

Ideas at Work (IaW)

#189-191J, Street 1928 (Mong Rithy St.),
Phuom Toul Kok, Sangkat Toul Sangke,
Khan Russey Keo, Phnom Penh
Cambodia



Phone : +855 (0)23 350 911
Mobile : +855 (0)17 660 252
E-mail : info@ideas-at-work.org
Web : www.ideas-at-work.org

4th
Customer Satisfaction
and
Technical Performance survey
of the Rope Pump "ROVAI"
made by
Ideas at Work
December 2012

BACKGROUND

In September 2006 Ideas at Work(IaW) started with manufacturing the Cambodian version of the Rope Pump, called ROVAI. This was done with an award of the World Bank Development Marketplace 2006 (DM2006). During the project period (2006-2008) our partner Resource Development International (RDI) did most project installations in Kien Svay district, Kandal province. From December 2007 IaW started a direct sales project to the rural areas of Kampong Chhnang province and in 2010 Kampong Thom province was added.

In February 2008, after 13 months of installing pumps a first survey was carried out to get user feedback and technical performance of the pumps. Global Positioning Satellite (GPS) coordinates were taken for each of the first 40 surveyed pumps along with their unique pump ID number.

The 2nd survey was carried out in 2009 again with the same 40 families in Kandal province. All of the pumps that were installed in the Kandal Province were the ROVAI model-5 (RP5) of which we are now, after 5 years, particularly interested in the wear of the pistons. During the 3rd survey (2010) another ROVAI model-6 (RP6) in another province was added (Kampong Chhnang province) in where most of the complaints about RP5 were improved.

For this 4th survey a technical and a customer satisfaction survey was done in Kampong Chhnang and Kampong Thom province but only a technical study in Kandal.

CONCLUSIONS

Users are happy with a Rovai pump and they recognize the benefits of being able to collect water faster and the access to more easy water for cooking and cleaning.

It is encouraging to learn that many users discover that they have more animals and vegetable now after they purchased the Rovai pump. People estimate this to be a possible extra income of 2000-5000 riel a day. More research is needed on this.

In the province where IaW works longest, Kampong Chhnang, more users know where to get spare parts (50%) than in newer provinces but it is still a concern that even individually bought pumps are sometimes abandoned due to lack of spare part. However, Ideas at Works telephone number is located on every installed pump and spare part are in every local market.

Manufacturer IaW is amazed at how long the rope seems to last. This is only guaranteed to 1 year but we find examples of 4 years use, even with daily use. The wear of the pistons seems to differ per

province but is found acceptable, see table below. It would be expected that the pistons have similar wear values for each year but they vary. This may be due to the fact that the original size of the pistons can varied within production margin. Also not all pistons are measured. It might also be that more users are using the pump than before or that families needs more water for example for setting up domestic gardens. We had expected to find people complaining about a lower water yield but this hasn't happened; the opposite as the pump confirm to be content with the flow rate. In Kandal we see, after 5 years, that now 50% of the pumps have replaced the original pistons.

The pumps itself has an expected life span of 5 years but we see that the oldest pumps (RP5) in Kandal now have exceeded expectations and are still going strong after 6 years when maintenance is carried out regular. However corrosion is still increasing on the older pumps, which was expected. Even the newer pumps that have been carefully spray-painted in 3 layers show at aging some rust. IaW is trialing galvanizing the Rovai pumps which might increase the life of the pump even further.

METHOD:

This 4th study was carried out in 3 parts:

- a customer satisfaction and a technical performance study in Kampong Chhnang province
- a customer satisfaction and a technical performance study in Kampong Thom province
- a follow up (4th) technical survey in Kandal Province

The known GPS coordinates made sure we surveyed the same pumps again as last year in Kandal Province and Kampong Chhnang. User satisfaction feedback was put next to last year results for comparison.

Surveyors:

- Mr. Seng Sophea, Vun Chanly, Som Rotha, Heang Lim (Ideas at Work)
- Mr. Yim Raksmeay (Resource Development International)

No. of interviews/pumps: 58

Period: October - December 2012

Survey area:

Kandal Province, Kean Svay district: 17 pumps (RP5) technical survey only

- Survey period: October 2012
 - o 2 villages
 - o Robos Angkanh
 - o Prek Thom
 - o 17 pumps

Kampong Chhnang province (KC), Borri Bo, Rolea B'ier, Kampong Trolach districts: 17 pumps (RP6, Family Rovai FR).

