

DAW VOLUME REDUCTION (VR) USING THE NEWLY DEVELOPED
20 MN (2200 tons) SUPERPACK - A NEW GENERATION OF SUPERCOMPACTOR EQUIPMENT

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ABSTRACT

A high performance supercompactor using a unique patented design to reduce size and cost with improved performance will be described. Results of a waste reduction campaign in a nuclear power plant will be presented.

During a backfitting campaign from September 1982 to September 1983, the Brunsbuttel Nuclear Plant located in West Germany, produced approximately 100 tons of pressable waste, which was all precompactd in more than 4,000 caustic soda drums of 180 liters each (47.5 US-Gallons). Some 2,365 of these drums have been transformed into 658 drums of 55 gallon content using a very novel development: the 20 MN SUPERPACK™ of Hansa-Projekt (HP), serviced by INET Corporation in the United States. SUPERPACK is a space and cost saving solution for waste management, fulfilling all safety requirements.

The SUPERPACK used in Brunsbuttel, gave a volume reduction factor (VRF) of 3.6 for drums which were precompactd by a factor of about four. These results are based on an experience of more than 4,000 pressed drums. This is a very cost effective low level waste management technique; the equipment cost was amortized in less than one year. Availability of the system was better than 95% during its first year of operation.

INTRODUCTION

With rapidly escalating transportation costs, disposal volume restrictions, and potential 1986 closure of existing sites to waste generators outside of identified regions, more utilities and other nuclear facilities have increased incentives for volume reduction are:

- reduce the quantity of waste being generated.
- apply a processing method to the waste generated to further reduce its volume.
- the cost for interim on site storage (IOS) can be reduced using VR equipment and VR methods.
- VR is a successful way to decrease costs based on the long-term benefits of VR.

EXPERIENCE OF THE NPS BRUNSBUTTEL USING SUPERPACK

Presently dry active waste (DAW) is collected in plastic bags in controlled areas. These waste bags are then collected in 47.5 gallon drums. Normally a precompactor is lowered to compress the waste and then lifted, more bags are added, and the process is repeated. This operation continues until waste will no longer fit into the drums. At NPS Brunsbuttel, even metals are fit into the caustic drums being generated from the backfitting campaign, mainly cut pipes, tools, etc. In this case, it is not required to center the metals in the caustic drums.

SUPERPACK works with a pressing force of 20 MN (2,200 tons), on a base plate of 1.70 X 1.70 meters

(67" X 67"), and has a total height of 3.50 meters (138"). The hydraulic unit and the control panel are separate units, both connected to the press via hoses. The SUPERPACK is equipped with conveyors and small swivel mounted cranes to charge filled drums and unload the pressed pellets into final 55 gallon drums ready for burial.

After the drum to be compacted has been placed inside the open clamshells, the clamshells are closed and sealed by a sliding girder. The locking device releases the press plunger, which will move with rapid power to the limited load of approximately 20 MN. Then the plunger automatically slides back rapidly into the final position. The motive power of the common drive for both pumps amounts to 55 kW (72 HP). The air forced out during operation is exhausted via perforated pipelines connected to aerosol filters. Any expelled fluid is collected via a drainage circuit and led away to a pipe connector. The fluid can be collected in a tank or facility waste system.

There are two emergency buttons, and in addition the operator is protected against accidents by photo cells barricading the SUPERPACK unit during operation. Walking into this protected area prevents operation of the compactor.

The cycle time can be set between 2 and 7 minutes per drum depending on installed motor power and required throughput. In case of NPS Brunsbuttel, mostly mixed waste has been pressed. The SUPERPACK, as well as the hydraulic unit, and the control panel, can be transported together in an open top 20 foot I.S.O. container using a flat bed trailer. SUPERPACK can be

