

# **Waka Ama**

## **Safety Guidelines**

### **Introduction**

***E ngā mana e ngā reo, tēnei te mihi ki a koutou katoa. Ko rātou mā ngā tūpuna i hoea te moana nui a Kiwa. E mihi ana ki a rātou. Ko tātou ngā kanohi o rātou mā, e kore tātou e ngaro, he kākano i ruia mai i Rangiatea.***

Waka Ama or outrigger canoes have always been an integral part of the culture of Pacific people. In Aotearoa, after initial settlement by the first Polynesian voyagers, Waka design and use went through a number of evolutionary stages. This was due to the difference in trees available to build Waka. Therefore Waka eventually, because of the size of the huge trees in Aotearoa, became single hulled and did not require the addition of an outrigger float or Ama to maintain the hull in an upright position.

Over a period of hundreds of years, Waka Ama gradually went into decline in Aotearoa. In the 20<sup>th</sup> century, Māori travelled to Pacific Islands such as Hawaii and Tahiti, and saw that the culture of Waka Ama racing was still being maintained in these places. And so, by the mid-1980's, the seed was sown to revive the culture of Waka Ama in Aotearoa.

Initially called Tātou Hoe o Aotearoa, the Waka Ama Association was made up of only two founding member clubs - Ngā Hoe Horo in the North, and Mareikura on the East Coast. From these humble beginnings, Ngā Kaihoe has grown into an organization that boasts six regional members and a constantly growing list of clubs developing in every region. A clear example of how the sport has developed is witnessed at the annual week-long National Waka Ama Championships, which now attracts upwards of 1,200 competitors.

As the participating numbers have grown, so too has a need for Ngā Kaihoe o Aotearoa to address certain aspects regarding the safety and well-being of its members. We are happy to have forged a good relationship with the Maritime Safety Authority and, together with new alliances with groups such as Ngā Waka Federation, we have been able to develop guidelines for safety in Waka Ama use for the paddlers of Aotearoa.

***Heoi anō, rau rangatira mā, koutou ngā tohunga tārai Waka, koutou ngā kaihoe o Aotearoa, ka nui te mihi ki a koutou, tēnā koutou katoa.***

### **Waka Ama in the Pacific**

**E Kore ahau e ngaro, He kākano i ruia mai, I Rangiatea**

*I shall never be forgotten, For I am the seed that was sown, In Rangiatea*

This ancient saying sums up the origins of the Māori people and tells of their pride and respect for their ancestors who traversed the great Pacific Ocean from Rangiatea (Ra'iatea), which was one of their ancient homelands.

The culture of the canoe or Waka is culturally significant and important for Māori. Most Māori trace their origins to ancestors who migrated here in voyaging Waka. Therefore, stories of great explorers and navigators such as Kupe who was sailing the Pacific 1,000 years ago and discovered Aotearoa, or New Zealand, reinforce a strong heritage for the Māori. Not only do these stories expound the knowledge and daring of ancestors such as Kupe, they provide direct links to many of the islands throughout the Pacific, and re-establish the links between the cultures that all originate from the same place in Pacific history.

Ocean voyaging on a canoe is an often-romanticised activity. However, the dangers and difficulties faced by the first voyagers were real, and their Waka needed to be strong and seaworthy. The Waka was, therefore, the basis of the community. Once a land had been settled and voyaging decreased, the Waka became the vehicle by which life was sustained, for fishing, trading and transportation. Often the Waka would be used for leisure purposes as well.

Today, the world has moved away from the dependency it once had on craft such as Waka, although in many places and cultures it still plays an important part in everyday life. In Aotearoa, the Waka is still used in ceremonial and official functions as well as recreational uses such as racing. The growth and development of the sport of Waka Ama in Aotearoa is a good example. Hosting the World Championships in 1990 re-kindled the flame, and in ten years the sport has grown tremendously. The development has been such that the sport has touched many people from different cultures and they all share in the history and traditions of the ancestors.

The strong Waka history and the fact that many Māori still retain their ancient Waka histories and traditions reflects the power of Waka as a means of identity and pride. From the first navigators, to the settlement made by subsequent voyaging Waka to today, the Māori are proud to acknowledge that they are a maritime people and that they will not be forgotten. The Waka will ensure that the traditions and histories of the ancestors are not forgotten and do not become whispers on the ocean.