- Survey period: November 2012
 - o 5 communes: Svay Chhrom, Pongro, Phsar, Por Pel, Ponley, Khun Rorng
 - o 10 Villages: Dork Krorng, Torm Tbeg, Krang Preah Svay, Ou, Snour, Kork, Prey Tamoung, Ang, Phsar, Chumteav Bottrey.
 - o 17 pumps

Kampong Thom province (KT), Brasat Sambo district: 24 pumps (RP6).

- Survey period: October 2012
 - o Communes: Kampong Chhor Teal & Sambo
 - o 4 villages:
 - o Chro Mash
 - o Cheay Sampov
 - o Art Sou
 - o Ou Krokae
 - o 24 pumps

Determining piston wear results

During the technical survey the surveyors measure 5 pistons out of approximately 20 pistons on the rope. This provides an average size for the pistons on the pump. This is then used to compare it against previous surveys and to determine an average wear rate over a year.

Determining the flow rate of the pump

During the flow rate test the handle is turned at a constant rate. A 20ltr container is put under the flowing pump and the time taken to fill the container is recorded. This data is then used to calculate the flow rate of the pump. During factory tests carried out in 2007/8 an average of 40 liters per minute could be achieved quite easily.

KEY RESULTS FROM THE SURVEY

General information

Most pumps were found to be in working. All survey pumps were installed on hand dug wells or combination wells. In Kandal we only carried out a technical survey but in Kampong Chhnang and Kampong Thom provinces we carried out both technical performance and customer satisfaction survey.

In Kandal province only ROVAI model-5 (RP5) pumps were installed which have a known corrosion problem which has been improved in the models after. The reason for visiting the Kandal pumps regularly is to keep testing the pistons wear.

In Kampong Chhnang province we installed the follow up pump, the ROVAI model-6 (RP6) and also the family pump for 1-3 families (FR).

User Satisfaction results

Of the 58 interviews 16 males and 22 females were interviewed, and all were users/owners.

Key findings:

- 60% of pumps is used by 1-2 families
 - 30% with 3-5 families and
 - 10% are used with 6 families or more.
 - on average a Cambodian rural family has 5 family members.
- 2% of family members are disabled but still able to use the pump.
- 100% of the families said they rated their satisfaction of the pump as "good" to "very satisfied".
 - Users regarded the pump as 'reliable'.
 - The flow rate was regarded as satisfying.
- Maintenance at pumps that are collectively owned is more often neglected than at privately owned pumps.
- All users mention to use more water after installing a Rovai pump.
- Faster water collection, easier cleaning, cooking, laundry and easier showering are most mentioned as benefits of the pump.

Rovai users reported that water used for cooking, cleaning and showering was collected faster and easier than they had previously done.

When our interviewers discussed 'income generation related to Rovai' the users found it difficult to recognize this. However, many users did tell us that before they had the Rovai Pump they had only limited water for their pigs, chickens, cow, buffalo and the household garden. During the interview they discovered that now, after the Rovai was installed, they have more pigs and more vegetables than before, even enough to sell in the market.

Other suggestions given:

- 1 person mentioned he expanded his business due to Rovai (KC-wine maker, extra income approx USD 2.50 per day)
- 2 others said that the timesaving gave them the opportunity to do extra other work (KC)

- 23 people of 24 interviewed in KT said they can earn more money of their vegetable gardens and pigs (before 2 pigs, now 3 and up). A rough guess was an daily increase of 2000-5000riel/day (USD 0.5-1.25)
- 6 times it was mentioned that money was saved on fuel or electricity (KC)

A lady from Kampong Thom:

before Rovai pump her 10-year old son fell into the well when collecting water by bucket-rope for buffalo and vegetable garden. A neighbor rescued her son. She said that when the Rovai was installed her fear left. An extra benefit was that now she grows much more vegetables that she sells to local market and earns \$0.75 to \$1 per day.

Technical Performance results

Kandal province: Technical survey on 17 pumps

Average pumps installed: 63 months (5+ years).

