

CATCHING ON: WORKING TOGETHER TO REDUCE MUSCULOSKELETAL INJURY RISKS IN COMMERCIAL FISHING

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ABSTRACT

This paper provides an overview of recent developments in occupational health and safety and human factors/ergonomics in the New Zealand marine fishing industry. The nature of New Zealand's fishing industry is summarised, and its previous and current legislative environment is discussed to understand the challenges for maritime health and safety practitioners. The Fishing Industry Safety Forum is acknowledged as a key industry driver for improving health and safety performance. The industry's consistently high work related injury rates with prevalent musculoskeletal disorders were recognised, and sparked an ergonomics scoping assessment to identify musculoskeletal injury risk factors for fishers. The results are summarised, along with the Accident Compensation Corporation (ACC) and industry resources that were consequently developed. Ongoing musculoskeletal injury prevention efforts are occurring within industry, with injury reduction and productivity gains that highlight the potential benefits to businesses. This approach appears to be a new model for intervention in the industry internationally. This paper highlights the contributions that can be made by health and safety generalists and human factors/ergonomics professionals, and the benefits of industry and government agencies working together.

KEYWORDS

Musculoskeletal injury risks, commercial fishing, industry safety forum, productivity, injury prevention.

NEW ZEALAND'S FISHING INDUSTRY

Fishing, aquaculture and seafood is an important earner in export markets, valued at around \$1.5 billion annually – an increase of 31 percent from 2002 (Statistics NZ, 2016). The market and product types are changing, with increasing earnings from the Chinese market and a focus on fresh/chilled fish as premium products, along with sustainable sourcing. The sector employs around 7,200 people in total, with 1,800 of these in fishing and around 5,000 in processing – a number that has fallen with advances in automation (Westpac Institutional Bank, 2016).

Four large fishing companies own or control approximately 80% of all New Zealand's fishing quota. These companies each operate several large deep sea fishing factory vessels of around 65m in length and crews of 45 that catch and process seafood at sea. In addition, there are approximately 1000 smaller vessels (less than 24 metre) operated either by independent fishers who own quota, or whom utilise quota owned by one of the four large fishing companies.

From an injury perspective, one in four (242 claims per 1,000 FTE) agriculture, forestry and fishery workers made a work-related injury claim in 2014 (Statistics NZ, 2015). This is the highest incidence rate by occupation in New Zealand, an unwelcome top place shared by these occupations since 2008. This rate tops 'elementary occupations' (e.g. cleaners, refuse collectors) at 238 claims per 1,000 FTE, and 'trades workers' (e.g. builders) at 209 claims per FTE.

COMPLEX MARITIME LEGISLATIVE ENVIRONMENT

The fishing industry has a very complex legislative environment and an interesting history in terms of the health and safety legislation. A working understanding of these aspects is critical for today's health and safety professionals working within the fishing sector.

Maritime Legislation

There are many maritime laws and conventions that must be adhered to by fishing companies. These include:

- International Maritime Organisation (IMO) conventions and protocols including:
 - safety of life at sea (SOLAS)
 - marine pollution (International Convention for the Prevention of Pollution from Ships) known as 'Marpol'
 - seafarer training, certification and watch-keeping
- International Maritime Dangerous Goods Code (IMDG)
- Load-line convention
- International collision regulations
- International manning requirements (IMO)
- International Labour Organisation requirements

These are interpreted by the relevant domestic authorities and used to create domestic Maritime requirements such as the Maritime Transport Act 1994. Maritime Operations are also required to comply with other domestic requirements such as:

- Food safety, via New Zealand's Food Act 2014, and requirements of the European Union's maritime rules
- Employment Relations Act 2000, and amendments
- Regional authority pollution requirements
- Health and Safety at Work Act 2015 (HSWA).

Health and Safety Legislation

Maritime New Zealand (MNZ) is the fishing industry's health and safety regulator, but it also has a range of duties that include ensuring safe and sustainable transport systems and protection of the marine environment. For the fishing industry the pathway to coverage by the HSWA was not always straightforward.

Vessels were not originally captured by the Health and Safety in Employment Act 1992 (HSE Act) when it came into force on land in 1993. The regulator believed that the maritime requirements already in force addressed many of the HSE Act requirements; hence vessels were not specifically captured by the HSE Act until 2003.

