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## **Review of Grinder Pump System Errors and Omissions December 2012 and September 2014**

The house at this address was destroyed in a fire in February 2012 and subsequently rebuilt on the same foundations. The house was a split level with rooms for half the house and crawl space for the other half. The grinder pump and effluent pipes exited the house from the crawl space area. There was mainly water damage in the lower level, not fire damage.

As part of the rebuilding it was decided to replace the grinder pump which had been installed at the original house building some 20 years before. The grinder pump being replaced as an Environmental One Series 210 grinder pump. (E1-210).

The contractor in charge of the rebuild was Better World Building Technologies (BWBT). The subcontractor for the replacement of the grinder pump was KMB Plumbing and Electrical Inc.

The invoice (#2486) for the work dated 6 December 2012 reads as follows:

'Installation of new retrofit E1 210 grinder with control wiring'

During the Labor Day weekend this September I went looking for some tools in the utility room in the basement where the grinder pump is located and found that there was effluent on the floor and then found that the sewer connection to the grinder pump was broken.

I informed the builder (BWBT) and Toni Lynch, the project manager examined the situation. We did not have the name of the subcontractor immediately available and after calling Saw Creek Estates Community Accosiation (the managers of the development) we contacted Semper Fi thinking they were likely to have been the installer. It turned out they were not, but asked them to effect repairs to the piping which they did.

Semper Fi also advised me that the float switches needed replacing, and that there was no alarm connected to the system. The float switch was replaced, and fixing of the alarm was scheduled for the following morning. The alarm was fitted the following morning, the system tested and everything seemed to be under control.

Late the following day, the alarm went off and I called BWBT for guidance on what to do now and called Semper Fi. Semper Fi came immediately to look at the situation and determined that the pump motor was not working and that the grinder pump assembly would have to be replaced.

Over the weekend I researched the building paperwork and found that the sub-contractor had been JMB Plumbing and Electrical Inc. (JMB). I described to them what I thought had happened. They could not come immediately but came the following Wednesday bringing a replacement grinder pump. They immediately disclaimed all responsibility for anything and everything because I had had another contractor work on the piping, replace a float switch (that had been alleged to be defective) and install an alarm which was missing from the 2012 replacement installation.

JMB advised me that the float switches had been improperly positioned and that this was the likely cause of the problem. They confirmed that the motor was 'fried'.

I asked JMB where the 'stickers' were that would let the owner know who had been the installer. No stickers were found. JMB said this must be because the building contractor (BWBT) had had them removed.

I asked about the alarm that was missing. I was told that an alarm had been installed ... and showed where it would have been in the kitchen above, but there was no evidence of any alarm or wiring for the alarm.

At this stage I contacted Pennsylvania American Water (PAW) to find out what specs are required for a grinder pump in their system in my location. The 'call center' in Illinois referred my inquiry to someone in their system ... but as of 10 days later I had no response from them, but then located their local staff and was helped with the information needed. They confirmed that the system at Saw Creek was designed to work with pumps of the E1-210 performance specs high pressure high head, and that the Keener pumps were low pressure low head and inadequate for many locations in the system.

Meanwhile BWBT was in conversation with Allstate Septic (Allstate) who came to me to check out the situation. From this I learned something of the difference between the E1 pumps and the Keener and Myles pumps being installed. Subsequently I decided that the information I was getting from Allstate made more sense than the information that was coming from the other contractors.

I also contacted the local distributor for the Keener Kutter Pumps (KKP) to learn something more about the pumps. The distributor is Avalanche American Pump Service in Mount Pocono PA. I learned something of the technical characteristics of the grinder pumps they distribute. These pumps are manufactured in Taiwan.

In addition I contacted the manufacturer of Environmental One pumps in New York State. It turns out the E1 210 is no longer manufactured, but an equivalent is still available. I learned something of the technical characteristics of the grinder pumps they manufacture, and how grinder pumps behave depending on the design of the sewer system itself.

When Allstate was installing the replacement rebuilt E1 210 it was interesting to see the clean design of the pump assembly because of the use of pressure switches rather than floats, and the fact that the assembly was firmly attached to the tank with some 8 1/4" bolts. Before this I had not realized that the pump assembly for the Keener pump was held in place merely by gravity (and friction) and the plastic effluent pipe.

I do not understand how the decision was made to install the Keener Pump rather than a replacement for the E1-210. The performance specs and the design characteristics are very different.

The following table summarizes the differences between the two pump types:

	Keener	Environmental One – 210
Pump type	Centrifugal ... this pump type does not function well at low pressures, nor at high head	Positive Displacement
Control	External float switch ... these switches are a problem in a small tank. The E1! 210	Pressure switch
Physical	Pump assembly held in place by gravity and attachment to the plastic effluent pipe	Bolted with 8 bolts to the tank structure
Motor HP	2 HP	1 HP
Pumping power	Low pressure and OK only to about 110 feet of head	High pressure and OK to 160 feet of head
Soft start for motor	No soft start ... critical because the motor torque is directly transferred to the pipe (which broke) every time the motor kicks in.	Don't know ... but it does not matter because the assembly is rigid bolted to the tank which is buried in the ground.

I have been bothered as to why a sewer pipe that lasted for 20 years in the old house broke after less than 2 years in the rebuilt house. I have been told that the pipes were replaced during the rebuild, and while I am not convinced that new piping was put in, the fact is that a critical pipe in the sewer effluent system broke and caused damage and considerable inconvenience.

Something obviously was not done right.

One gets the impression from the JMB invoice that they installed a replacement E1-210, but this is not actually what happened. A grinder pump assembly of very different characteristics was installed, and this is the root cause of the subsequent problems.

The E1 210 is designed for the tank which is being used in this house. The Keener systems and other systems with external float switches are liable to get hooked up in a tank that is too small and then not function correctly.

There are other characteristics of the Keener and E1 210 that are of relevance, but the base reason for the pipe to break is that the pipe was the only way in which the pump assembly was fixed in place. In this situation, every time the motor kicked in the full torque of the motor gets transferred to the pipe and in due time the pipe breaks.

I have paid out to date the following in connection with this matter:

Semper Fi Pump Sales and Service	420.00
Allstate Septic Systems LLP	165.00
Allstate Septic Systems LLP	2,163.00
TOTAL	2,747.00

This does not include any costs that will be incurred in connection with water effluent damage to items in the utility room and clean up / disinfecting.

I would also add that when I tried to have a follow up conversation with PMB Plumbing and Electrical I was told bluntly to 'talk to my lawyer'.

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