Investigation into helmet use in IRB's

14 August 2018

1 Project Purpose

The mandatory use of helmets for all lifeguards when in an IRB for any purpose (including racing, training, on patrol and event safety) is due to come into force at the start of the 2018/19 season (Saturday 20th October 2018). It is currently highly recommended.

Prior to that SLSNZ has committed to clubs to complete an assessment as to whether there are any situations where from a risk perspective it is safe not to wear a helmet.

As such, the primary purpose of this project was to identify if there are any situations when the driver/crew of an operational IRB are not required to wear helmets to mitigate the risk of head injuries.

Only if such situations do exist, then the secondary purpose of the project was to develop and document a risk assessment tool to allow clubs (via their patrol captain or IRB crew) to make the decision themselves on the day as to whether the risk factors in their particular circumstances at the time require a helmet to be worn (or not).

This was to be done in two stages:

(a) Stage 1: **Risk Assessment Investigation** – a comprehensive risk assessment which identifies all operating situations for an IRB and if a helmet (as PPE, the lowest form of control) is required in each of those situations.

(b) Stage 2 (if required): **Risk Assessment Tool** – develop a simple risk assessment tool to allow frontline lifeguard personnel and IRB operators to make on-the-spot decision as to whether a helmet is required to be worn or not.

2 Project Scope

Stage 1:

Includes	Excludes
• All IRB on-water applications – e.g. patrol use, SAR callouts, training, event safety, racing etc. • Not just looking at circumstance in isolation, but also assessing the likelihood of applications/ circumstances changing/ blurring into each other. • Looking at the ability of those potentially making risk-assessment decisions to be able to anticipate all the risk factors and react in a timely manner.	• Risk assessment for injuries other than head injuries.

Stage 2 (if required)

Includes	Excludes
• All IRB on-water applications – e.g. patrol use, SAR callouts, training, event safety, racing etc. • KISS approach. • Identifying a simple tool for frontline operators to use.	• Risk assessment tool for injuries other than head injuries.

3 Project Team

- Stu Lowth — H&S Advisor & IRB Chief Examiner (Project Lead).
- Mike Smith — NLC member & H&S professional.
- Kent Jarman — IRB Examiner (Bay of Plenty) & IRB practitioner.
- Ross Merrett — SLSNZ H&S Co-ordinator.

4 Project Findings

Framing the Context

One of the most serious situations for a lifeguard is to end up unconscious in the water. With drowning occurring very quickly it is life-threatening in the extreme. The most likely cause of ending up unconscious in the water is a head injury.

At the root of the question of whether helmets should be mandatory, is whether it is realistic for Patrol Captains and IRB operators to be able to anticipate, before they leave the shore, all the circumstances that might occur?

If not, can there ever be a situation where they don't need to wear PPE for the worst-case scenario? This was the purpose of this investigation.

One of the more 'foreseeable' causes of head injuries is when a lifeguard is in (or thrown out of) an IRB, particularly due to the forces generated when operating at speed and then coming into sudden contact with one of many potential solid objects in or around an IRB. The correctly inflated chambers of an IRB alone pose potential risk upon sudden impact by an unprotected head. There is evidence of concussions resulting from sudden impact of heads on IRB pontoons, even when operated at low speed into the face of broken surf. Analysis of pedestrian versus motor vehicle survivability data, was utilised as a relevant approximation of the trauma that an unprotected head is likely to experience during IRB operations. This data suggests that in the absence of any viable higher control measures, PPE is the only remaining option to help mitigate the risk of serious head injuries.

The operating environment for an IRB is also very dynamic – one second it can be bobbing stationary in flat water near the beach and the next second racing 5km to a rescue at high speed and then operating in and around rocks being pushed by winds and swells. The unexpected is a constant factor – hitting a submerged object, being overturned by a random wave, having a crew member fall out if they simply misjudge a situation or colliding with another IRB or craft. Things can change and go wrong very quickly.

Rarely are serious incidents happening where they were anticipated and prepared for – it is what people didn't expect that gets them into trouble!

On the sporting side, helmets are mandatory in every other form of motorsport in NZ and in IRB racing at ILS level, yet there are arguments put forward that IRB racers don't need helmets because of other controls – e.g. separate lanes, safety boats and warning systems etc. There is compelling evidence that these 'control' measures alone have not significantly reduced the potential risk of IRBs colliding when racing in conditions where waves hide competitors from each other. During this review the team considered if there were any valid reasons for IRB racing to have an exemption to the SLSNZ helmet rule. There weren't.

