

# The Awassa Hand Pump

January 2005

*"...This is a large work I've called you into, but don't be overwhelmed by it. It's best to start small. Give a cool cup of water to someone who is thirsty, for instance. The smallest act of giving or receiving makes you a true apprentice. You won't lose out on a thing."*

*Matthew 10:41-43 (The Message)*

## **Introduction:**

My name is Richard Cave. I am an engineering consultant from British Columbia. I work for Koers & Associates Engineering, in Parksville, BC. Our mission is to help people in developing countries improve their life by reducing sickness through providing sanitary conditions and a continual supply of clean water.

We are here to present to you some new technology in hand pumps, specifically designed for rural communities in developing countries.

Although I enjoy working on land development projects and have done so for the past 18 years, recently I have felt a calling from God to use my engineering skills for a greater purpose. We are not sales reps for this pump, what we hope to gain from this presentation is some contacts with people who work in these developing nations, and get some insight into what God wants us to do with this pump.

## **Background:**



It is estimated that 80% of illnesses in developing countries are linked to poor water and sanitation practices.

An estimated 6000 children die each day of preventable diseases because of the lack of clean water and unsanitary conditions.

Hand pumps installed in wells provide one of easiest and least costly ways of supplying rural populations with potable water.

Although hand pumps are part of the solution, there are problems with conventional hand pump technology that can cause a hand pump to break down. Coupled with the need for special tools and/or lifting equipment, there can be delays of days, weeks or even months before service personnel and equipment can be mobilized to repair the broken down pump.

During that time, the people may resort to drinking polluted water from surface water sources such as ditches or rivers.



The Awassa Hand Pump uses different technology and was designed to overcome these problems.

**The Conception: (Larry Dillon, Profession Engineer, Inventor)**

In the early 1980's Larry Dillon worked in Ethiopia, where he was in charge of a rural water supply project which involved the installation of hand pumps. He stayed in Ethiopia for 11 years. Larry was very bothered and frustrated by how conventional hand pumps would fail and often could not be repaired by the people in the village. He thought surely modern technology could come up with something better. Larry thought that if the connecting rod in a hand pump could be eliminated and replaced with a flexible and light riser pipe, many of the problems would be eliminated.



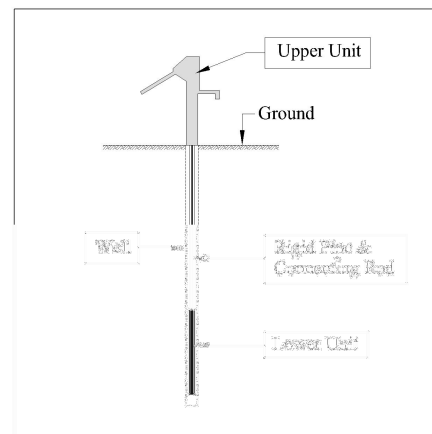
From that thought, Larry went to work and designed the Awassa Hand Pump. When back in Canada in the early 1990's, Koers and Associates helped Larry develop, endurance and field test, and patent the pump.

**Conventional Pump Technology:**

Conventional hand pumps have an upper unit on the ground, a pump that is in the well and mechanical hardware connecting the two together. This is typically a combination of a rigid riser pipe, galvanised steel or PVC and a connecting rod through the pipe. Some pumps use connecting steel cables.

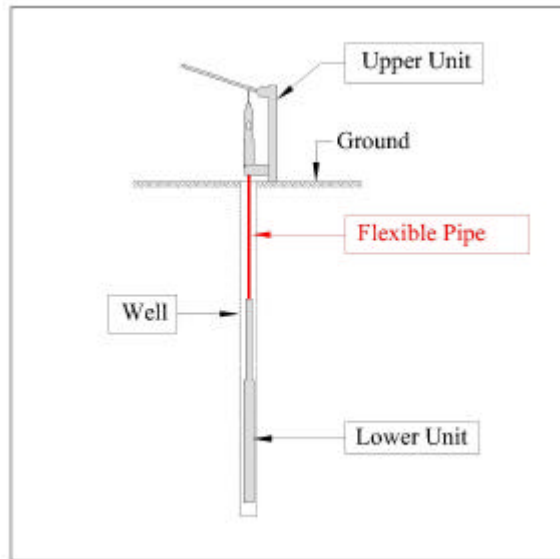
When the handle of the pump is operated, the connecting rod or cables push or pull the plunger at the bottom of the well, forcing water up through the riser pipe and out of the spout.

Hand pumps have seals that require maintenance and because conventional pumps have mechanical connections, they will experience wear and tear over time. When these pumps break down, they have to be lifted out of the well with equipment and special tools. Often this equipment and tools are not readily available.



The upper unit of conventional hand pumps must be installed directly above the well and the riser pipe and connecting hardware must be straight. This means that the villagers must use the pump where it is most convenient to drill a well, which may not be the most sanitary or convenient location.

