, well okay what is included in that dollar threshold? Or what is not? Because then you have got people who get crafty about the contractual arrangement in order to contract themselves out of higher order requirements."* A union representative also commented: *"So many projects that I've had involvement have had an estimated contract value, not project value. And anecdotally I'd say less than five per cent of them come in on budget or below."*

Participants observed that principal contractor duties could potentially be avoided through contract-splitting and identified this as a potential loophole in the operation of the monetary threshold. A construction OHS expert commented: *"So let's say someone calls up with a \$249,000 job. Is it fundamentally less risky? Probably not. And they might even say, 'You know what, I'll do the build for \$200 grand. And then we'll do the landscaping for 80. All right. Fine'. And they split it up and so they've avoided the whole thing."*

A regulator also observed how contracting arrangements can be manipulated to avoid the duties: *"... So, if a project is AU\$1 million, but they say that they're just a project manager. They're not the principal contractor. They're the project manager. The first time a contract for building work arises, is with the civil works company that's turning out to be a \$220,000 project. And then the supplier of precast bridge components, which is \$240,000. You see what I mean? So, you could artificially structure things so that what most people would normally think of as the principal contractor [can say] 'oh, no we're actually just the project manager'. And they turn what you would normally think of as subcontractors into head contractors, to circumvent the threshold."*

Other participants believed that a nationally consistent monetary threshold creates problems due to variable costs of construction and in different geographic locations. One regulator observed: *"It does cost more in remote areas to build the same structure or any construction project...this is the reason why monetary thresholds aren't very useful."*

The issues of variation by geographic location and also design specification are discussed below.

Table 4: Perceived disadvantages of the monetary threshold

Frequen cy	Perceived disadvantage
19	Arbitrary figure/lack of association with OHS risk
19	Too low/captures low risk works
19	Failure to capture high risk work
17	Anomalies relating to project costing methods
7	Creates regional variations/inequitable in its current operation

Alternative threshold approaches

Participants were asked whether alternative threshold definitions are preferable to the monetary threshold. Potential alternatives are identified in Table 5:

Table 5: Potential alternative threshold mechanisms

Frequen cy	Alternative threshold mechanism
35	A definition based on construction activities
32	Multifactorial approaches combining more than one definitional ‘trigger’
12	The use of a risk matrix framework

Thirty five participants expressed the view that additional WHS planning and coordination duties should apply when certain high risk construction activities are involved in construction works.

Participants expressed the view that high risk work is already clearly defined and understood. One regulator commented: *“We all are very clear on what high risk work activities are and what that constitutes and we all very well understand how to control some of those risks on site so I don’t see how it would be a hard thing to...”*

Participants also suggested mapping construction activities by incident frequency and injury severity to identify those activities that should trigger additional OHS planning and coordination duties. A union representative suggested: *“So we have information available about where and all the hazards lie and the risks have manifested themselves in, in terms of injury and fatality and others. Can they reasonably be used to correlate the probability of the likelihood? And then mapped over a project description? I think that’s entirely possible.”*

A representative of an industry association commented: *“So it’s really the type of work which is being undertaken as far as the construction project itself is concerned, that determines the level of complexity and therefore the potential risk which goes with it, as opposed to it’s \$250,000.00.”*

Another 32 participants recommended the use of a multifactorial trigger for the OHS planning and coordination duties. These multifactorial triggers would include more than one risk factor being present simultaneously. For example, participants suggested the use of a monetary threshold in combination with the presence of high risk construction activities, or the number of persons engaged at a worksite in combination with the presence of high risk work activities. For example one union representative commented: *“So, why couldn’t you have a combination of cost and persons and the hazards which are being looked at, you know what kind of work processes you’re doing. If we look at a [monetary] threshold and working at heights, for example if you’re doing a two-storey or above, if you’re adding an extra level so if you go up one level over two metres, and you had five or more on site.”*

Other suggestions for triggers were more complex with some participants suggesting the use of a risk-based framework of a measure of the level of interdependency between trades as being relevant to the need for additional planning and coordination. However one disadvantage of a multifactorial threshold is the potential difficulty for duty holders in understanding and applying the definition. One regulator cautioned: *“Each time you introduce a new element or exception or however you want to word it, there is an increased level of the complexity which makes it harder for everybody to comply.”*

International perspectives

Four UK-based construction OHS experts were interviewed to examine their opinions relating to the additional OHS planning and coordination duties established under the Construction (Design and Management) Regulations which were revised in 2015. Under the CDM Regulations 2015, a construction project is notifiable if the work on a construction site is scheduled to:

- last longer than 30 working days and have more than 20 workers working simultaneously at any point in the project, or
- exceed 500 person days.