IRB Uses

The uses identified and considered as part of this investigation were:

- Formal training – driver
- Formal training – crew
- Informal training – driver
- Informal training – crew
- Patrol use – club
- Patrol use – Regional Lifeguard
- Testing equipment (hulls, engines)
- SAR callouts
- SAR Squad training (surf only and multi-agency)
- Event safety – external (3rd party) events
- Event safety – surf life saving events & activities
- Supporting Beach Education activities
- Supporting Nipper/ Junior surf activities
- Public demonstrations
- Public or sponsor 'experiences'
- IRB racing – arena
- IRB racing – longhaul
- IRB racing - training
- Surf Sport event support – e.g. laying cans

Risk Factors

The following risk factors were identified:

Category	Risk Factor	Comment
Operating use	• Varies by situation	See above list of IRB uses.
Human	• Age of crew • Competency of crew • Experience of crew • Level of supervision • Club/peer group culture	Age is a known factor in risk taking. Cognitive skills in youth not fully developed until age 25 plus
General Environment	• Wind • Wave/swell conditions • Visibility • Other weather conditions (e.g. rain) • Proximity to rocks/ cliffs • Proximity to structures/ overhanging trees etc • Proximity to other craft • Rips /currents/ holes • Natural debris • Human debris • Proximity to assistance	Speed, impact Size, interval, dumping, spilling Being seen or seeing hazards Wharves, moorings, navigation aids Anchored and moving Logs, animals Shipping containers, wood
Craft itself	• Speed • Condition (e.g. anchor points, working throttle return) • Presence of 'hard' surfaces/ objects in the IRB	This is a key factor for injuries Pontoons, motor, other people, equipment being carried.

Effectiveness of other controls

PPE is the lowest form of control for a risk, and an assessment was undertaken of whether any of the higher controls (see Appendix 1) would be effective and remove the need to wear helmets. The outcome of this exercise was that there is still a need for PPE, as the practical application of the higher levels of control still could not fully eliminate the risk.

Conclusions

- Speed, creating force is the biggest single factor that will cause head injuries. This is well proven in other areas (e.g. pedestrian versus motor vehicle accidents) and with IRB's always having the potential to be operated at speed while on the water, this means the latent risk is constantly present, even if at some points in time they are not being operated at speed.
- The number of risk factors and potential use situations made the exercise of creating a comprehensive risk matrix far too complicated to do in practice.
- While in theory there may be a very small number of combinations of factors that create a scenario where it would be safe to not wear a helmet (e.g. event safety on a lake with no waves, an experienced crew, no debris in the water and never going over 5 knots) there are very few of these in the wide scope of IRB operations.
- Even when in those exceptional situations, there is always the potential for the circumstances to change very quickly to a situation where helmets are required, so at all times it would be very important that helmets were available in the craft.
- Following the logic of always having helmets on board an IRB to cope with the possibility of those changing circumstances, it then makes sense, like lifejackets, to be wearing them all the time. To quote the Maritime NZ advert – "there is nothing faster than disaster", and there is no point of having helmets nicely attached to the IRB hull if the incident has already happened.
- There was no rationale to support an exemption to the use of helmets for IRB racing.

Considering all the elements above, and testing it under various scenarios, the project Team concluded:

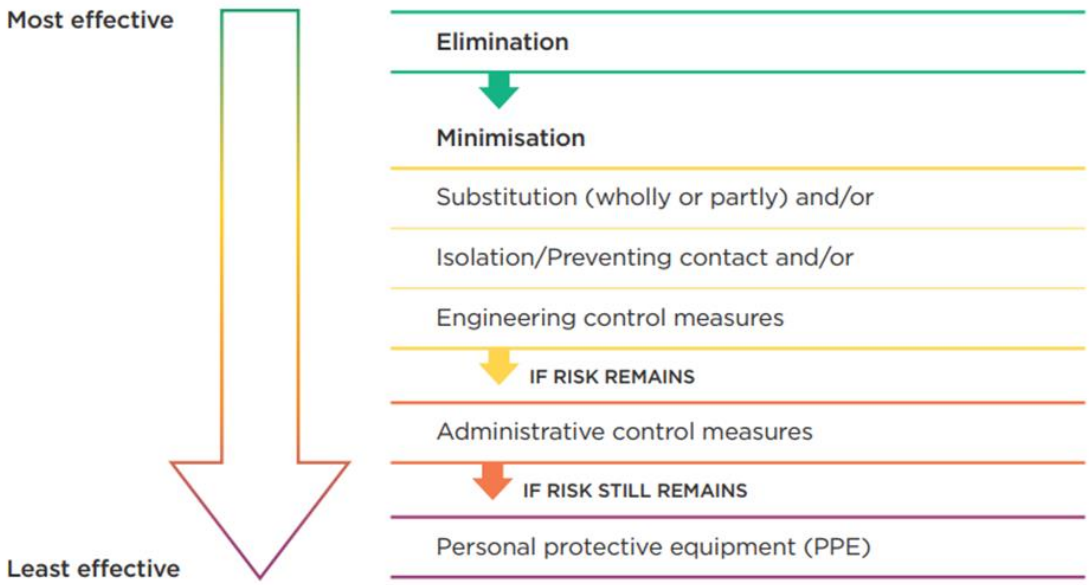
- ***The high level of variability in operation, even in situations where a general user would consider it "controlled", has a level of risk sufficient to warrant the use of helmet; and***

- ***That the policy set to come into place on 20th October 2018 continue to be implemented as planned, i.e. that helmets be compulsory in all situations where an IRB is used.***

Appendix 1

Hierarchy of Controls

Below is the standard hierarchy of controls used to manage risk:



1. **ELIMINATION**
   Remove the source of the danger entirely. For example an old quad bike could be disposed of to take the risk physically away from the club membership.

   If not practical, then……

2. **SUBSTITUTION**
   Substitution involves replacing hazardous equipment or hazardous work practice with a less hazardous one. Using an ATV instead of a quad bike for example.

   If not practical, then……

3. **ISOLATION**
   Isolation involves separating the hazard from persons at risk of being injured by it. An example of this could be installing a hazardous goods store for fuel and chemicals.

   If not practical, then……

4. **ENGINEERING**
   If the hazard cannot be eliminated, substituted or isolated, Engineering Control is the next preferred option. Examples include such things as safety features on the equipment (e.g. key access only or roll bars on quad bikes)

   If not practical, then……

5. **ADMINISTRATIVE**
   Administrative controls include the use of danger signs, work practices that reduce the risk such as restricting use of particular equipment to certain people, regular rest breaks for keyboard operators and reduced exposure to noisy machines (by job rotation), supervision and training. Written procedures accompanied by associated training are also considered to be administrative controls.

If the risk still remains, then……

6. PERSONAL PROTECTIVE EQUIPMENT (PPE)

Personal protective equipment should be considered only when other control measures are not practical, or to increase protection. PPE includes items such as helmets, lifejackets, eye protection, hearing protection, safety footwear, appropriate clothing, and gloves. The provision of PPE must be accompanied by training in its proper use, fitting, cleaning and maintenance.

Looking at these in the context of IRB head injuries:

Control	Comment
Elimination	• There will be occasions where the conditions are not safe for an IRB to be used at all, in which case this control will apply. • However, for the vast majority of situations conditions will not be that severe, so the risk will continue to exist.
Substitution	• In some circumstances an alternative craft may be able to be used (e.g. rescue board), but as the IRB is the workhorse of surf life saving it is not practical for this to be an effective control.
Isolation	• By simply being in the IRB, the crew are exposed to the risks. It is not possible to isolate the crew from the risk and for them to operate the IRB. • It may be possible to instruct crew to avoid certain hazards (e.g. do not go near any rocks or hard structures) and therefore be isolated from some risks, but this does not cover all risks nor guarantee the instruction will be followed.
Engineering	• It is not feasible through redesigning the IRB to remove the many and varied risks of head injuries, both inside and outside of the IRB. • If attempted it is highly likely that additional risks would be created, such as through preventing the crew to easily exit the IRB.
Administrative	• Improved training/ qualifications for crew and tighter rules/ policies around the use of IRB's are valid strategies for reducing the risk. • However, they will not be able to fully mitigate the risk due to many factors being outside of the control of the crew.
PPE	• Lifejackets have been compulsory PPE for IRB crew for a number of years, and the need for these follows essentially the same logic path as that used for helmets. • The inability for other controls to fully eliminate the risk means that helmets as PPE are still needed to mitigate the risk of serious head injuries.