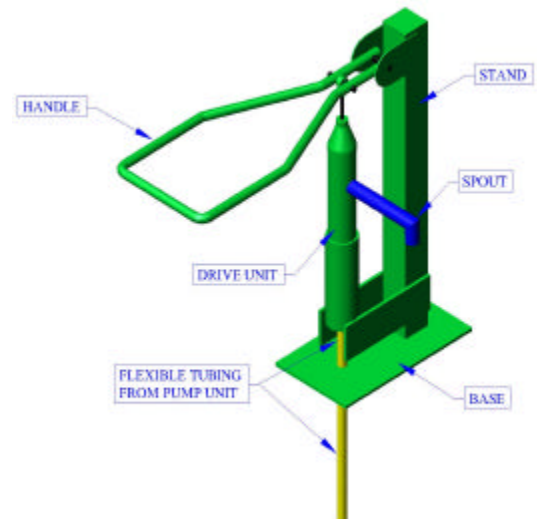
### The Awassa Hand Pump:



The Awassa Hand Pump also has a unit on the ground, called the drive unit and a unit in the well, called the pump unit.

The drive unit and pump unit are connected with a single flexible plastic pipe.

The pump works by hydraulic action. When the handle is pushed down, water is forced down the pipe and compresses a coil spring within the pump unit. When the handle is pulled up, the spring forces water up the riser pipe and out of the spout. The Awassa Hand Pump has been successfully tested to a depth of 100 feet, but deeper applications can be achieved.



The Awassa Hand Pump is unique, and as far as we know, there is no other pump that uses a single flexible pipe between the pump unit and the drive unit.

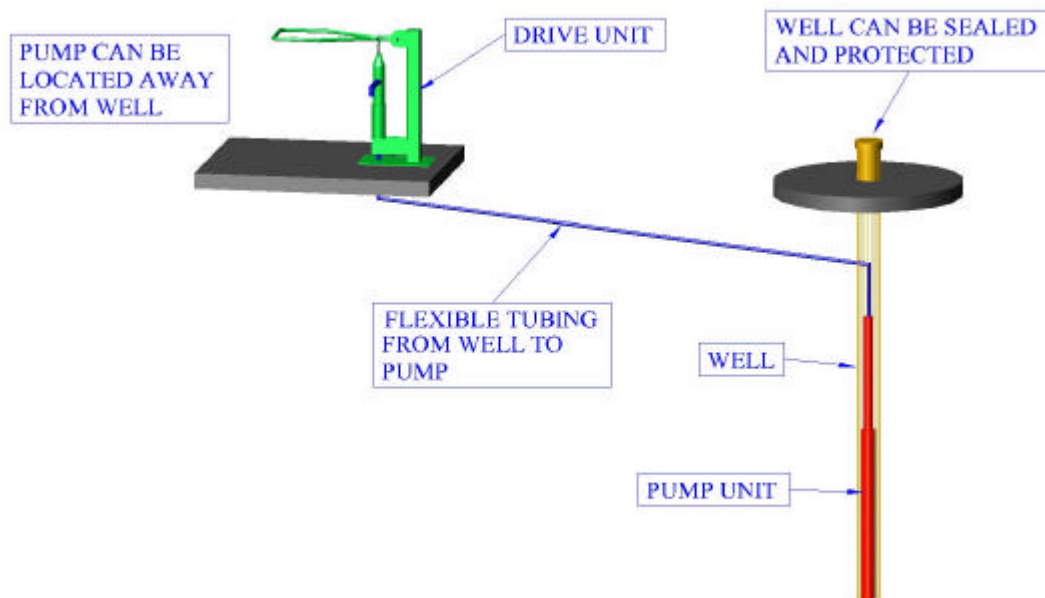
### Maintenance:

Maintenance on the Awassa Hand Pump can be done at the village level using only common hand tools. The pump unit and riser pipe are relatively light, therefore, no equipment is required to pull the pump out of the well, and the flexible connecting pipe can be coiled on the surface.

The only items requiring maintenance at the village level will be the replacement of leather seals in both the drive unit and the pump unit. These seals are standard items readily available in developing countries.

### Off-Well Installation:

Other than the ease of maintenance, a key benefit of this pump is its ability to separate the pump from the well.



The single flexible pipe connecting the two units provides opportunities to separate the drive unit, where the people come to collect water, from the well where the pump unit is installed. This provides the ability to totally protect the well from contamination and it also allows for the well to be located and locked within a building to keep runoff away from the well.

### Awassa Hand Pump, Part of the Solution:



Having a good working pump is only part of supplying people with clean water. It is the drilling of the well and keeping the water supply free from contamination that is the most important issue. There are currently many great efforts and organizations providing clean water and therefore reducing illness and death. The Awassa Hand

Pump can be part of a solution to provide clean water by reducing breakdown rates due to the non-mechanical nature of the pump, simple maintenance which reduces the time the pump is out of order and increased ability to provide sanitary conditions by separating the pump from the well.

**Conclusion:**

People in the world are dieing because of poor water and sanitation conditions. The diseases which take their lives are often preventable, and are not significant problems in developed countries where clean water and sanitary conditions are found.



While good work is being done to provide clean water to developing nations and better sanitary conditions, much can still be done to improve the availability of clean water to rural villages. Many hand pumps remain broken down for days or even longer, awaiting service equipment and parts. Water is still needed during these times and is often taken from polluted sources. In addition, even with a conventional hand pump in good

working order, the well can still become contaminated by people using the pump at the well site.

The Awassa Hand Pump uses technology that is unique;

- It does not have high maintenance requirements, and when maintenance is required, it can be done at the village level without special tools or lifting equipment. The pump can be pulled, taken apart, maintained and put back into service in a very short time.
- It can be installed away from the well so that the well can be protected from potential contamination.

If you are involved in projects in rural villages that require hand pumps or you know of people who are involved and you would like more information, we would be more than happy to talk with you.

For more information about the Awassa Hand Pump please contact:

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