



Wirelessly Addressing Leaking Toilets. A Case Study.

Date: January 1, 2013

Presented by: Jim Brackett

Direct: (615) 300-3194

E-mail: jab@leakbeeper.com

Profile

The Leak Beeper was invented and patented by Steve Ghertner and Vince Luciani of Ghertner Automation. It was invented in response to a recurring problem that Steve's property management company, Ghertner Property Management, was having: high water bills due to leaking toilets. Steve and Vince, both Electrical Engineers, were convinced that the solution was rather simple: what was needed was a device that could gauge when water was re-filling a toilet's water tank due to a reason other than a deliberate flush.

Upon installation, the toilet is flushed so that the unit can establish the timing of a normal or intended water flow. The flush is detected by the probe as water flows through the refill tube. A microprocessor compares every flush length to the calibration value for that toilet. From this moment on, water flows that deviate from this calibrated time are flagged as suspected leaks.

In mid-2011, the Leak Beeper was reengineered to incorporate a radio transmitter that could wirelessly transmit its leak indications. The Fairfield Inn- Fort Worth- University was the first tested installation of the new system.

Subject

The Fairfield Inn- University is a 79 room hotel in Fort Worth, Texas. In the 12-months prior to the test, The Fairfield Inn consumed an average of 343 CCFs (Hundred Cubic Feet) of water per month and averaged water/sewer bills of \$1,572.

We kept track of Cost and Consumption using two different methods; General and POR. General Cost and Consumption is what is reported on the property's monthly bill. To more accurately determine potential savings, we tracked water consumption based on the number of days of usage each billing month and the number of apartments occupied. This method, common in the hospitality industry, is known as Per-Occupied Room or POR.

Prior to the Leak Beeper installation, POR Cost was \$.94 and POR Consumption was .204 CCFs of water.

The occupancy rate remained relatively stable for the 12-months prior and post installation; 73% and 70%, respectively. The property has an irrigation system with a separate meter and is not included in the usage we tracked.

Test

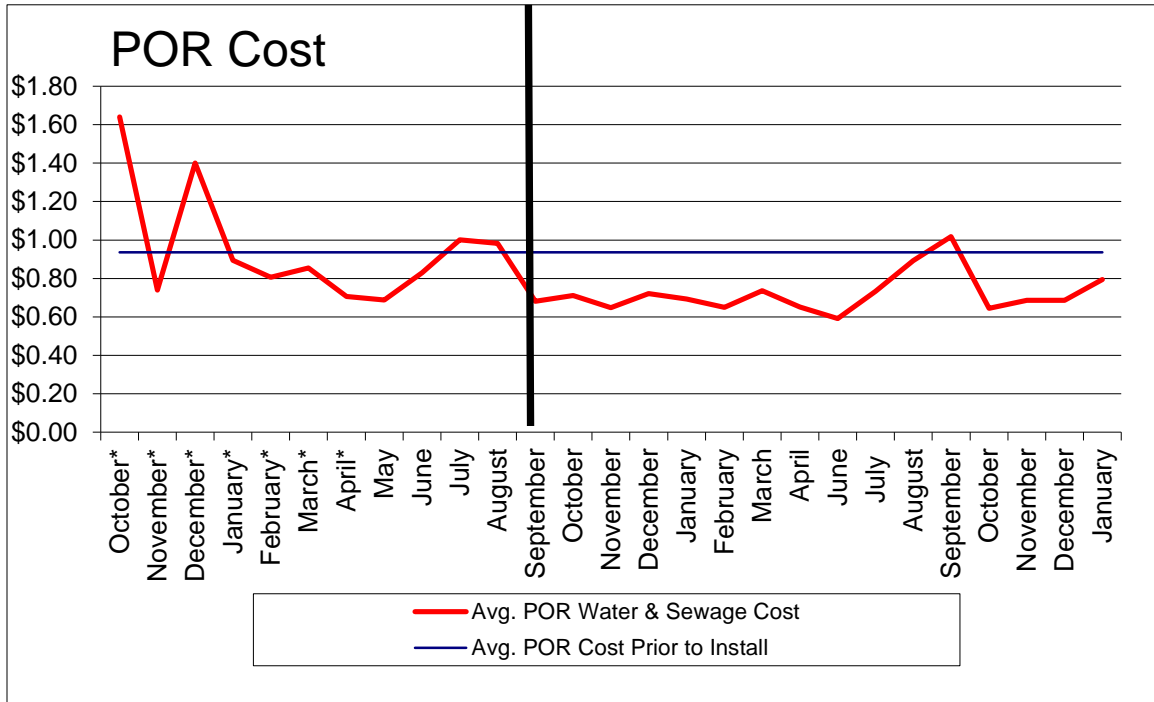
In September of 2011, wireless Leak Beepers were installed on The Fairfield Inn's 79 toilets. Leak indications were reported on a daily basis and that information was forwarded to the onsite manager and engineer. The toilets were repaired in a timely manner. The results were tracked over a 15-month period post installation.

