



3rd
Customer Satisfaction
and
Technical Performance survey
of the Rope Pump "ROVAI "
made by
Ideas at Work

September 2010

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.

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 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). So we have added to the 3rd survey (2010) the ROVAI model-6 (RP6) which have been installed in Kampong Chhnang province.

METHOD:

This 3rd study was carried out in 2 parts:

- a customer satisfaction (Kampong Chhnang province)
- a technical performance survey (Kampong Chhnang and Kandal Province)

GPS coordinates made sure we surveyed the same pumps again in Kandal Province and check on wear rate of the pistons and rope. User satisfaction feedback was put next to last year results for comparison.

Surveyors:

- Mr. Un Em
- Mr. Vun Chanly
- Mr. Seng Sophea
- Mr. Kim Sakhorn

No. of interviews/pumps: 62

Period: July-August 2010

Survey area:

Kandal Province, Kean Svay district: 23 pumps (RP5) technical survey only

- Survey period: August 2010
- o 2 villages
 - o Robos Angkanh, Prek Thom

Kampong Chhnang province, Borri Bo, Rolea B'ier, Kampong Trolach districts: 39 pumps (RP6).

- Survey period: July-August 2010
- o 22 villages
 - o Ang village, Andong Russei, Krang Preh Svay, Trea Troung, Toem Tbeng, Thmey, Brambey Choum, Banteay Preal, Tropeng Thom, Krang Leav, Thlork Youl, Krolanh, Ou village, Prey Tamung, Phsar village, Chum Teav Bottrey, Kork village, Snoir village, Prey Preh Ream, Thnorl Thmey, Meanchey, Prey Khmer.

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

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

In Kandal province only ROVAI model-5 (RP5) pumps were installed which have a known rust problem. In Kampong Chhnang province we installed the follow up pump, the ROVAI model-6 (RP6).

User Satisfaction results

On average the pumps are used with 1-2 families but 20% are used with 5-10 families.

100% of the families said they rated their satisfaction of the pump as "good" to "very satisfied"

30% know where to purchase spare parts (piston and rope) i.e. at the market.

Still 40% answered they didn't know where to buy them.

10% never did any maintenance but 90% do carry out (some) regular maintenance.

Technical Performance results

Kandal province: Technical survey on 23 pumps

Pumps installed 29-52 months, with an average 38 months (3+ years).

23 pumps are working.

10 pumps had traces of oil on the bushes (13 not). Not applying oil makes it the handle harder to turn and usually much noisier.

All had rust which we knew as being prominent RP5 problem

Flow rate: 27.3- 40 liter/minute, average 35.3 liter/minute

Piston size 26.94-28.58mm

Average piston size: 27.8mm

Piston comparison 2009 versus 2010 in Kean Svay district, Kandal Province: Over a period of 16 months the average wear is 0.36mm

Kampong Chhnang province: Technical survey on 39 pumps

Pumps were installed between 11-36 months ago, with an average 22 months.

All 39 pumps are working

Maintenance: 24 pumps had traces of oil on the bushes (15 not)

Rust: 24 pump had no signs of rust, 14 had small amount of rust, 1 with a lot of rust

Flow rate: 19.9-43.9 liter/minute,

Average flow rate: 28,7 liter/minute

Piston size 27.7-28.4mm

Average piston size: 28.1mm

COMPARISON 1st, 2nd and 3rd SURVEY

	2008	2009	2010	2010
	Kandal prov	Kandal prov	Kandal prov	KC prov
satisfied with Rovai pumps worth the money	100%	100%	100%	100%
average months in use	yes:39p 9 months	yes: 40p 20 months	yes: 23p 38 months	yes: 39p 22 months
average flow rate per minute	37.9ltr*	39.3ltr	35.3ltr	28.7ltr
	<i>*note possibly too low count</i>			
max/min flow rate per minute	30.8-42.9ltr	34-48 ltr	27.3-40 ltr	19.9-43.9 ltr
piston size	27.6- 28.8mm	27.6-28.8mm	22.2-28.6mm	26.9-28.6mm
average piston size	28.11mm	28.00mm	27.80mm	28.10mm
	<i>**starting piston size average: 29.1mm</i>			<i>**starting piston size average: 28.3mm</i>
period since last survey (months)		14	14	
piston wearing per year		0.09mm	0.17mm	
Users know where to buy spare parts	0%	8%	na	30% (KC)