- 14 pumps visited are working, 3 stopped working because of piped water arriving or the purchase of an electronic water pump.
- 8 pumps still used the original pistons
- Rope condition in all pumps is acceptable and at 3 pumps the people mentioned never to have changed the rope.
- Piston size 27.26-27.85mm
- Average piston size: 27.48mm
- Piston comparison 2009 versus 2012 in Kean Svay district, Kandal Province: Over a period of 55 months the average wear of one piston is 0.63mm

COMPARISON 1st, 2nd, 3rd and 4th SURVEY

	2008	2009	2010	2012
	Kandal prov 40p	Kandal prov 40p	Kandal prov 23p	Kandal prov 17p
satisfied with Rovai RP5 pumps worth the money	100%	100%	100%	n/a
average months in use	yes:39p 9 months	yes: 40p 20 months	yes: 23p 38 months	na 63 months
average flow rate per minute	37.9ltr*	39.3ltr	35.3ltr	n/a
	<small>*note possibly too low count</small>			
min/max flow rate per minute	30.8-42.9ltr	34-48 ltr	27.3-40 ltr	n/a
piston size	27.6- 28.8mm	27.6-28.8mm	22.2-28.6mm	27.26-27.84mm
average piston size	28.11mm	28.00mm	27.80mm	27.48mm
	<small>**note **starting piston size average: 29.1mm</small>			
period since last survey (months)		14	14	27
piston wearing per year		0.09mm	0.17mm	0.14mm
still use old Rope				3
still use old pistons				8
still working				14*
				<small>*3 have bought electric pump or connected to piped water system</small>

The reason to survey fewer pumps is that the pump type has developed over time when earlier survey results were implemented. Now we are mainly interested in the piston and rope wear

Kampong Chhnang province: Technical survey on 17 pumps

RP6 & FR pumps were installed 43-59 months ago with an average of 51 months ago: 16 on a hand dug well and 1 pump on a tub/combination well.

- 15 pumps are working, 2 not as the owners said they don't where to get spare parts.
- Maintenance:
 - 60% says to do maintenance although on 15 pumps the surveyors noticed no traces of oiling the bearings
 - 14 pumps have never had the rope changed (at 11 pumps the interviewer advised the owner to replace the rope soon)
 - 50% knows where to buy spare parts (local market)
- Rust: 2 pump had no signs of rust, 13 had small amount of rust, 2 with a lot of rust
- Flow rate: 33.8-48.0 liter/minute,
- Average flow rate: 41,57 liter/minute
- Piston size 23.9-28.0mm
- Average piston size: 26.52mm

	2010	2012		
	KC prov	KC prov	KC prov	KC prov
satisfied with Rovai	100%	100%		
pumps worth the money	yes: 39p	yes: 17p		
average months in use	22 months	53 months		
average flow rate per minute	28.7ltr	41.57ltr		
min/max flow rate per minute	19.9-43.9 ltr	33.8-48 ltr		
piston size	26.9-28.6mm	23.9-28.0mm		
average piston size	28.1mm*	26.5mm		
	<i>* av start 28,3mm</i>			
period since last survey (months)		25		
piston wearing per year	0,11mm	0.61mm		
users know where to buy spare parts	30%	50%		

Kampong Thom province: Technical survey on 24 pumps

RP6 pumps were installed between 16 and 53 months ago, on average 37 months ago and all on hand dug wells.

- All pumps are working
- Maintenance:
 - 90% says to do maintenance at some point although only on 8 pumps the surveyors noticed traces of oiling the bearings
 - Nobody can remember when the rope has been changed last
 - 25% knows where to buy spare parts (local market)
- Rust: 2 pumps had no signs of rust, 15 had small amount of rust, 7 with a lot of corrosion.
- Flow rate: 32.9-47.9 liter/minute,
- Average flow rate: 42,4 liter/minute
- Piston size 26.5-27.8mm
- Average piston size: 27.0mm

	KT prov	KT prov	KT prov	KT prov
satisfied with Rovai	100%			
pumps worth the money	yes: 24p			
average months in use	39 months			
average flow rate per minute	42.4ltr			
min/max flow rate per minute	32.9-47.9 ltr			
piston size	26.5-27.8mm			
average piston size	27.0mm*			
	<i>* av start 28.3mm</i>			
period since last survey (months)				
piston wearing per year	0.4mm			
users know where to buy spare parts	25%			

Notes on flow rate

The flow rate is calculated as the amount of liters water lifted up to the outlet pipe per minute. The low flow rate found in 2008 could not be adequately explained, the only possible reason was that the surveyor may have been turning the handle too slow on this first survey. Factory test showed that in 2007/8 an average of 40 liters per minute could be achieved quite easily.

