

# **Container Vacuum/Crusher Unit for Collecting Depot Recyclables**

**(Progress Report)**

**WDO Project #: OPT-R1-11**

**Prepared for:**



**Prepared by:**



**County of Peterborough**

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## **Introduction**

The County has been working with a private sector partner to provide design and engineering support for the project.

There are three critical components associated with the design of this piece of equipment. The unit relies on a compaction unit to reduce volume, a fan to generate vacuum and a hose to draw material from the host container into the vacuum/compaction unit.

## **Compaction Unit**

Tests were carried out on two compaction units, an auger system and a Dr. Crusher container crusher/perforator. The Dr. Crusher units are currently used by the County of Peterborough in their curbside recycling trucks. The private sector partner supplied the auger compactor.

The compaction units function is to reduce container volumes as much as possible and yet allow material to be sorted at the MRF. The compaction unit must also allow for enough throughput to avoid delays at pick up points. The analysis carried out suggested that the auger system would generate volume reductions in excess of 50% at the fastest throughput.

Initial testing of the auger raised some issues with respect to the extent of the container material being broken apart in the case of plastic bottles. Given the robust nature of the auger and its reliable and adjustable compaction characteristics the County decided to review the unit design to eliminate or reduce the impact on plastic bottles.

The auger unit has been modified and in fact the modifications have been incorporated into the latest production model that is being sold.

## **Vacuum Unit**

Container vacuum/compaction units of this type are already in service but generally rely on pure stream plastics being drawn through the fan. Initial tests drawing mixed container material through the fan resulted in unacceptable levels of container shredding. This presented a particular challenge because it was first thought that placing the fan after the compaction unit, remote from the material source was not workable. The initiative then moved to examining various size fans and power sources and eventually a combination generated the desired outcome.

## **Vacuum Hose Unit**

The other critical component is the vacuum hose. The hose must be large enough to accommodate the largest containers in the container mix yet be flexible enough to enter and draw material from a variety of host containers and strong enough not to collapse or recoil under the material loads drawn and vacuum conditions that will be developed. This work is also largely done.

## **Prototype Assembly**

The components have been identified the design work to place the various units in the roll-off have begun. (I have included a preliminary design but please note this will undoubtedly change) One of the critical exercises here is to maximize the volume of the roll off that can be accommodated on the roll-off truck to obviously maximize carrying capacity.

## **Discussion**

The next two weeks will confirm the suitability of the auger unit as the preferred compaction device. If tests prove that it creates processing problems that cannot be overcome the default will be the Dr. Crusher units. The Dr. Crusher unit is less robust and adjustable but can deliver an acceptable compaction rate and we know the material is processable.

This project has been ongoing much longer than any of the partners had planned for. The delays have been largely the result of the business success of our private sector partner. The company is growing rapidly and was unable to devote the level of attention to this project that it would have liked. Despite this we have been able as described above to work our way albeit slowly through the component evaluation and development part of the project.

The testing and commissioning of the equipment is well within the scope of the County but the design and engineering is definitely the skill set that resides with our private sector partner.

The projected timeline for prototype delivery is mid November when commissioning will begin. It is expected that the unit will be in full service at the beginning of 2002.

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September 7, 2001

## Photos

The following photos were taken during auger unit tests at the MRF on Pido Road in Peterborough, November 5, 2001

1) Loose residential container material prior to processing



2) Side view of auger



3) Overhead view into hopper showing auger mechanism



4) Spring loaded collar at end of auger



5) close-up of containers that have just passed through the auger



6) close-up of auger crushed container material



7) close-up of auger crushed container material