CONCLUSIONS

In Kandal province only a technical survey was carried out while in Kampong Chhnang a small user satisfaction survey was carried out as well. In 2011 it is planned to expand the user satisfaction part of the survey.

The results show that the number of people who consider the pump to be worth the money has changed very little over the years.

Of the people who were asked where to buy spare parts only 30% answered positive in Kampong Chhnang province. This is a bit disappointing as IaW has a focus on increasing this knowledge and will continue to make it a target point.

Notes on flow rate

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.

As expected in the comparison table it shows that the sizes of the pistons in Kandal are slowly decreasing. This is indicating that there is around 0.09-0.17mm wear per year. It is not known why the wear rate for the first two years is so different. It would be expected that these have similar values for each year, though this may be due to the fact that the original size of the pistons varied and that the size of these was not obtained and were assumed to be of a certain size. 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 gardening plants. The next survey would expect to show that the wear to be more consistent with the last year.

The pump users are still content with the flow rate of the pump as no feedback on low flow rates were given by the users.

Notes on rust:

Severe rust on the pumps in Kandal province was due to the first pumps not having a good paint system on the RP5 models. However this was significantly improved on the RP6 model. In Kampong Chhnang only the RP6 models have been installed.

Annex 1 Survey form Kampong Chhnang - Khmer

Annex 2 Survey form Kampong Chhnang - English

Annex 3 Survey form Kandal - Khmer

ទំនាក់ទំនងប្រជាជនបច្ចេកទេសអំពីស្នប់ទឹកថែ

របស់របរដែលត្រូវរៀបចំ និង យកតាមខ្លួន នៅពេលដែលអ្នកធ្វើការស្រាវជ្រាវ៖

- a) ម៉ែត្រវាស់ b) ម៉ែត្រគៀប c) GPS d) ប៊ិច និង ក្រដាស e) ប្រឹក្សា f) ធុងចំណុះ 20 លីត្រ g) នាឡិកាផ្សំម៉ោង

ធ្វើឡើងដោយ (Survey carried out by):

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

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

ឈ្មោះម្ចាស់ស្នប់ (Name pump owner)

តើប៉ុន្មានគ្រួសារប្រើប្រាស់ស្នប់ទឹកនេះ (How many families use the pump): :

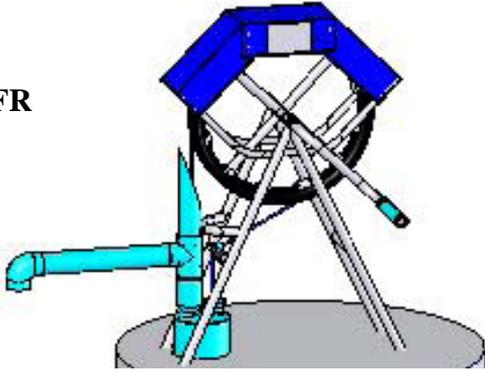
សេចក្តីលំអិតអំពីការកំឡើង

- 1a] ស្នប់ទឹករ៉ៃត្រូវបានកំឡើងលើ : អណ្តូងជីកដៃ , អណ្តូងស្នប់ , ស្រះទឹក
 Is the Rovai installed on: Hand dug well, Tube well, Pond
- 1b] តើស្នប់ត្រូវបានកំឡើងនៅពេលណា? ខែ..... ឆ្នាំ.....
 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?,