Notes on pistons

During the technical survey the surveyors measured 5 pistons out of approximately 20 pistons on the rope. Therefore it is possible that different pistons have been measured and this may influence the survey results. However the pistons are manufactured with a small tolerance hence measuring five pistons should provide a reliable value for wear rate calculation and comparison with previous years.

The piston production in the IaW factory has been more accurate over the years, with in the specification listed minimum and maximum range of 28.0-28.5mm. The pistons used for the first batches of pumps, installed in Kandal province in 2007, had an average of 29.1mm. The pistons leaving the factory now are on average 28.1mm. Where pistons have been replaced the wear rate may be misleading.

Technical Survey Form in Kandal province

ទំនាក់ទំនងស្រាវជ្រាវបច្ចេកទេសរបស់ស្ថាប័នអភិវឌ្ឍន៍

សំរាប់ ខេត្តកណ្តាល ឆ្នាំ ២០១២

របស់របរដែលត្រូវរៀបចំ និង យកតាមខ្លួន នៅពេលដែលអ្នកធ្វើការស្រាវជ្រាវ៖

- A) ម៉ែត្រគ្រឿង B) GPS C) ប៊ិច និង ក្រដាស

កាលបរិច្ឆេទ (Date):

GPS: N, E, Elv.....

លេខសំគាល់ស្នប់ (Pump ID No.):

ការស្រាវជ្រាវនេះធ្វើឡើងដោយ (Survey carried out by):

ការវែងដាំ សក្តានុពល និង ដំណើរការ

- 1] ឃើញមានប្រេងទើបតែដាក់នៅតាមប្លង់ដាង? មាន គ្មាន
 Evidence of oil recently applied to the bushes
- 2] សក្តានុពលរបស់ខ្សែ? ត្រូវប្តូរ អាចទទួលយកបាន ល្អ
 What is the condition of the rope?
- 3] ប្រភេទស្នប់ទឹករ៉ៃ? RP5 RP6
 Type/version of Rovai pump?
- 4] ប្រសិនបើស្នប់មិនដំណើរការ សូមគូសនៅក្នុងប្រអប់៖
 If pump is not working tick box
- 5] ទំហំពីស្តង់
 Piston size

ប្រើប្រាស់ ម៉ែត្រគ្រឿង វាស់ពីស្តង់ចំនួន ៥ ដោយចន្លោះៗ ហើយ សរសេរទំហំនៅក្នុងតារាងខាងក្រោម ៖
 Using verniers measure 5 pistons at random and write the size down in table below

ពីស្តង់លេខ	1	2	3	4	5	សរុប	មធ្យម Avg (=សរុប/5)
បញ្ចូលទំហំ (mm)							

យោបល់ ឬ ការសង្កេតឃើញផ្សេងទៀត (Other comments or observations) :

.....

.....

.....

.....

ទំរង់ស្រាវជ្រាវបច្ចេកទេសរបស់ស្នប់ទឹកថែ និងការពេញចិត្ត

សំភារៈត្រូវយកតាមខ្លួន

a)ម៉ែត្រវាស់ b)ម៉ែត្រគ្រឿង c)GPS d)ប៊ិច និង ក្រដាស e)ហ្វឺត f)ធុងចំណុះ 20 លីត្រ g)នាឡិកាផ្សេងម៉ោង

ផ្នែកទី១: បច្ចេកទេស (Part1: Technical Survey)

ធ្វើឡើងដោយ (Survey carried out by):.....

កាលបរិច្ឆេទ (Date):..... លេខសំគាល់ស្នប់ (Pump ID No.):.....

GPS: N, E, Elv.....