Under CDM 2015 Specific duties requiring principal contractors to coordinate of work activities are triggered when projects involving more than one contractor.

The international experts interviewed indicated that they believe this is an appropriate trigger. One commented: *“The trigger is when do you need coordination right? So when you need coordination is when you have more than one contractor on the site. So to me that makes practical sense that as soon as there’s more than one contractor there is a need at that point for one of them to coordinate the both contractor’s pieces of work.”*

Another stated: *“I mean you have to assume that the risk was up the more contractors were involved. If there was a lack of coordination then there’s a lack then you know chaos will be the result. And uncertainty will lead to [negative effects] on their health.”*

The international experts also did not believe a monetary threshold to be an appropriate trigger because there is no linear relationship between project size (contract sum) and OHS risk. One international construction OHS expert explained: *“Well for smaller sites I see this, and I’ve seen it historically, if a large construction organisation has one large site that’s several million pounds worth of work. And then on the other hand they have a 100 small sites with you know worth 100 thousand each...I’ve seen evidence that those 100 small sites will have more accidents right? And it’s difficult to pin down why but it would seem that there’s more going on, it’s more difficult to manage 100 small sites. The economies of scale don’t kick in because you’ve got smaller sites. And the budget is probably not there to systematically manage... with small sites there’s a lot happening simultaneously and possibly less resources to manage it.”*

Variation by geographic location and design specification

Two construction work scenarios were developed to test the sensitivity of the monetary threshold to variation in geographic location and design specifications (in particular, the choice of materials or finishes).

Steps in the modelling process were:

- scenarios were developed that were intended to reflect construction works that could be at the margins of the operation of a monetary threshold definition,
- based on specified assumptions, cost estimates for each of these scenarios were generated,
- cost estimates based on variation in design criteria (materials and finishes) were estimated, and
- regional variations in costs for each scenario were estimated.

The construction work scenarios were the construction of a 2.5km long fence adjacent to a road and the construction of a single-storey residential dwelling. For the purposes of the cost estimation it was assumed that the estimated duration of the fence construction was 30 business days. It was assumed that the gross floor area of the residential dwelling was 200 square metres and the duration of construction work was 120 business days.

Cost estimates were developed based on the assumed gross floor area/length and the unit cost for the specific construction activity. The cost estimates were generated with reference to the latest edition of Rawlinsons’ *Australian Construction Handbook* (Rawlinsons, 2017).

Cost estimates reflect the cost of production from the owners' or developers' perspective, i.e., they include an allowance for preliminaries and builders' profit and overheads. The estimates were based on the average price for typical buildings at December 31, 2016 within metropolitan areas in each state/territory. Regional costs were estimated by adjusting the building price index (BPI) to the costs estimated for the capital city in each state/territory. The BPI reflects the potential higher logistics/transport and wage costs associated with construction in regional areas.

Cost estimates for each scenario were generated for six state/territory capital cities (i.e., Adelaide, Brisbane, Melbourne, Perth, Sydney, and Darwin). In addition, cost estimates were generated for six regional towns. These were purposefully selected to reflect variation in costs due to distance from the nearest metropolitan areas. They were:

- Coober Pedy (846km from Adelaide, prices are +20%),
- Cloncurry (1707km from Brisbane, prices are +50%),
- Corryong (431km from Melbourne, prices are +8%),
- Port Headland (1640km from Perth, prices are +60%),
- Walgett (682km from Sydney, prices are +20%), and
- Tennant Creek (989km from Darwin, prices are +40%).

Table 6 shows the cost estimate for the erection of the 2.5km fence. The Design 1 cost estimate is based on a basic timber butt-jointed paling fence. The Design 2 estimate is based on a galvanised metal post fence with plastic coated link mesh. The cost estimates suggest that the galvanised metal and mesh fence would exceed the AU\$250,000 threshold definition for a construction project in all metropolitan areas included in the analysis. In terms of regional locations, the estimated cost of the metal and mesh fence exceeded the AU\$250,000 threshold definition in all regional towns, meaning that a 2.5km fence of this design would be considered a construction project under the model Work Health and Safety Regulations. However, if constructed of timber, the 2.5km fence would not be captured by the AU\$250,000 threshold definition in Corryong (regional Victoria) or Walgett (regional New South Wales), but would be captured by this definition if constructed in other regional towns.