Waka are like needles, Islands are like flowers. The Waka of old have sewn the Islands of the Pacific together. Today the Waka is sewing together the people of the world.

## **The Guidelines**

As the sport of Waka Ama expands, there is a need for appropriate safety systems and procedures to be developed and nurtured, by coaches, clubs and experienced paddlers. All new paddlers entering the sport must be made aware of the risks and be provided with the skills needed to avoid unnecessary risk situations or, in the event of an incident occurring, have the knowledge to deal with it appropriately.

In short, it is essential that the risks to both paddlers and other water users are minimised through the adoption of a code of safe practice for Waka Ama. By implementing safety procedures, the highest level of safe, responsible practice can be said to have been put in place, thereby minimising risk to all concerned both on and off the water. Taking the 'safe' option is not to suggest we wrap the sport in cotton wool and never push our equipment or ourselves, but simply that it is done within safe limitations<sup>1</sup>.

It is important to stress from the outset that these are **Safety Guidelines** and not an actual **Safe Operating Plan**. It is envisaged that each club will develop its own personalised safety plans based on the Safety Guidelines, in accordance with the local conditions within which they operate.

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<sup>1</sup> Kanu Culture Vol 7, Steve West

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## **Section 1: Waka and Equipment**

### **a. Definitions**

#### **Waka Ama – outrigger canoe**

A Waka Ama consists of a hull with one or more outrigger pontoons (Ama), rigged out to the side for stability and lashed to the hull with cross beam members (kiato). The hull has sealed bow (ihu) bulkheads and stern (kei) bulkheads.

#### **Waka Taurua – double hulled canoe**

A Waka Taurua is a vessel with two hulls lashed together with kiato for stability.

#### **Waka Tere – sailing canoe**

A Waka Tere is a Waka Ama fitted/rigged with a mast, a sail and appropriate sailing kiato. The Waka Tere also has a special sailing Ama for the purpose of sailing.

### **b. Types of Waka**

#### **Waka Ama**

- W1 - one person single hull Waka
- W2 - two person single hull Waka
- W3 - three person single hull Waka
- W4 - four person single hull Waka
- W6 - six person single hull Waka

#### **Waka Taurua**

- WT12 - twelve person double hull Waka

#### **Waka Tere**

- WT4 - four person single hull sailing Waka
- WT6 - six person single hull sailing Waka
- WT12 - twelve person double hull sailing Waka

**c. Design and Construction**

With the growth in Waka Ama builders and the variations in the models that exist internationally, it is acknowledged that there are currently no Design and Construction Standards in New Zealand. However, Ngā Kaihoe o Aotearoa are working towards the following:

- **Certification**

Nga Kaihoe o Aotearoa (NKOA) parchment/plate attached to Waka to certify that the vessel has been constructed to approved design and construction standard.

- **Partnership with Boating Industries Association**

NKOA Hull committee to work with the Maritime Safety Authority and other appropriate boatbuilding authorities to provide Design and Construction guidelines to achieve certification.

- **Safety Audits**

Establishment of Nga Kaihoe o Aotearoa as 'Authorised Persons' for the purpose of safety audits for all Waka Ama.

*Attached in Appendix 1 is a draft prepared by Kris Kjeldsen which sets out safety considerations that should be taken into account by anyone contemplating designing or building a Waka Ama.*

**d. Equipment**

**i. General**

Item	Number required	Comments
Floataion tubes	2	Required
Lifejackets	1, 2, 4, 6 or 12	Required - Sufficient lifejackets must be available for all those on board the Waka.
Bailers	2	Required - A large bailer will cut down the bailing time
Spare paddles	1 or 2	Required
Flares (day & night)	2	Recommended
Fixed white light 1 metre above deck, that can be seen 360°	1	Required for night paddling
Throw bag	1	Recommended
Repair kit	1	Recommended and should include spare rubber lashing, duck tape, bungs and towing rope.
Spray Skirt (optional)	As required	To be utilised dependant on weather and sea conditions.