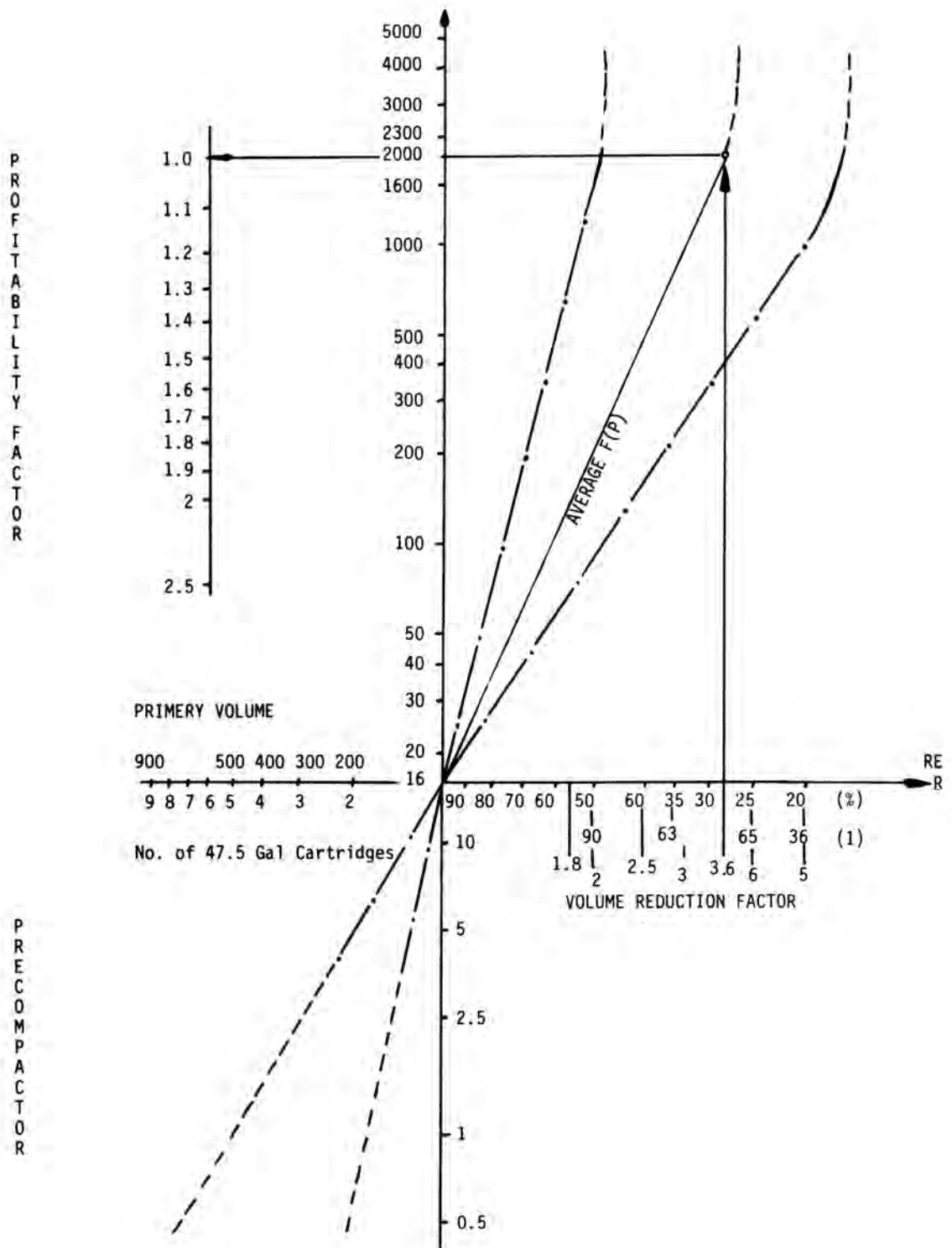


Fig. 1. Range of preprocessing force.

installed within two days and can be operated by unskilled laborers after a short training of two days.

RESULTS AND EXPERIENCES

Experience of NPS Brusbuttel shows that the use of a precompactor is advisable to avoid voids and to get better VR.

Figure 1 shows the range of preprocessing force from 0.5 to 16 tons (metric). The range of 16 to 2,000 tons has been evaluated and the experience using the SUPERPACK shows that 2,000 tons (metric) constitutes the optimum pressing force.

Main results from the VR campaign using SUPERPACK at NPS Brunsbuttel have been:

- if precompact waste has been pressed, the VRF was on an average of 3.6 - this gives an overall volume of reduction of over 14.
- when no precompactor was used, the VR was 94% giving a VRF of about 15.

- the availability of the system was better than 95%.
- increased throughput is obtained with increased motor power as shown in Table I
- installation and training to operate the SUPERPACK was less than one week.

TABLE I

SUPERPACK - Throughputs

Motor Power	Drums/Hour
55 Kw	10-20
90 kW	20-30
110 kW	30-40