Results

- General Consumption decreased by 22% to an average of 275 CCFs per-month
- POR Consumption was reduced by 25% to an average of .157 CCFs
- General Cost decreased by 21% to an average of to an average of \$1,275 per-month

- POR Cost decreased by 25% to an average of \$.72 per-occupied room per-month from \$.94
- Monthly Water and Sewage bill decreased by an average of \$329 per month
- Cumulative savings at the end of the period were \$4,607

Charted Consumption



Conclusion

The Case Study demonstrates that leaky toilets can present a significant financial burden to property managers. This initial *wireless* Case Study also shows that leak indications can be remotely reported to onsite personnel for faster repairs.

The study also demonstrates that a significant number of leaks were occurring at the property, but weren't being reported by guests and weren't being discovered by maintenance or housekeeping personnel.

In summary, over the past year, the Leak Beeper has shown itself to be a cost-effective tool in reducing overall expenses for property managers.



Case Study Details

Month	Water Use Per-Occupied Toilet, Per-Day (Cubic Feet) (POR)				Water Cost Per-Occupied Toilet, Per-Day (\$) (POR)				General Bill	Avg. Monthly (RUD)**	Avg. Daily Annualized (RUD)**
	Avg. Prior to Install	Actual	Difference 12-month Avg. Prior to Install.	Difference Same Month Before Install	Avg. Prior to Install	Actual	Difference 12-month Avg. Prior to Install.	Difference Same Month Before Install			
December	15.61	18.70			\$1.19	\$1.42					
January	15.61	18.90			\$1.19	\$1.43					
February	15.61	17.94			\$1.19	\$1.36					
March	15.61	17.69			\$1.19	\$1.34					
April	15.61	13.71			\$1.19	\$1.04					
May	15.61	14.84			\$1.19	\$1.13					
June	15.61	14.63			\$1.19	\$1.11					
July	15.61	14.67			\$1.19	\$1.11					
August	15.61	14.53			\$1.19	\$1.10					
September	15.61	15.11			\$1.19	\$1.15					
October	15.61	19.66			\$1.19	\$1.49					
November	15.61	13.40			\$1.19	\$1.02					
December	15.61	13.61			\$1.19	\$1.03					
January	15.61	14.54			\$1.19	\$1.10					
February	15.61	12.27			\$1.19	\$0.93					
March	15.61	12.86	-18%	-27%	\$1.19	\$0.88	-26%	-34%	\$2,726	\$2,968	\$18,788
April	15.61	12.55	-20%	-8%	\$1.19	\$0.90	-24%	-13%	\$1,953	\$2,944	\$17,509
May	15.61	13.47	-14%	-9%	\$1.19	\$0.98	-18%	-13%	\$3,038	\$1,781	\$12,941
June	15.61	13.18	-16%	-10%	\$1.19	\$0.98	-17%	-12%	\$1,775	\$2,017	\$12,767
July	15.61	12.80	-18%	-13%	\$1.19	\$0.93	-22%	-17%	\$2,311	\$2,553	\$16,159
August	15.61	13.30	-15%	-8%	\$1.19	\$0.96	-19%	-13%	\$1,994	\$2,235	\$14,151
September	15.61	13.21	-15%	-13%	\$1.19	\$0.95	-20%	-17%	\$1,770	\$2,387	\$14,635
October	15.61	13.28	-15%	-32%	\$1.19	\$0.96	-19%	-36%	\$2,862	\$1,979	\$13,870
November	15.61	12.55	-20%	-6%	\$1.19	\$0.90	-24%	-11%	\$2,224	\$2,841	\$17,422
December	15.61	12.75	-18%	-6%	\$1.19	\$0.92	-23%	-11%	\$2,089	\$2,705	\$16,590
January	15.61	13.16	-16%	-9%	\$1.19	\$0.95	-20%	-14%	\$2,936	\$2,054	\$14,393
February	15.61	12.48	-20%	2%	\$1.19	\$0.91	-23%	-3%	\$3,343	\$2,461	\$17,245
March	15.61	12.52	-20%	-29%	\$1.19	\$0.90	-24%	-33%	\$2,543	\$2,785	\$17,628
April	15.61	12.70	-19%	-7%	\$1.19	\$0.96	-19%	-8%	\$1,704	\$2,320	\$14,230
May	15.61	12.22	-22%	-18%	\$1.19	\$0.93	-22%	-18%	\$2,867	\$2,359	\$15,961
June	15.61	12.43	-20%	-15%	\$1.19	\$0.97	-18%	-12%	\$2,283	\$1,974	\$13,116
July	15.61	13.32	-15%	-9%	\$1.19	\$1.00	-15%	-10%	\$1,433	\$1,812	\$11,336
August***	15.61	14.48	-7%	0%	\$1.19	\$1.08	-9%	-2%	\$307	\$1,066	\$6,458
September	15.61	13.10	-16%	-13%	\$1.19	\$0.99	-17%	-14%	\$1,838	\$1,913	\$12,289
October	15.61	13.59	-13%	-31%	\$1.19	\$1.02	-14%	-31%	\$1,980	\$1,472	\$9,964
November****	15.61	12.69	-19%	-5%	\$1.19	\$0.96	-19%	-6%	\$1,459	\$2,236	\$14,156
December	15.61	14.87	-5%	9%	\$1.19	\$1.06	-10%	3%	\$104	\$1,256	\$7,703
January	15.61	12.56	-20%	-14%	\$1.19	\$0.95	-20%	-14%	\$2,394	\$2,048	\$14,351
February	15.61	11.68	-25%	-5%	\$1.19	\$0.89	-25%	-4%	\$2,947	\$2,601	\$18,227
March	15.61	10.87	-30%	-16%	\$1.19	\$0.82	-30%	-7%	\$2,238	\$3,766	\$22,394
April	15.61	11.81	-24%	-6%	\$1.19	\$0.90	-24%	0%	\$2,600	\$2,628	\$17,784
Averages		12.88	-19%	-13%		\$0.94	-21%	-15%	\$2,304	\$2,368	\$15,329





