LX-10 PRESSING STUDIES

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DEVELOPMENT DIVISION

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Normal Process Development
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MASTER

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ABSTRACT

Pressings of LX-10 will require multiple compacting cycles to obtain a density greater than 1.855 Mg/m^3 .

DISCUSSION

LX-10 is not presently assigned to a weapon program; thus, a firm density requirement has not been specified. The material is currently considered for several future applications. Therefore background data are necessary for the easiest-to-make cycle in the event production should be required. Basic considerations are quality, labor and equipment-life.

Ten billets of 11.8 kg each were pressed to determine density as a function of the number of compaction cycles. Two techniques, wet-bag and captive water, were considered with repeated applications of compacting cycles, sequenced to be compatible with production equipment.

The densities of the pressings are shown in Fig. 1. Obviously a re-pressing process will be required to obtain densities above 1.855 Mg/m^3 if the dwell period is not extended. Previously reported work(1) showed extended dwell periods to be impractical.

The early work with LX-10 produced densities higher by $\sim 4 \text{ kg/m}^3$ than the current work with a larger lot of production quality material.

Each process has some specific advantages that are not described in Fig. 1. The advantages are:

Wet-bag pressing does not cause the press to be opened for assembly change. The labor is thus slightly reduced and the process time is shorter by three or four minutes per part.

The captive-water technique reduces stresses that might be induced by the dimensional changes of the sac during decompression. The water that surrounds the billet serves to prevent tensile forces but is not restrictive to the compression forces. Also, a pressing that has been faulted during the original forming cycle, for any of a number of reasons, will more likely be an obvious reject when it is finally stripped from its container. Thus a slight reduction of machining and/or X-ray effort is afforded.

(1) J. D. Harrell, *LX-10 Pressing Study*, MHSMP-71-47-H, April - June 1971.

FUTURE WORK, COMMENTS CONCLUSIONS

Multiple compaction cycles are required with either wet-bag or captive-water technique to obtain densities above 98% TMD.

The captive-water process offers improved quality, with a slight increase of labor and equal equipment usage. The captive-water process with multiple repressing cycles of short dwell periods should be considered the primary process.

Note: Billets pressed via captive-water must first be formed by wet-bag, hence, "first" captive-water has already seen one wet-bag cycle.

* Average of two billets

Fig. 1. Density versus Compaction Cycles PBX LX-10, Lot 711-1