Table 6: Cost estimate for erecting a 2.5 kilometre fence

GFA/Length: 2.5km Project duration: 30 business days		Cost estimation (per sqm) - metropolitan areas, prices in AUD					
		Adelaide (SA)	Brisbane (QLD)	Melbourne (VIC)	Perth (WA)	Sydney (NSW)	Darwin (NT)
Design I							
Timber, standard butt jointed paling face, 1500mm high		95	78	60	90	64	116
Design II							
Mesh, 1200mm high fence of galvanised welded mesh roll top panels and tubular posts, pre-painted finish to fence, green plastic coating to link mesh		119	104.5	118	136	121	145
Lump sum Total cost	Design I	237,500	195,000	150,000	225,000	160,000	290,000
	Design II	297,500	261,250	295,000	340,000	302,500	362,500
Regional area lump sum, different designs		Cost estimation (per sqm) - regional areas (towns), prices in AUD					
		Cooper Pedy (+20%)	Cloncurry (+50%)	Corryong (+8%)	Port Hedland (+60%)	Walgett (+20%)	Tennant Creek (+55%)
Unit & total cost	Design I	114	117	65	144	77	165
		285,000	292,500	162,000	360,000	192,000	411,800
	Design II	143	157	127.5	218	145	206
		357,000	391,875	318,600	544,000	363,000	514,750

Table 7 shows the cost estimate for the single-storey house built by a volume home builder. The Design 1 estimate is based on standard materials/finishes while the Design 2 estimate is based on the specification of higher quality materials/finishes. The Design 1 house would fall below the AU\$250,000 threshold in state/territory capital cities included in the analysis except for Darwin. The Design 2 house would be over the AU\$250,000 threshold in all capital cities except Adelaide. The cost of the Design 1 house would also be below the AU\$250,000 threshold in Coober Pedy (regional South Australia) and Corryong (regional Victoria) but would be captured by the AU\$250,000 definition in the other regional towns included in the analysis. The cost of the Design 2 house would exceed the AU\$250,000 threshold in all regional towns included in the analysis.

Table 7: Cost estimates for single-storey dwelling (volume built)

GFA/length: 200m ² Project Duration: 120 business days		<i>Cost estimation (per sqm) - metropolitan areas, prices in AUD</i>					
		Adelaide (SA)	Brisbane (QLD)	Melbourne (VIC)	Perth (WA)	Sydney (NSW)	Darwin (NT)
Design I							
Tiled roof and built on a flat site, basic standard finish 120/140 sqm full brick		820-885	1,055- 1,140	1,055- 1,135	890-960	1,085- 1,170	1,900- 2,050
Design II							
Medium standard finish 120/140 sqm full brick		1,015- 1,095	1,350- 1,460	1,305- 1,405	1,025- 1,105	1,270- 1,370	2,040- 2,200
Lump sum <i>Total cost</i>	Design I	170,500	219,500	219,000	185,000	225,500	395,000
	Design II	211,000	281,000	271,000	213,000	264,000	424,000
		<i>Cost estimation (per sqm) - regional areas (towns), prices in AUD</i>					
		Cooper Pedy (+20%)	Cloncurry (+50%)	Corryong (+8%)	Port Hedland (+60%)	Walgett (+20%)	Tennant Creek (+55%)
<i>Unit & total cost</i>	Design I	1,023	1,646	1,182	1,480	1,353	2,370
		204,600	329,250	236,520	296,000	270,600	474,000
	Design II	1,266	2,107	1,463	1,704	1,584	2,544
		253,200	421,500	292,680	340,800	316,800	508,800

Discussion

Getting the balance right in risk-based regulation

Windholz (2013a) highlights differences of opinion relating to what constitutes good OHS regulation, stating: “Employers argue for regulation that is balanced and reasonable, encourages a culture of mutual responsibility, and which minimises the regulatory burden on them. Unions, on the other hand, argue for absolute employer duties, high standards and a role for workers and unions in the management of OHS issues at the workplace...governments, for their part, find themselves trying to produce effective regulation that balances these competing interests in a manner that also does not damage their electoral prospects.” (pp. 1-2).

