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TATB PBX FORMULATION (RECYCLING SCRAP PBX)

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DEVELOPMENT DIVISION

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Process Development
Endeavor No. 106

DISCLAIMER

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ABSTRACT

Three 300-gallon batches of RX-03-BB containing machining scrap were processed. Portions of new TATB powder were mixed with the machining scrap in two of the batches. The third batch consisted of 100% scrap PBX and was made by the Holston processing method. Tensile strength of all three batches were adequate with the batch containing 50% new TATB powder giving the superior properties.

Thirty-litre batches of scrap PBX were processed to evaluate the effect of additives. Dapon M offered some improvement in physical properties.

INTRODUCTION

Reclaiming of TATB PBX machining waste or scrap is of major interest due to the high cost of the TATB and the large quantity of scrap which will be generated.

LARGE SCALE PROCESSING 300-GALLON KETTLE

Tensile strength data for three large lots processed in the 300-gallon kettle are given in Fig. 1. The material which contained new TATB powder mixed with machining scrap was made by the standard Pantex process while the batch containing all machine scrap with no new TATB was made by the Holston ethyl acetate process.

As shown in the results, all three batches had reasonable high stress with adequate strain. The batch containing 50% new TATB, however, had the highest strain value.

PANTEX PROCESS

The standard Pantex slurry procedure involves a 133 g/litre HE-to-water ratio with heat and an air sweep to remove the solvent. The RX-03-BB machine cuttings and a water-immiscible solvent pair, MIBK and NBA, are added at a low water level to the reactor to form the slurry. The water level is then raised and heat is applied for subsequent solvent evaporation and granulation.

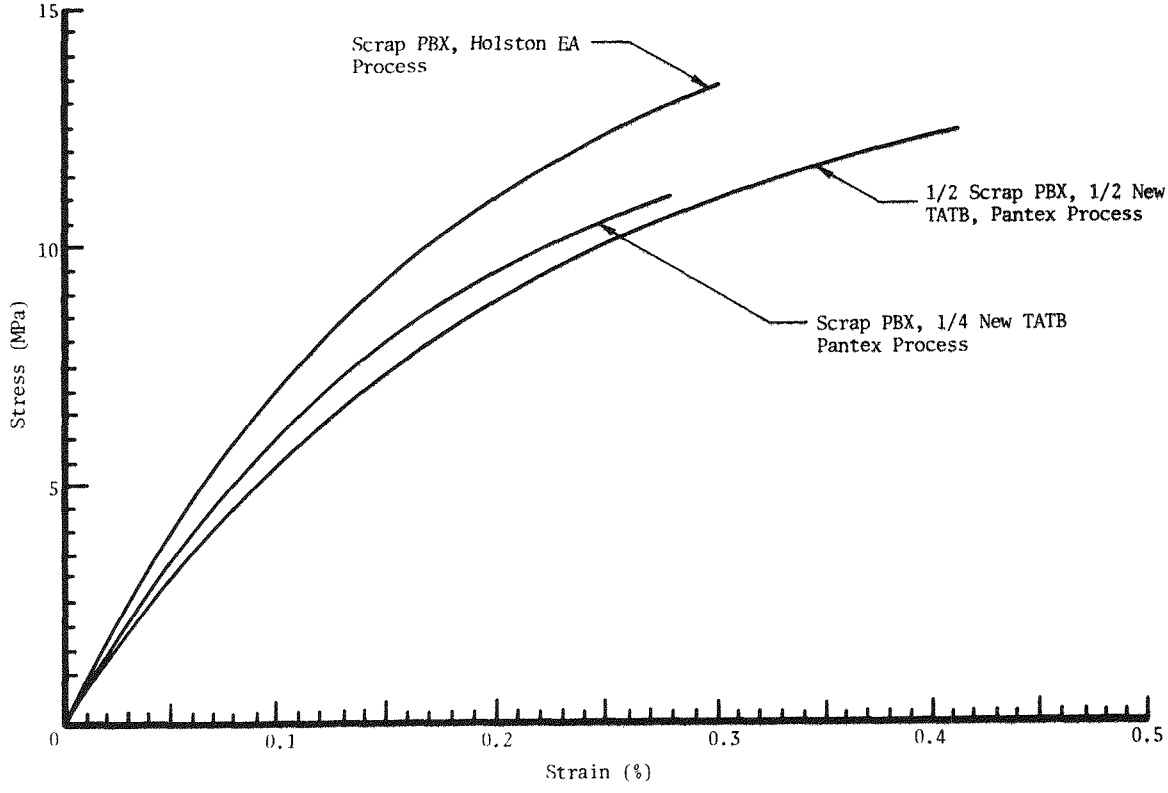

Fig. 1. Tensile Strength, RX-03-BB - Recycled Scrap PBX

HOLSTON PROCESS

A higher HE-to-water ratio is used in the Holston process and the granules are made by adding quench water to extract the solvent, thus causing the formation of the granules. After a granule aging or annealing period the solvent is removed with heat.

RECLAIMED TATB PBX WITH ADDITIVES

An experimental series to evaluate the effect of additives was performed in the 30-litre reactor using the Pantex slurry procedure. Results are summarized in Fig. 2. Two additives, TNT and Dapon M, were evaluated. Dapon M is diallyl isophthalate prepolymer manufactured by FMC Corporation.

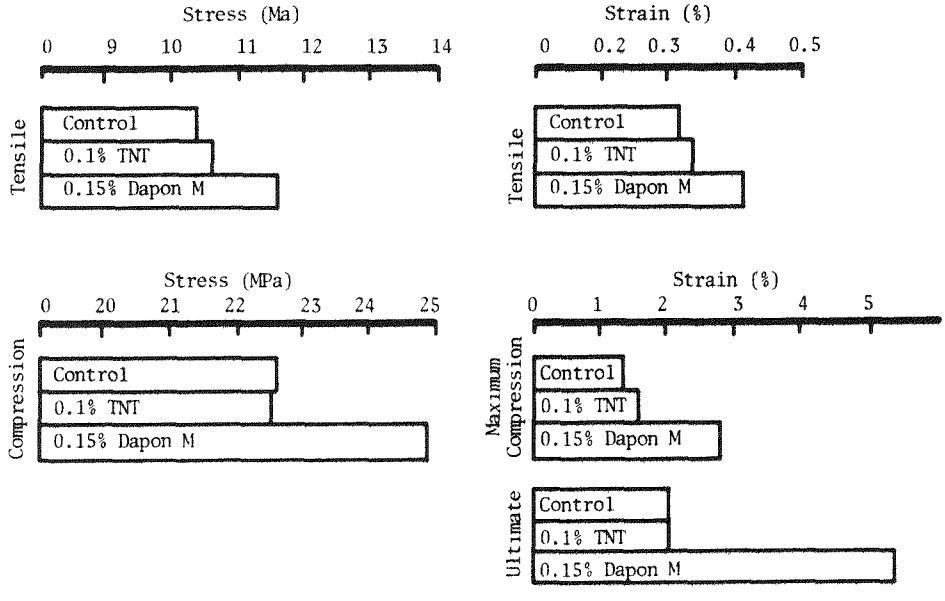

Fig. 2. Physical Strength of Reclaimed RX-03-BB With Additives

CONCLUSIONS

The results clearly show that large scale processing of TATB PBX machining scrap is feasible. Physical properties, specifically tensile strain, appear to be improved by the addition of new TATB powder.

The addition of 0.1% TNT did not appear to influence or improve physical properties. However, Dapon M offered some improvement for both compression and tensile stress and strain. The physical properties of the recycled scrap were more nearly similar to the physical properties of PBX made from new TATB powder.