The fishing industry still had a high serious harm and fatality rate, and to address this FishSafe was introduced by ACC, the Seafood Industry Training Organisation, MNZ and the Federation of Commercial Fishermen in 2004. The industry championed FishSafe as they recognised that - despite the legislation - they had to do better. Maritime operators at that time relied on compliance with the Safe Ship Management Systems (SSMS) of MTA. Fishers had the belief that 'my boat is surveyed, and I have a safety plan' (under SSMS/MTA) and understood they had met all the requirements. The HSE Act was another layer of regulation that was all new. An independent review of the SSMS in 2002 (Thompson Clark Shipping Pty Ltd) found that the current framework was inadequate, and recommended a number of core system changes. A limited number of changes to the SSMS system were consequently enacted, resulting in a Code of Practice for Safe Ship Management.

Following the 2006 Kotuku sinking in Foveaux Strait with the loss of 6 lives, further work to improve the SSMS system was recognised and initiated by MNZ. The resultant improved Maritime Operator Safety System (MOSS) came into effect in July 2014.

These changes created the environment for confusion amongst some operators. MNZ has begun to address this via publications that clarify the HSWA and MTA requirements. In addition, there is a small number of maritime health and safety professionals and only developing recognition of the need for skills development that is specific to this sector.

Despite the history, fishing industry leaders are now grasping contemporary health and safety practice. In 2013 the industry formed the Fishing Safety Forum, which has representation from 80% of the industry (by fishing quota). The forum meets regularly, and is a vehicle for sharing safety learning and collaborating in the interests of health and safety with the mantra 'there are no secrets in safety'. Thus the fishing industry is working together to address health and safety issues.

RECOGNITION OF MUSCULOSKELETAL INJURY RISK

Whilst working in a health and safety role in a New Zealand fishing company, Guard recognised that many of the injuries sustained by fishing crew were musculoskeletal in nature. This was consistent with the 2012 'Fishing Sector Action Plan' (MNZ et al) that from ACC data identified 51% of fishing industry claims as soft tissue in nature (contusion, strain, sprain) followed by 20% 'laceration, puncture, sting' and 7% 'fracture/dislocation'. Further, Kahler and Chau's (2012) ACC funded report on New Zealand maritime injuries on under 24 metre vessels found that 'human energy' (lifting; lowering; pushing and pulling; repetition; awkward, difficult and sustained postures; caught between objects being handled; and struck by or against the object being handled and another person) was primary cause for 37% of injuries, and 'gravitational energy' (descending access systems; falls to same level; falls from height; and falling objects) was cause for a further 21% of incidents. These authors recommended a focus on human and gravitational energies to reduce the work toll on the smaller fishing vessels.

Recent 2011-2015 data from ACC (2016) confirms that musculoskeletal injury remains prevalent. For the commercial fishing sector, accepted claims for 2011-2015 years that related to manual handling (including pushing/pulling, and loss of hold) averaged 30% of the claim types. For these manual handling incidents lower back injuries were consistently the most common injury site (35% of injuries) followed by shoulder injuries (13%).

Previous work by Guard (cited in Edwin and Guard, 2014) had identified that over 24 metre vessels carry the greatest risk for injuries – with 2000-2008 data suggesting that 68% of serious harm incidents occurred on over 24 metre length vessels. Linked to the higher crewing numbers, this suggested that it would be valuable to target the largest factory fishing vessels to positively impact injury rates.

Matching these findings with observations on factory vessels suggested to Guard that a focus on musculoskeletal injury prevention on factory vessels was indicated.

ERGONOMICS EXPERTISE ON-VESSEL

In order to identify musculoskeletal injury risks for crew on working vessels, specialist input from a human factors/ergonomics professional was sought. This led to conversations with an ergonomist, and then to discussions with ACC about the potential benefit of a study of the intervention opportunities possible for fishing crew. Improving the working environments and tasks aboard vessels fits with contemporary

human factors knowledge - ergonomists aim to help prevent injury and improve work performance.

The ergonomics 'scoping assessment' of opportunities to prevent musculoskeletal injury risks aboard larger fishing vessels was approved as an ACC-funded industry project, with support from Auckland University of Technology. From the international literature, this project appeared to be a unique approach to identifying the injury risks faced by fishers. The work proceeded during 2013 with the ergonomist experiencing a total of 12 days at sea on 3 different working fishing vessels. One was a factory vessel, catching and processing fish, returning to land after up to 6 weeks at sea with market-ready product; and two smaller 'fresher' vessels bringing whole chilled fish back for processing on land.

