The History of the Kiwi Shaft Seal

Henleys Propellers and Marine have been designing and manufacturing stern gear componentry since 1917.
Up until 1984 Henleys manufactured a large range of Packing type Admiralty shaft glands that were by in large also used by a large range of manufacturers Worldwide.

The Packing gland was found to be very reliable in a relatively small range of similar sized engines - by today's standards.

However the packing gland required constant maintenance and care full adjustment to avoid excessive shaft wear and excessive internal heat. In some case's the white metal bearing would melt and lock onto the shaft. Units that had rubber mounted nose cones could fail due to the nose spinning in the direction of the shaft rotation if the packing was adjusted to tight.

By the start of the 80's pleasure and light commercial craft went thru a development of increased applied BHP, higher revving, soft mounted Diesels. The client's expectation of speed and low maintenance became evident.

Henleys responded to this change by developing the "Flexi Shaft Seal" in 1984. This seal consisted of two lip seals in a Bronze bearing carrier that were connected to a Bronze square flanged housing by a heavily reinforced hose to allow for the movement now created by flexible mounted engines. The forward nose cone had a white metal bearing which was grease lubricated and the aft flange housing incorporated a water feed and fiber type bearing. This initial design was found to be extremely reliable – there are still hundreds of these original units in service after 23 years.

By 1990 the first of a new breed of face type mechanical seals appeared on our market. The first unit to come to our attention was the "Deep Sea Seal". This unit consisted of two main components - a rubber housing with a vulcanized copper face insert and water feed - aft, a rubber boot arrangement that consisted of a fiber ring that was compressed against the copper face by squeezing up the boot and locking into place - fwd.

Henleys was approached to become the sole NZ distributor for this product. We took to this new technology with gusto and for the next nine years shelved the flexi seal.

The Deep Sea Seal had some definite advantages with regards to

1) No shaft wear.
2) Minimal maintenance.
3) No grease.

The following negatives started to appear after the first two years of service in a relatively high percentage of units sold.

1) The rubber lost its memory and the face compression / water seal was compromised.
2) Over time the vulcanizing from the rubber to the copper disc failed which caused leakage from behind the face and if the forward boot was pulled back the copper disc would drop out causing a major failure.
3) Excessive wear of the copper disc by the fibre ring.
4) Should the engine move forward excessively on its mounts then the seal face would come apart and allow a large volume of water into the vessel in a very short span of time.

After two years of excitement and two years of cleaning up the mess Henleys thought there had to be a better way!

We began a search for the next generation of mechanical seal. Out of the USA came the PSS shaft seal. This seal had a set of compressible bellows that connected to the stern tube – aft end; water cooled Carbon face nose cone that had a highly polished face that was similar to the standard industrial type mechanical seals. Up against this carbon face was a SS collar that was mounted onto the shaft and sealed by two "o" rings. The Collar was locked into its compression position via two hollow face grub screws that also had locking grub screws.
This design showed some definite improvements over the earlier "Deep Sea Seal".

1) Only one end relied on rubber memory to maintain seal face alignment and compression.
2) The copper and fiber ring was gone – carbon face and SS gave significantly better life as wearing components.
3) No grease
4) No perceived maintenance, however we always advised our clients to check the seal every time the boat was used.

After some initial research on this new product Henleys became the sole NZ distributor for the PSS shaft seal. During the next five years we supplied hundreds of units to both our domestic market and also vessels destined for export. After three years of consistent sales on the PSS seal we started to see a few issues develop. While these were not of the same scale as our previous face seal – when things went wrong our client's safety was put at risk due to the following situations.

1) The rubber bellows lost memory which caused the unit to spray a black band of carbon in a 90 degree line off the seal face around the engine room.
2) If the exit point of the stern tube was blocked off by fishing line or a failed bearing then the pressure from the water feed caused the bellows to expand and in some cases split. This allowed large volumes of water into the engine room in a very short span of time. In some cases the skipper would head for land at max speed which further exasperated the problem as the water feed from the engine to the seal increased the volume of water into the hull.
3) The SS rotor suffered crevice corrosion on the wear face to the carbon compromising the seal face.

4) The SS rotor could creep forward which would allow the seal faces to come apart.
5) Should the engine move excessively forward if the vessel came into contact with rocks or another boat then the seal faces would part allowing a large volume of water into the engine room in a very short span of time.
6) The carbon was prone to cracking at the point of entry with the water feed tail.
7) The carbon nose cone would split, chip or crack if an object was accidentally dropped or came into contact with the face.

In conclusion:
If the seal ran as designed it was dry and safe. If it failed due to any of the above then the nature of the design allowed a significant volume of water into the vessel in a very short span of time which in some cases put the crew in a high risk situation.

In our fifth year of representing the PSS seal in New Zealand we decided to decline the agency and continue to further develop our lip seal design.

Our first step was to conduct an extensive survey on what the client is looking for or expects from a shaft seal as this product represents one of the most vulnerable points in any type of water craft. The following results are listed in order of preference from our clients.

1. **Safety:**

Without doubt when the client stood back and looked past the sales promotions, the overriding issue was that the skipper wanted to ensure the long term safety of his family, crew and passengers.

2. No Maintenance:
This was an expectation largely developed on the back of the available mechanical type face seals that had transformed clients from the rigors of a packing gland to a relatively maintenance free device.

3. Ease of installation:
This was mainly put forward by the boat builders and engineers who demanded a simple yet full proof system that could interchange with the majority of shaft and stern tube sizes available on today's markets.

Our survey highlighted the following:
For the sake of a few hundred dollars – if the skipper was given the choice would he put his crew / family at risk?

The answer was a definite NO!

After taking the past nine years experience with face type seals and the previous six years with lip seals Henleys embarked on a mission to produce a safe design of lip seal glands. Over time the “Flexi seal” morphed into the “Orca shaft seal” and then the “Kiwi Shaft Seal” due to design refinements based on the ever changing and demanding marine environment.

Each product release was slightly modified taking into account our past 23 years of involvement with various shaft seal designs and learning from the comments and experiences received from our valued clients Worldwide.

Our Company products have been developed by our previous and current staff, most of who have been with the company for 10 to 30 years. They either own their own boat or are heavily involved in water craft as a recreational pastime. They understand what is important when things get tough out at sea.

In 2009 due to product demand a new Company “Kiwi Shaft Seal Ltd” was formed to take on the design, production and marketing of the “Kiwi Shaft S e a l ”.

Developed for the rigors of the Southern Ocean – our company is proud to introduce you to the **“Kiwi Shaft Seal”** experience.

Yours Truly

Mark J Power

Managing Director