The analysis presented in this paper shows how getting the balance right can be challenging in regulating the management of societal risks. Black (2010) observes that risk-based frameworks incorporating decisions about what should be regulated and how regulators should utilise their scarce resources to meet objectives are increasingly seen as a means to achieve better regulation (p. 186).

Yet, in defining when and to what extent an activity should be regulated, inequalities or anomalies can arise.

The research examined the current situation in Australia, following an attempt to create nationally harmonised regulation of OHS management, planning and coordination in construction projects. The model Work Health and Safety Regulations incorporate a monetary threshold definition, requiring the appointment of a principal contractor with specific responsibilities for management planning and coordination in projects valued at AU\$250,000 or more.

Advantages of the monetary threshold

Industry stakeholders interviewed during the course of our study identified the simplicity and clarity of the monetary threshold definition as its most important advantage. The monetary threshold was perceived to be easily understood by industry participants, easily verified by inspectors and to have attained a reasonable level of industry acceptance. The reduction of uncertainty and compliance costs is an element of regulatory effectiveness agreed by the Council of Australian Governments: “Good regulation should attempt to standardise the exercise of bureaucratic discretion, so as to reduce discrepancies between government regulators, reduce uncertainty and lower compliance costs. Regulatory measures should contain compliance strategies which ensure the greatest degree of compliance at the lowest cost to all parties” (COAG, 2007, p. 5).

However, despite its simplicity, many of the construction industry stakeholders argued that the cost of construction work is not a valid proxy indicator of OHS risk. These participants argued that using a monetary threshold to trigger principal contractor duties related to OHS planning and coordination in construction works can be problematic.

Type I errors

Black (2010) points out that, if a regulator assumes an activity (or firm) is risky when it is safe they are accused of over-regulating and stifling industry growth and innovation. Our

interviews revealed that the current monetary threshold is perceived to give rise to heavy-handedness in its coverage and application.

Some participants argued that the monetary threshold captures some work that is low risk and should not trigger the principal contractor, OHS management planning and coordination duties. In particular, these participants inferred that domestic renovation work should be excluded from the operation of the principal contractor OHS planning and coordination requirements altogether. One regulator commented: “*...renovation work on a house and that might be simply things like replacing a roof or building an alfresco pergola out the back of the house or doing a whole range of things on an established house. The cost of AU\$250 [thousand] could bring that sort of work into the definition of a construction project and you would say to yourself it's on an already established house and there's a chap out the back and if there's not [a] large number of trucks going in and out and if there's not large numbers of workers on the site at the one time or maybe less. That sort of thing should not be included and I think in some circumstances that cost level as it is at the moment could capture those environments.*”

Other participants noted long term contracts for maintenance or repetitive minor works undertaken by a single trade contractor may be inadvertently captured by the AU\$250,000 threshold. Participants also noted that the rising costs of construction have led to capture creep, whereby construction works that would previously have fallen below the AU\$250,000 threshold are now being captured. They noted that inflation has therefore changed the operation of the regulation over time to the extent that the regulation was no longer proportional to the issue being addressed. A regulator argued for indexation of the threshold to avoid this issue: “*If you don't index it, you end up capturing lower value projects, or buildings, that weren't intended to be captured when you initially set the trigger ten years ago.*”

It is noteworthy that, in response to inflation, the dollar value of the monetary threshold has been increased in several jurisdictions in response to this issue (see Table 1). This was regarded as being appropriate by representatives of industry associations. One commented: “*...that is largely the reason to push those thresholds up because there is such an influx ... as soon as you add a management plan to a person's world [you add] a huge level of complexity for a business.*” However, a union representative favoured retaining the threshold at AU\$250,000: “*It's an appropriate benchmark to start with. I know [in the housing sector] they say it's too low, you know? And I say well, I think it's just right where it is.*”

OHS risk in small business operations

One construction OHS expert observed that small (low cost) construction works can often present more significant OHS risk than larger worksites: “*Because I reckon that plumber doing his \$10,000, \$50,000 trenching work is probably far more at risk than a worker working on the [tier one contractor's] building in the city.*” This is consistent with previous research that shows that projects that cost the least are statistically the most dangerous (Arboleda and Abraham, 2004). Arboleda and Abraham (2004) observe that 48% of fatal accidents in trenching operations examined in the US construction industry occurred in projects with a value of less than US\$250,000, and this was attributed to the fact that, in

small projects, insufficient budget allocation is provided for relevant protection systems, equipment or other construction OHS measures.