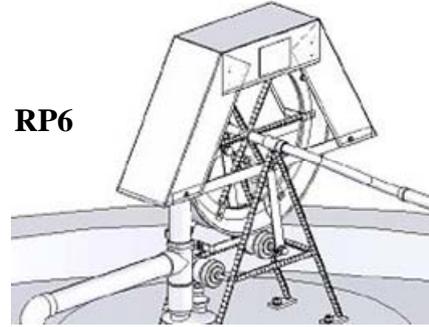
ការវែងធាំ លក្ខខណ្ឌ និង ជំនឿការ

- 5] ឃើញមានប្រេងទើបតែដាក់នៅតាមប្តូងដាង: មាន គ្មាន
 Evidence of oil recently applied to the bushes
- 6] លក្ខខណ្ឌរបស់ខ្សែ? ជំនួស អាចទទួលយកបាន ល្អ
 What is the condition of the rope?
- 7] តើមានសញ្ញាច្រេះនៅលើស្នប់ដែរឬទេ? គ្មាន មានខ្លះ មានច្រើន
 Are there signs of rust on the pump?

FR



RP6



ដំណើរការ

8] ប្រសិនបើស្នប់មិនដំណើរការ សូមត្រួតពិនិត្យនៅក្នុងប្រអប់៖

If pump is not working tick box

9] ការធ្វើតេស្តលើអត្រាលំហូរ

ប្រើធុងដែលមានចំណុះ 20លីត្រ ដាក់នៅជិតស្នប់ទឹក រៀបចំនាឡិកាផ្ទៀងម៉ោង និង ត្រៀមរាប់ចំនួនជុំ ដែលអ្នកប្រើប្រាស់ រវៃដែលស្នប់ ចាប់ផ្តើមរវៃ ហើយបន្ទាប់មក ដាក់ធុងនៅក្រោមបំពង់បង្ហូរទឹក

នៅពេលដែលលំហូរទឹកចាប់ផ្តើមចេញមកពេញលេញ ។ នៅពេលដែលធុង ចំណុះ 20លីត្រពេញ ឈប់ផ្ទៀងម៉ោង និង ឈប់រាប់ចំនួនជុំ ។

Use a 20ltr bucket and put this next to the Rovai, prepare a stop watch and get ready to count how many times the user turns the handle, start turning and then put bucket under outlet only when full flow has started. Stop counting time and No of turns when the 20ltr bucket is full.

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

10] ទំហំពីស្តុង

ប្រើប្រាស់ មែត្រគៀប វាស់ពីស្តុងចំនួន៥ 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)							

សួរសំណួរទៅកាន់អ្នកប្រើប្រាស់

11a] តើអ្នកចំណាយថវិការលើ ស្នប់ដែលកំពុងប្រើប្រាស់នេះដែរឬទេ ? ចំណាយ , មិនចំណាយ
 Is pump worth the money?

សួរពីមូលហេតុ ទោះបីជាឆ្លើយថា ចំណាយ រឺ មិនចំណាយក៏ដោយ (Ask reason for either Yes or No)

11b] តើអ្នកធ្វើការថែទាំស្នប់នេះ ដែរឬទេ ?
 Do you do maintenance in pump?

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

ព័ត៌មានត្រឡប់ ពីអ្នកប្រើប្រាស់

12] តើអ្នកប្រើប្រាស់ មានសំណើឱ្យកែលំអរលើរូបរាងស្នប់ដែរឬទេ ?
 Does user have suggestions on design?

យោបល់ ឬ ការសង្កេតឃើញផ្សេងទៀត (Other comments or observations) :

.....

Rovai technical survey form

Items to prepare and take with you on the survey:

- a) Tape measure, b) vernier, c) GPS, d) pen paper, e) marker pen, f) 20ltr bucket, stop watch

អ្នកនាំការធ្វើ (Survey carried out by):

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

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

Name pump owner :

How many families use the pump :.....