ឈ្មោះម្ចាស់ស្នប់/អ្នកឆ្លើយ (User name) អាសយដ្ឋាន (address) ភូមិ

ឃុំ ស្រុក ខេត្ត Tel:

ក. សេចក្តីលំអិតនៃការតំឡើង

1a] ស្នប់ទឹករ៉ៃត្រូវបានតំឡើងលើ: អណ្តូងលូ, អណ្តូងខ្វែង/ចម្រុះ, ស្រះទឹក
Is the Rovai installed on: Hand dug well, Tube/combination well, Pond

1b] តើស្នប់ត្រូវបានតំឡើងនៅពេលណា? ខែ..... ឆ្នាំ..... (សរុបចំនួនខែ)
When was the pump installed?

2] កំពស់ទឹកក្នុងអណ្តូងពេលមិនទាន់ប្រើប្រាស់ វាស់វែងឃើញ....., ប៉ាន់ស្មាន.....
What is the Static depth of well?

3] ជំរៅអណ្តូង (ជំរៅពេញ) វាស់វែងឃើញ....., ប៉ាន់ស្មាន.....
What is the depth of well (full depth)

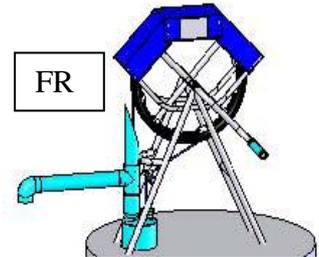
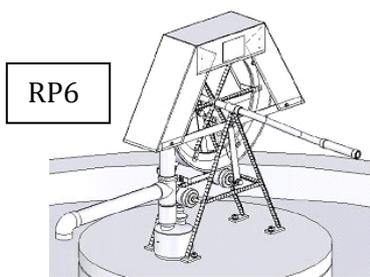
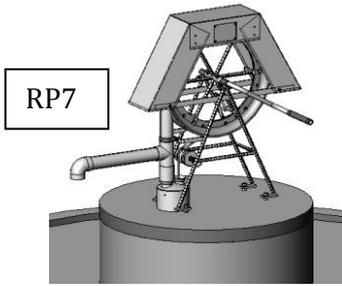
4] ជំរៅរបស់ប្រអប់រន្ធហ្ន វាស់វែងឃើញ....., ប៉ាន់ស្មាន.....
What is the depth of guide box?

ខ. ការថែទាំ លក្ខខណ្ឌ និង ជំនឿការ

5] ឃើញមានប្រេងទើបតែដាក់នៅតាមប្តូងដាង: មាន គ្មាន
Evidence of oil recently applied to the bushes

6] លក្ខខណ្ឌរបស់ខ្សែ? ត្រូវប្តូរ អាចទទួលយកបាន ល្អ
What is the condition of the rope?

7] តើមានសញ្ញាច្រេះនៅលើស្នប់ដែរឬទេ? គ្មាន មានខ្លះ មានច្រើន
Are there signs of rust on the pump?



គ. ដំណើរការ

8] ប្រសិនបើស្នប់មិនដើរ សូមគូសនៅក្នុងប្រអប់៖
 If pump is not working tick box

9] ការធ្វើតេស្តលើអត្រាលំហូរ

ប្រើធុងដែលមានចំណុះ 20 លីត្រ - នាឡិកាផ្ទៀងម៉ោង - រាប់ចំនួនជុំ និង ផ្ទៀងម៉ោង ចាប់តាំងពេលចាប់ផ្តើម រហូតដល់ទឹកពេញធុង ។
 Use a 20ltr bucket and a stop watch. Count how many times the user turns the handle and count the time since start until bucket is full.

លេខរៀង	ប៉ុន្មានវិនាទីបាន ២០លីត្រ Time to fill 20ltr (seconds)	រវៃប៉ុន្មានជុំ No. of handle turns
តេស្ត		

10] ទំហំពីស្តុង

ប្រើប្រាស់ មែត្រគ្រឿង វាស់ពីស្តុងចំនួន ៥ ដោយចន្លោះៗ ហើយ សរសេរទំហំនៅក្នុងតារាងខាងក្រោម ៖
 Using verniers measure 5 pistons at random and write the size down in table below

ពីស្តុងលេខ	1	2	3	4	5	សរុប	មធ្យម Avg (=សរុប/5)
បញ្ចូលទំហំ (mm)							

ឃ. សំណួរទៅកាន់អ្នកប្រើប្រាស់

11a] តើអ្នកធ្វើការថែទាំស្នប់នេះដែរឬទេ ?
 Do you do maintenance in pump?