Previous research has also noted that small businesses struggle to meet the requirements of management-based OHS regulation that establishes process requirements, rather than detailed prescriptive goals or performance outcomes (Hale et al. 2015). In fact, Fairman and Yapp (2005) report that many small business owners are unaware of their legislative responsibilities or do not understand how to apply management-based regulation to their work activities. The difficulties faced by small construction firms were reflected by comments made by participants. For example, a representative of an industry association described how: *“A lot of the smaller organisations just don't have the same systems...you do notice the difference in views of the world between those small players and some of the bigger players. Albeit, you know, there's a lot more resources in the bigger players to put these things in place. Whereas a smaller guy is going to have to go, he's been working all day and he goes home in the evening and he has to take all these phone calls and then manage all the other stuff.”*

Type II errors

Black (2010) also notes that if a regulator assumes that activities (or firms) are safe when they are risky, regulatory failure can occur, potentially even threatening the existence of the regulatory agency.

Participants were roughly equally split between those who perceived the AU\$250,000 threshold to capture works that should not be subject to the principal contractor duties, and those who perceived that this level of monetary threshold could fail to capture activities that are high risk and require careful attention to OHS management planning and coordination.

It is noteworthy that some of these participants perceived that a ‘five or more persons’ on site threshold would be more appropriate because *“...that is more closely aligned to the risk you're wanting to address through the coordination plan.”*

Inequality in the operation of the monetary threshold

Hale et al. (2015, p.114) argue that “centrally formulated regulations cannot easily reflect the diversity of situations to which they apply.” The scenario modelling and interview data both suggest that a nationally consistent monetary threshold has the potential to operate inconsistently and inequitably:

- across states/territories,
- between regional and metropolitan areas, and
- between works utilising different materials and finishes.

The modelling of construction cost estimates confirmed that the operation of the monetary threshold definition can be influenced by factors that are not likely to be related to OHS risk or the need for OHS planning and coordination by a principal contractor. These differences related to design specification (materials) and the location of works. Both the single storey house building and the fence-building scenarios were impacted by geographic and design-related variations in the operation of the monetary threshold. In the fence building scenario, in most metropolitan areas the fence construction would be below AU\$250,000 if constructed from timber but greater than AU\$250,000 if constructed of metal. However, the OHS risk inherent in the fence construction is more closely related to the location of the fence than its material. If constructed adjacent to a road traffic management requirements would suggest a

higher level of OHS planning and coordination would be called for than if constructed adjacent to an empty paddock. This example highlights inconsistencies inherent in using a purely monetary threshold and suggests the need for a more nuanced approach that is better aligned to OHS risk.

Conclusions

One meaning ascribed to risk-based regulation is the reference to risk in determining which activities should be regulated and what level of prevention firms should be required to take. Regulation is sometimes triggered through the specification of thresholds above which particular duties apply and below which they do not. Because risk is often difficult to objectively measure, the thresholds are often specified using proxy indicators of risk. In Australia, the national framework through which states and territories were expected to adopt harmonised OHS regulation specifies the cost of construction as a trigger for duties relating to the appointment of a principal contractor with responsibility for OHS management planning and coordination. Although this threshold definition is widely perceived to be simple and clear, it is also regarded as being arbitrary in its operation. Interviews with industry stakeholders revealed a majority view that the use of cost as a proxy indicator of OHS risk is problematic, creating both Type I and Type II errors. That is, some activities that participants perceive should be exempt from the principal contractor duties are captured by the threshold definition, while other high risk activities to which participants believe the duties should apply fall below the threshold due to their relatively low cost. Some participants are strongly opposed to the use of a monetary threshold, arguing that cost to be unrelated to OHS risk in construction work. Other participants believe that the current threshold is too low. Participants' concerns regarding inequality in the operation of the threshold as a result of factors unrelated to OHS risk, including the geographic location of construction works and the selection of particular construction materials or finishes were borne out in cost estimate modelling for hypothetical house and fence building scenarios. The results provide insight into challenges associated with achieving an appropriate balance to achieve efficient and effective OHS regulation.

Acknowledgement

The authors would like to thank Safe Work Australia for the financial support for this study. The views expressed in this article are those of the authors and do not necessarily represent the views of Safe Work Australia.

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