more dif f cult. Because metal powders are compacted by compression in a die, “springback” is a problem in powder metallurgy. Springback is a phenomenon in which the volume of the compact expands when the elastic deformation of the compact is relaxed during the product is ejected from the die by pressing the die down after compaction. This is accompanied by frictional force between the green compact and the die wall. Moreover,

1. Introduction

In sintered parts, centering on automobile parts, the trends toward downsizing of parts for weight reduc- [illegible]

A variety of high density compaction methods for sintered parts have been adopted, such as the 2 press, [illegible] tion at 700 MPa and higher. All of these methods have [illegible]

sity and compaction pressure for HDX, the ZnSt-added simply mixed powder, and the WC powder. In all cases, the green density increased by 10% accompanying increased compaction pressure. However, when compared at the same compaction pressure, the green density of HDX is higher than that of the ZnSt-added mixed powder in compaction at 686 MPa at room temperature, and is comparable to that of warm-compacted WC, at least in compaction at pressures higher than 500 MPa.

Figure 2 shows the relationship between ejection force and green density for LEX and the ZnSt simply mixed powder. With both powders, the ejection force increases as the green density becomes larger. However, when compared at the same green density, it can be understood that the ejection force of LEX is 20% lower.

with HDX

The compressive stress-stroke curve obtained when HDX was filled in a tablet-shaped die with an inner diameter of 25 mm and compacted was analyzed using a Cooper-Eaton type empirical equation[3], as shown in Eq. (1), and the contribution of particle rearrangement and contribution of plastic deformation to the final green this accelerates particle movement. On the other hand, with ZnSt, the increase in density in the high temperature region is small in comparison with that at the start of compaction. It appears that ZnSt impedes the movement of particles at higher temperatures.

The final compaction density, as mentioned above, increases accompanying increasing die temperatures with both lubricants. **Figure 4** shows the temperature dependence of densification from the convergence of particle rearrangement to the final compaction temperature. The increment of density attributable to particle deformation is substantially constant with HDX, but in contrast to this, with ZnSt, the increment of density increFitR ÉÁq.%PD

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