Installation Instructions

Step 1

Remove toilet tank lid & hang Leak Beeper Alarm Unit on side or back of tank, so alarm light is visible.

Step 2

Remove existing connector that attaches tank re-fill tube to overflow pipe, & install Leak Beeper S-Clip Probe in its place. Make sure that water level is at least 1/4 inch from bottom of Leak Beeper Probe. This may require lowering the Fill Valve Float.

Step 3

Attach Leak Beeper's grounding clamp to the refill tube, about 1 inch from the probe.

Step 4

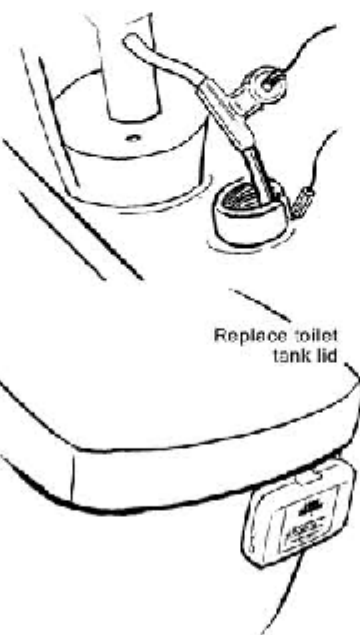
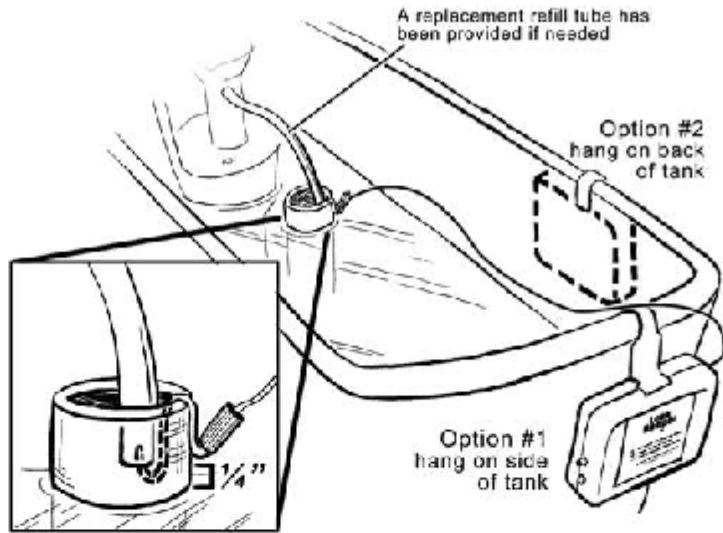
Connect the Probe Lead Plug into the Leak Beeper Alarm Unit. Make sure that the red and black wires are not twisted together. Replace Tank Lid.

Step 5

Re-set the unit for calibration by pushing the indicator button briefly. Indicator light on the Leak Beeper will change from Red to Yellow, then to Green. The Green light will stay on to await the initial calibration flush.

Step 6

Flush the toilet. Green light will blink while toilet is refilling. Blinking green light will stop after the toilet is refilled. The Leak Beeper is now monitoring your toilet for leaks.



Leak Indications:

Blinking Red Light: Indicates a "Short Leak", which is typically caused by a faulty flapper.

Solution: Replace flapper.

Constant Red Light: Indicates a "Long Leak" which is typically caused by a faulty fill-valve or flush-valve.

Solution: First replace the fill-valve. If leak indication persists, replace the flush-valve.

Constant yellow light: Indicates low batteries.

Solution: Replace Leak Beeper's 2 AAA batteries.

Constant green light: (when button is pushed) Indicates that the Leak Beeper and your toilet are functioning correctly.

In the unlikely event that both types of leaks occur at the same time, and that a low battery is detected, the indicator light will signal each occurrence concurrently, for 3 seconds each; a blinking red light, a solid red light and a constant yellow light.

To clear out the leak indications and re-set the Leak Beeper for future detection, simply hold the indicator button down until the indicator light changes from Red to Yellow to Green. The Green light will stay on to await a new calibration flush.