Details of installation

1a] Is the Rovai installed on: Hand dug well , Tube well , Pond well

1b] When was the pump installed? Month..... Year

2] កំពស់ទឹកក្នុងអណ្តូងពេលមិនទាន់ប្រើប្រាស់

What is the Static depth of well? Measured, Estimated

3] ជំរៅអណ្តូង

What is the depth of well (full depth) Measured, Estimated

4] What is the depth of guide box? Measured, Estimated

Maintenance, condition & performance

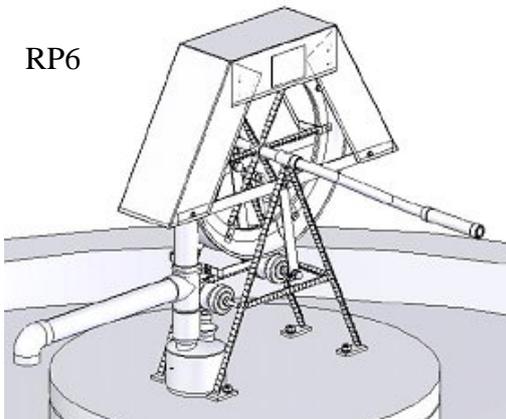
5] Evidence of oil recently applied to the bushes: Yes , no

6] What is the condition of the rope? Replace , acceptable , good

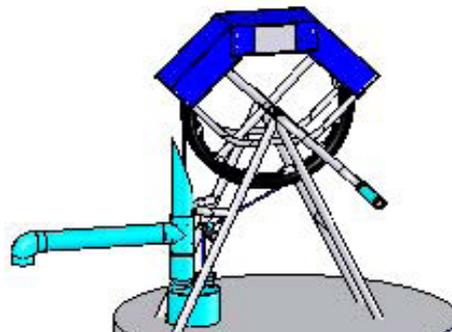
7] Are there signs of rust on the pump? None , some , a lot

Show rust on drawing:

RP6



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Performance

8] If pump is not working tick box:

9] *Flow rate test*

Use a 20ltr bucket and put this next to the Rovai, prepare a stop watch and get ready to count how many times the user turns the handle, start turning and then put bucket under outlet only when full flow has started. Stop counting time and No of turns when the 20ltr bucket is full.

លេខរៀង (No)	ប៉ុន្មានវិនាទី = ២០លីត្រ Time to fill 20ltr (seconds)	រង់ប៉ុន្មានដុំ No. of handle turns
Test		

10] *Piston size*

Using verniers measure 5 pistons at random and write the size down in table below

Piston No	1	2	3	4	5	Total	Average (=total/5)
Insert size (mm)							

User questions

11a] Is pump worth the money? Yes , no

Ask reason for either yes or no

.....

.....

.....

11b] Do you do maintenance in pump?

.....

11c] Where do you buy spare parts?

.....

User feedback

12] Does user have suggestions on design?

<p>Other comments or observations:</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p> <p>.....</p>
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ទំរង់ស្រាវជ្រាវបច្ចេកទេសរបស់ស្នប់ទឹករ៉ៃវ

របស់របរដែលត្រូវរៀបចំ និង យកតាមខ្លួន នៅពេលដែលអ្នកធ្វើការស្រាវជ្រាវ:

a) ម៉ែត្រវាស់ b) ម៉ែត្រត្រៀម c) GPS d) ប៊ិច និង ក្រដាស e) ប្រឹក f) ធុងចំណុះ 20 លីត្រ g) នាឡិកាផ្ទៀងម៉ោង

កាលបរិច្ឆេទ (Date):

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

លេខសំគាល់ស្នប់ (Pump ID No.):

ការស្រាវជ្រាវនេះធ្វើឡើងដោយ (Survey carried out by):

សេចក្តីលំអិតនៃការកំណត់

1a] ស្នប់ទឹករ៉ៃវត្រូវបានតំឡើងលើ:

Is the Rovai installed on:

អណ្តូងដីកដៃ , អណ្តូងស្នប់ , ស្រះទឹក
Hand dug well, Tube well, Pond

1b] តើស្នប់ត្រូវបានតំឡើងនៅពេលណា?