MUSCULOSKELETAL INJURY RISKS

A wide range of opportunities to reduce injury risks were identified as discussed in Edwin and Guard (2014) and Edwin, Moore and Guard (2015). Key injury risks that were identified for fishers on factory and fresher vessels included:

- Repetitive factory tasks with long task exposures and seasonal peaks
- Heavy and awkward loads
- Poorly designed work areas with constricted and awkward work spaces
- Shifts of 6 hours on, 6 hours off, for up to 6 weeks
- Vessel motion impacts on the nature of the load and footing/posture for all activities, and contributes to physical fatigue
- Psychosocial aspects of crew living and working in close proximity on-vessel
- Poor training in injury prevention strategies, and poor training in safe work methods
- Poor understanding of the role of cardiovascular activities, stretching and general fitness for vessel crews, and limited facility for this on-vessel
- Poor organisational/management understanding of the nature of musculoskeletal injury risks and methods of intervention
- Employee selection processes with little link to the task demands of on-vessel work
- Dehydration was common and significant in fishers
- Lack of injury prevention resources specific to the fishing industry
- Poor organisational processes for incorporation of health and safety elements into planned maintenance work, including the design processes utilised.

RESOURCE DEVELOPMENT

Further discussion with ACC led to an initial project to develop industry specific resources targeting musculoskeletal injury prevention. Thus a range of injury prevention tips can be found at the ACC site <http://worksmarttips.co.nz/choose-your-workplace/> (select 'fishing'). Key industry players also worked together to produce a set of stretching posters and a lifting and handling poster suited to the work tasks and environment of a working fishing vessel. These were made available via the Fishing Safety Forum (Figure 1, over), and can be found at <http://www.guardsafety.co.nz/>.



Figure 1. Some of the poster resources produced by industry and ACC.

INDUSTRY UPTAKE AND RESULTS

Findings were fed back to the industry via the Fishing Safety Forum. This has contributed to fishing companies having better knowledge of musculoskeletal injury risks and the range of strategies to address these. Some fishing companies have initiated interventions targeting musculoskeletal injury reduction, with one company reporting positive results from the initiation of a number of interventions (Edwin, Moore and Guard, 2015). An ergonomics training programme addressing manual handling methods, sleep hygiene, stretching, break practices for work tasks, task methods, fitness and hydration were conducted with crews in a land-based venue whilst in port. This company also addressed the physical design aspects of the factory on one vessel, and for this vessel reported a lost time injury frequency rate that dropped from 3.15 (121 injuries) for the 2013 year end, to 1.06 (55 injuries) at 2014 year end. In conjunction with this promising result the vessel also experienced a 9.3% productivity gain. Ergonomics training interventions, improved discomfort and injury reporting, factory design changes, and a more stable and effective crew mix were identified as the key changes contributing to the injury reductions and productivity gains. This verified the findings of Gaskin et al (2015), who suggested that considerable financial gains could be made by fishing companies investing in targeted injury prevention and process improvement strategies.

The nature of work on fishing vessels increases the difficulty of experts accessing the working facility, thus is logistically challenging for all involved. As crews are at sea for 6 or 12 weeks before 6 weeks on land, they are less able to participate in education or other development activities and it is challenging to coordinate all key personnel for meetings. Even more challenging for design processes is that two sets of senior officers operate each vessel - demanding work with two sets of operators, and for some companies several sets of factory/deck crew.

This novel approach to working with New Zealand's commercial fishing sector has promising results, and may be usefully expanded upon to begin to address the lack of research (Lucas et al, 2013) specific to occupational safety within the international commercial fishing industry.

CONCLUSIONS

The Fishing Safety Forum is an industry initiative that continues to drive a focus on injury reduction for the fishing industry, and is an example of the importance of industry-lead action in the health and safety space. An example of effective

interaction with a government agency, this work demonstrates how ACC has added value and direction by supporting the scoping investigation that allowed the fishing industry to gain an understanding of the injury risks present within the industry, and make some progress towards interventions. Further, ACC has supported the development of resources that allow industry to more effectively address the injury risks. MNZ have indicated an interest in application of this work. This work also highlights the benefits of engaging different health and safety professionals – in this case health and safety generalists and human factors/ergonomics professionals – to work together to address industry needs.

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