## ii. Equipment Requirements for Support/Escort Boat

Item	Number required	Comments
Lifejackets	Sufficient number for crew and support crew	
40 metre rope	1	For towing purposes
First aid kit	1	As per first aid requirements
Communication equipment	At least 1 form of communication device	VHF Radio, RT, Mobile phone (in a plastic watertight bag)
Rescue tubes	2	Support crew must be trained to use in emergency
Throw bag	1	
Spare paddles	As required	

### e. Maintenance

Regular, scheduled maintenance is to be carried out on all Waka and equipment by suitably qualified and experienced people. Such maintenance is to be documented.

Regular audits by an expert/approved builder or 'authorised person' are also to be undertaken to confirm that maintenance of the Waka is being carried out effectively. Audits should cover:

- the structure of Waka; and
- all equipment.

## Section 2: Personnel

### a. Roles and Responsibilities

The following points must be considered and training adapted to meet these minimum requirements:

#### **Skipper or Kaihäutu**

The skipper or Kaihäutu:

- Must be designated prior to voyage
- Must have knowledge of weather forecasts and/or where to find it (metfax, radio, newspaper and internet).
- Must understand what happens with local sea conditions:
  - Strong on-shore or off-shore winds creating unsafe swells
  - Informing people of their voyage plans, how many are on board and who they are and what time they are due back
- If the Waka is unsupervised (for example, during training) then the Kaihäutu must:
  - know the medical needs of crew and have an updated first aid kit and be proficient in its use
  - know the capabilities of his crew
  - have communication systems eg VHF and or cellphones in zip lock plastic bags
  - ensure Waka has all appropriate and relevant equipment
  - ensure the crew are appropriately clothed for the hoe eg polyprops, wind breakers and hats
- Must ensure that sufficient water supplies are available
- Must ensure spray skirts are fitted prior to commencement of voyage if the conditions warrant them.

#### **Paddler/Kaihoe**

The Kaihoe must be competent in, and have awareness of, the following procedures:

- Knowledge of Swamping, Capsizing, Man Overboard safety procedures
- The use of floatation devices immediately available and on the support vessel.
- The ability to swim at least 50 metres
- He must be able to work within a confined space
- He must be patient and resilient to cope with any situation as a result of intense training
- He must not be under the influence of **drugs** or **alcohol** while on the water.

## **Safety Co-ordinator**

All clubs must appoint a Safety Co-ordinator who will be responsible for:

- Development of a Safety Plan and procedures for the club in accordance with these Safety Guidelines
- Reporting of safety requirements/issues for the club
- Initiating any emergency procedures in accordance with club's Safety Plan and procedures
- Safety information and emergency contact details eg Police, local Coastguard etc.

## **b. Training**

Clubs are required to maintain a training programme for all levels of participants/crew focused on developing the competency of the paddler to participate confidently in whatever Waka Ama activity is undertaken. This should include:

- Competency in swimming/floatation
- Minimum level of fitness relevant to Waka Ama
- Crew familiarity with safety drills
- Swimming standards
- Fitness requirements
- Familiarisation with roll/capsize procedures
- Coaching levels (generic)
- Understanding of risk management
- Safety awareness
- Lifesaving (surf survival programme)

## Section 3: Operational Procedures

### a. Generic

Procedures must include:

- a thorough check of both existing and forecast operating conditions prior to the voyage
- a full Waka and equipment check prior to the voyage
- a full briefing on the voyage given to all parties
- an unequivocal alcohol and drug policy

### b. Racing<sup>2</sup>

For Waka Ama racing, procedures must provide for:

- a briefing of club representatives prior to the race
- a physical check of Waka Ama to ensure that it is seaworthy
- a physical check of safety equipment to ensure it is fully serviceable/suitable
- a physical check of bailers/spare paddlers/PFD's to ensure they are serviceable/suitable
- ensuring that a safety/escort boat(s) is provided
- a safety craft course brief to all participants
- Karakia
- medical/first aid
- flipping drills
- communications equipment
- crew lists
- distances to safe haven for marathons
- course markers
- event management
- obtaining the necessary approvals from local authorities, etc
- minimising the impact on, and operating safety with, other boaties and water users
- the checking of eligibility criteria
- liability factors
- emergency procedures
- categories of events.

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<sup>2</sup> Nga Kaihoe o Aotearoa Race Rules.