When was the pump installed?

ខែ..... ឆ្នាំ.....

2] កំពស់ទឹកក្នុងអណ្តូងពេលមិនទាន់ប្រើប្រាស់

What is the Static depth of well?

វាស់វែងឃើញ, ប៉ាន់ស្មាន

3] ជំរៅអណ្តូង (ជំរៅពេញ)

What is the depth of well (full depth)

វាស់វែងឃើញ, ប៉ាន់ស្មាន

4] ជំរៅរបស់ប្រអប់រទ្ធិ

What is the depth of guide box?

វាស់វែងឃើញ, ប៉ាន់ស្មាន

ការវែងទាំ លក្ខខណ្ឌ និង ដំណើរការ

5] ឃើញមានប្រេងទើបតែដាក់នៅតាមប្តូងដាង:

Evidence of oil recently applied to the bushes

មាន គ្មាន

6] លក្ខខណ្ឌរបស់ខ្សែ?

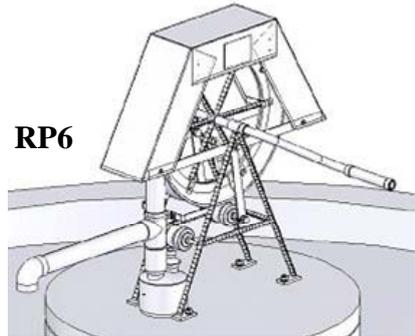
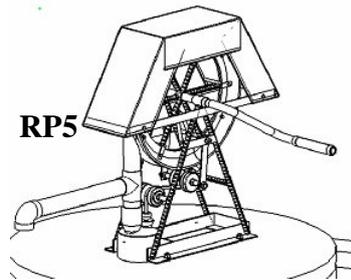
What is the condition of the rope?

ជំនួស អាចទទួលយកបាន ល្អ

7] តើមានសញ្ញាច្រេះនៅលើស្នប់ដែរឬទេ?

Are there signs of rust on the pump?

គ្មាន មានខ្លះ មានច្រើន



ដំណើរការ

8] ប្រសិនបើស្នប់មិនដើរ សូមគុសនៅក្នុងប្រអប់:
If pump is not working tick box

9] ការធ្វើតេស្តលើអគ្រាល់ហ្វារ

ប្រើធុងដែលមានចំណុះ 20 លីត្រ ដាក់នៅជិតស្នប់ រៀបចំនាឡិកាផ្ទៀងម៉ោង និង ត្រៀមរាប់ចំនួនជុំ ដែលអ្នកប្រើប្រាស់ រវៃដៃស្នប់ ចាប់ផ្តើម រវៃ ហើយបន្ទាប់មក ដាក់ធុងនៅក្រោមបំពង់បង្ហូរទឹក តែនៅពេលដែលលំហូរពេញលេញ ។ នៅពេលដែលធុងចំណុះ 20 លីត្រពេញ ឈប់ ផ្ទៀងម៉ោង និង ឈប់រាប់ចំនួនជុំ ។

Use a 20ltr bucket and put this next to the Rovai, prepare a stop watch and get ready to count how many times the user turns the handle, start turning and then put bucket under outlet only when full flow has started. Stop counting time and No of turns when the 20ltr bucket is full.

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

10] ទំហំពីស្តុង

ប្រើប្រាស់ មែត្រគ្រឿង វាស់ពីស្តុងចំនួន ៥ ដោយចន្លោះៗ ហើយកត់ត្រាទំហំរបស់វា នៅក្នុងតារាងខាងក្រោម :
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)
កត់ត្រាទំហំ (mm)							