11b] តើអ្នកបានផ្លាស់ខ្សែជាលើកចុងក្រោយ នៅពេលណា ?
 When did you change the rope last time?

11c] តើអ្នកទិញសំភារៈជួលជុលនៅឯណា ?
 Where do you buy spare parts?

11.d]

យោបល់ ឬ ការសង្កេតឃើញផ្សេងទៀត (Other comments or observations) :

ផ្នែកទី២: ការពេញចិត្ត (Part2: Customer Satisfaction Survey)

1	Are you the buyer or user of pump, or both	1. Buyer 2. User 3. Both
2	Disabled (look at respondent)	yes/no (arms or hands, other.....)
3	Age	
4	Gender	1. Male 2. Female
5	How many families use this pump?	1. 1 family 2. 2 families 3. 3-5 families 4. 6-10 families 5. >11 families
6	Do any disabled people use this pump?	yes/no
7	Overall, how would you rate the quality of the pump?	1. Excellent 2. Very good 3. Good 4. Poor 5. Very poor
8	Is collecting water easier or harder than before?	1. Now much easier 2. A little easier 3. No difference, the same 4. A little more harder now 5. Now it is much harder
9	Are you satisfied with the flow rate of the pump?	1. Very satisfied 2. Satisfied 3. Neutral 4. Dissatisfied 5. Very dissatisfied
10	How would you rate the reliability of the pump?	1. Very reliable 2. Reliable 3. Somewhat unreliable 4. Very unreliable
11	Are you satisfied with the design of the pump?	1. Very satisfied 2. Satisfied 3. Neutral 4. Dissatisfied 5. Very dissatisfied
12	What type of information did you receive when the pump was installed?	<input type="checkbox"/> No information was given <input type="checkbox"/> Don't know <i>only probe after letting them come with first answer</i> <input type="checkbox"/> On cleaning? what was said?..... <input type="checkbox"/> On maintenance? what was said?..... <input type="checkbox"/> On repair? what was said?..... <input type="checkbox"/> On children playing? what was said?..... <input type="checkbox"/> Animal dung? what was said?..... Other.....
13	Who is responsible for maintenance?	
14	When did you/this person change the rope last?	
15	When did you/ this person oil the baring?	
16	If there is a major breakdown (welding) who would repair it?	<i>do not lead answers but if people don't know tell them to go to hard ware store</i> 1. Village Shop 2. Technician in village 3. Don't know 4. Other place.....
17	Are you using more water than before now?	Yes <input type="checkbox"/> No <input type="checkbox"/> Don't know <input type="checkbox"/>
18	Before, you had an open well or a pond and collected water with rope and bucket. What other extra benefits do you feel you have by using the ROVAI pump?	<input type="checkbox"/> Don't know <i>probing, more than 1 answer possible</i> <input type="checkbox"/> Faster water collection <input type="checkbox"/> Easier cooking, cleaning, laundry <input type="checkbox"/> Easier showering <input type="checkbox"/> Easy for vegetable garden

		Other
19	Do you think the pump can earn you some more income?	Yes <input type="checkbox"/> No <input type="checkbox"/>
20	Extra income through: (you can tell them about the winemaker who earns \$4.40 per day extra now) - Increase domestic vegetable garden (vegetables to market)? - More animals than before? - Increase other business? (wine market, cement ring making, drinking water making) -Other	Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/>
21	If yes, how much money are you earning more since the Rovai pump?	1. 2,000r to 5,000r per day 2. 6,000r to 10,000r per day 3. 11,000r to 20,000r per day 4.
22	What improvements should we make so that your pump is better for you?	in design: in performance:
23	Would you say that the ROVAI pump is easier or harder to use than other pumps you have used?	1. ROVAI is easier 2. The same 3. ROVAI is harder
24	What kind of pump did you use before?  VN6  TARA	 AFRIDEV
25	Do you have any recommendations or comments for us?	<i>Interesting quotes of people:</i>