**c. Practice**

For practice sessions with Waka Ama, the following must be provided:

- a briefing of course plan
- notification of training location placed on the club notice board
- training is specific for race event
- logging of training hours
- allocation of training times
- safety co-ordinators to be informed of voyage plans
- induction programme for new members (probation period of 3 months – usually build-up to the nationals)
- crews to train in pairs
- line of sight– check points
- correct lighting for night training
- emergency procedures

## **Section 4:       Emergency Procedures<sup>3</sup>**

Waka leaders/Kaihautu must ensure at all times that there are sufficient crew members who are capable of taking charge of the situation in the event of the Waka swamping, rolling or capsizing.

### **In a swamp situation**

- Do not move from your position
- Hold your hoe in tapāpa position
- Do not lean or shift weight
- Wait & listen for Kaihautu's commands

### **In a roll /capsizing situation**

- Do not let go of your hoe
- Take hold of the Waka and use for extra buoyancy
- Check to see where your partner is and if he's alright
- Use your hoe to help others reach the Waka
- Carry out a Roll call
- Initiate Roll/capsize procedures

### **Man overboard - *procedures to be confirmed***

- Training in the use of the Rescue Tube for all Waka crews



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<sup>3</sup> Nga Kaihoe o Aotearoa Race Rules

## Appendix 1

### **SAFETY CONSIDERATIONS FOR THE DESIGN AND CONSTRUCTION OF WAKA AMA**

Anyone contemplating designing or building Waka Ama (Outrigger Canoes) for approval by Nga Kaihoe O Aotearoa, if not already experienced Waka Ama Paddlers, should first familiarise themselves with the expected uses of these canoes. What ocean (or Lake/River) conditions they will be used in and expected to stand up to? Also, what possible accidents they might be involved in, in the course of racing or recreational use? Designers should also be aware of the Nga Kaihoe O Aotearoa specifications (minimum weight, etc).

#### **Recommended Design Criteria for six Person Waka Ama (W6)**

Waka Ama should be designed so that they can be built with **maximum strength, stiffness and durability**.

Waka must be **strong** enough to withstand all manner of extreme ocean conditions e.g. ocean waves caused by strong winds (breaking waves), surf and tidal currents.

They must be strong enough to withstand collisions with other Waka (in racing situations) as well as with rocks, bridge pilings, floating logs, etc that might be encountered in normal use (or misuse).

Waka must be **stiff** enough so that minimal flexing and twisting occurs in these same conditions. Twisting and flexing will, sooner or later, compromise the strength and durability of the Waka.

These canoes are, by nature, long and narrow in shape, so special attention and consideration must be taken with regard to longitudinal strength and overall stiffness in their design and construction. Picture if you can, a Waka some 40ft in length, moving at speed and going over a steep wave, either on a surf beach, river mouth bar or even in the open ocean. At some point, if only for a second or two, the front half or more of the vessel will be launched and suspended perhaps 10ft in the air above the surface of the water, before plunging back down with a considerable force and weight.

**Durability** goes hand in hand with strength. It is possible to build a stiff canoe that is not strong. In time or under certain conditions the Waka either breaks or loses its stiffness. It is also possible to make a strong canoe that is not stiff enough. In time, due to flexing and/or twisting, the strength of the canoe is compromised.

To ensure that any customer who may purchase a canoe will get value for money, Waka should be built to withstand the potential conditions described above. With proper maintenance, a Waka should be serviceable during 10-12 years or more of continuous use.

Other design criteria with regard to safety that should be considered are **freeboard and floatation**.

There should be enough **freeboard** so that, fully loaded, the Raukawa or Gunnels of the Waka are high enough above the water to minimise waves breaking over the Waka in moderate conditions (in rough conditions, a spray cover should be fitted).

Another design consideration is that the Waka should, after swamping or capsize and righting, **float** high enough out of the water to enable it to be bailed out. In Waka that are built with materials other than wood, this must be achieved by water/air tight floating chambers in the Ihu (Bow) and Noko (stern) of the Waka and with positive buoyancy.

As much positive floatation should be used in the construction of a Waka as possible, using either wood or foam plastic. Within the floatation chambers, positive floatation should be installed in the form of plastic foam or airtight plastic bottles. Inspection hatches should be installed in bulkheads so that Waka owners can fill the chambers with plastic bottles.

