HISTORY OF THE BILLABONG HYDRAULIC RAM

Energy efficient yet under-utilised

Although most people are familiar with the water wheel, few have heard of the water ram, a comapratively small and ingenious pump that was used widely in the nineteenth and early twentieth centuries for lifting water to tank or reservoir far above the water level from which the water originally came from. The water ram used no fuel and was operated solely by the water itself.

Based on available historical data, the Australian-made Danks Billabong Hydraulic Ram is one of the oldest rams produced anywhere in the world—and this year i.e. 2011 it celebrates its 156th Anniversary.

The water ram concept was discovered in 1790 when an engineer in Bristol, England, by the name of Wilkinson was given the task of piping water to a hospital from a reservoir. Since the upper floors were above reservoir level, he calculated that only the ground floor could be supplied with water.

A lead pipe was laid and terminated by a trap. Wilkinson noticed a *thump* in the pipe when the flow of water was turned-off suddenly and, in time, a bulge developed in the lead pipe. He realised that this was not caused by the weight of water alone, but by the percussive force of what was to become known as *water hammer.*

To relieve this force, he led a smaller pipe from a point close to the bulge to the upper floors of the hospital, well above the reservoir level. When the hammer effect was produced, by use of the tap, a spurt of water shot out of the relief pipe. Wilkinson had thus discovered the percussive force that water could apply, but he failed to incorporate it into a machine which could use it automatically for practical purposes.

In Paris, in 1797, Joseph Michel Montgolfier, brother of the famous balloonist, exhibited an automatic pump as a kind of scientific toy. It used the water percussive power to pump water many times higher than the source from which it came. King George III granted the first original patent to Pierre Montgolfier in 1816, who in 1798 invented the first automatic pulse valve, thus making the ram a commercial reality.

The water ram remained no more than a curiosity until an Englishman called Easton acquired the rights of manufacture and marketing for the British Isles and Empire. Easton intorduced the ram to England in about 1830, and started to produce it for practical use. This early model was improved and popularised by John Blake of Accrington, Lancashire, England, in 1865, and although in the latter part of the nineteenth century some 30 companies were engaged in water ram production, it was with the name of Blake that the ram became firmly associated and indeed, it is still manufactured by Blakes today.

A final word must be said about the name *water ram*. In the Montgolfier version of the 1797, the two valves were of the iron *ball in a cage* variety. When they closed onto their seatings there was a distinctive *thud*, which reminded Montgolfier of the sound of two rams meeting in a headlong charge.

He therefore named his invention *Le Belier*, or *The Ram*.

Even with the adoption of more sophisticated valves, the water hammer effect still produces a distinctive thud at the regular stroke intervals.

In 1809, the first American Ram patent was issued to J. Cerneau and S.S. Hallet in New York, but it was not until 1832 that the ram capability became known throughout the United States. Prior to the 1840's, most ram pumps in the USA were imported from Europe. The first American Ram was built in 1843 by H. H. Strawbridge of Louisiana. The 1840's and the 1850's saw a large number of rams manufactured in the USA.

The Billabong Hydraulic Ram was first introduced into Australia in 1855 by John Danks and Son Limited, although details and background of its introduction are not available today due to the lack of documentation. The first available documentation confirming the above introduction is the John Danks and Son Limited catalogue published in 1890, listing Billabong Hydraulic Rams as one of its major machinery products.

The catalogue also provides reference to the company's ram experience and manufacture, beginning by stating that in 1890 they already had 35 years of experience with Billabong Hydraulic Rams.

The business was acquired from John Danks by Misal Technologies Pty. Ltd. in 1986, and the company has continued with the manufacturing and marketing of Billabong Hydraulic Rams for the past 25 years. The rams are being used by thousands of satisfied customers in Australia and the South Pacific regions, including the Solomon Islands and Papua New Guinea. Several years ago, the United Nations supplied a large quantity of seven Billabong Rams to the Solomon Islands for supplying water to mountainous villages located in remote areas.

Many satisfied customers have been using Billabong Rams for up to 50 years. The current range is based on the John Danks 1912 design, with the full set of the original drawings still in existence today. And they continue to be built as very robust and soid units, thus ensuring many years of longevity for their users.

The hydraulic ram has stood the test of time and more. It remains one of the few really practical and efficient uses of natural energy today. They operate without any costs, will last indefinitely and, with only two moving parts, are simplicity itself whilst requiring the minimum of maintenance and replacement of parts. It is not uncommon to find rams working non-stop for many years without requiring any maintenance.

Since water rams are still manufactured today, it is difficult to see why, in view of rising fuel costs, they are not more widely used.

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