## **Construction**

For centuries strong, durable and seaworthy Waka have been built by carving them out of solid wood, by fastening together wooden planks, or a combination of the two.

Today, due to price considerations, lack of suitable trees and inexperienced traditional builders, most Waka Ama are built either by a combination of laminated wood and fibreglass reinforcements, or fibreglass reinforcements and plastic resin laminated in a mould.

The vast majority of Waka Ama in use today for racing and recreation, throughout the Pacific and beyond, are built of fibreglass reinforcements and polyester resin. This is the method we will deal with here.

There are many types of fibreglass reinforcements available today. There are also many ways of combining them to utilise their full potential to achieve the required strength, rigidity and durability in the finished Waka. An experienced and competent fibreglass boat builder should know how best to use these materials, as well as proper fibreglass construction methods.

Some of the materials that can be used to laminate fibreglass Waka Ama are:

**Chop Strand Mat (C.S.M)** - This material is made up of chopped up glass fibre, held together by a binding agent and comes in the form of a thin sheet, on a roll, in different weights e.g. 225gm per m<sup>2</sup>, 300 G.S.M etc. Chop strand mat does not have a lot of strength due to the short fibres in a random pattern. It is used in a laminate to put a thin skin over the colour coat and to bind together the other layers of the lamination. It also adds thickness and stiffness to the canoe.

C.S.M is inexpensive compared to the stronger reinforcements and, in the past, some Waka were built solely of it, or in combination with Coremat, quite cheaply. None of these canoes lasted very long.

**Core Mat** - A papery, felt like material of various thicknesses used in a laminate to add thickness and stiffness but, without any real strength.

**Uni Directional** - All long fibres running in one direction.

**Woven Roving** - A woven material with long fibres running at 0° and 90° - A Strong Material.

**Biaxial** - A material consisting of long fibres running at 0° and 90° - fibres stitched together instead of woven - Very Strong.

**Double Bias** - Long fibres running at 45° and 45° stitched together - Very Strong.

As a rule of thumb, a six person Waka Ama (W6) should have reinforcements that total an average weight of 1500-1600 grams per m<sup>2</sup>. Of these reinforcements, no less than 50% should be the strong, long fibre types.

An example of a good strong laminate for a W6, in order, is:

C.S.M	300 G.S.M
Double Bias	420 G.S.M
C.S.M	225 G.S.M
Biaxial	450 G.S.M
C.S.M	225 G.S.M

As well as these laminates in the hull, it is a good idea to laminate into the keel a full length Uni Directional strip 100mm wide for additional longitudinal strength and rigidity.

The deck and Ama laminates can be slightly lighter but need to be strong. It is recommended that a light, stiff, durable wood be laminated into the Gunnel for longitudinal strength and rigidity, and additional positive buoyancy/floatation. The seats and taumanu should also be made of wood encased in fibreglass and strongly laminated to the hull of the Waka. Polyurethane foam could also be used for seats and gunnels, but foam in itself is not as stiff or strong as wood; nor will it hold screws and fastenings for attaching spray cover fittings.

If water does leak through the fibreglass into the foam and eventually saturate it, its floatation value is nullified.

If wood is used, it should be naturally rot resistant or chemically treated to resist rot.

Seats, taumanu and bulkheads should be strongly laminated into the Waka using good strong type reinforcements and not just C.S.M.

Ama of course should be strong and water tight. All joining seams (deck to hull and Ama) should be sealed and reinforced with fibreglass cloth tape.

The materials listed above are not cheap and, as mentioned, some unscrupulous or unknowing builders have used either inferior laminates or lightened laminates to cut costs.

These canoes do not last and might not be safe or seaworthy in all conditions.

**WARNING** - A canoe built of inferior materials will look just as shiny and colourful as a good one when it comes out of the factory.

**Laminated Wood Construction** - Although it hasn't been done much in New Zealand as yet, Waka Ama can also be made of laminated wood strips, edge glued to each other and covered with glass cloth and epoxy resin, inside and out. If done correctly, the resulting Waka are strong and stiff.

It would be advisable to build in watertight bulkheads, creating floatation tanks fore and aft, as in fibreglass Waka construction.

**Kris Kjeldsen**  
**October 2001**