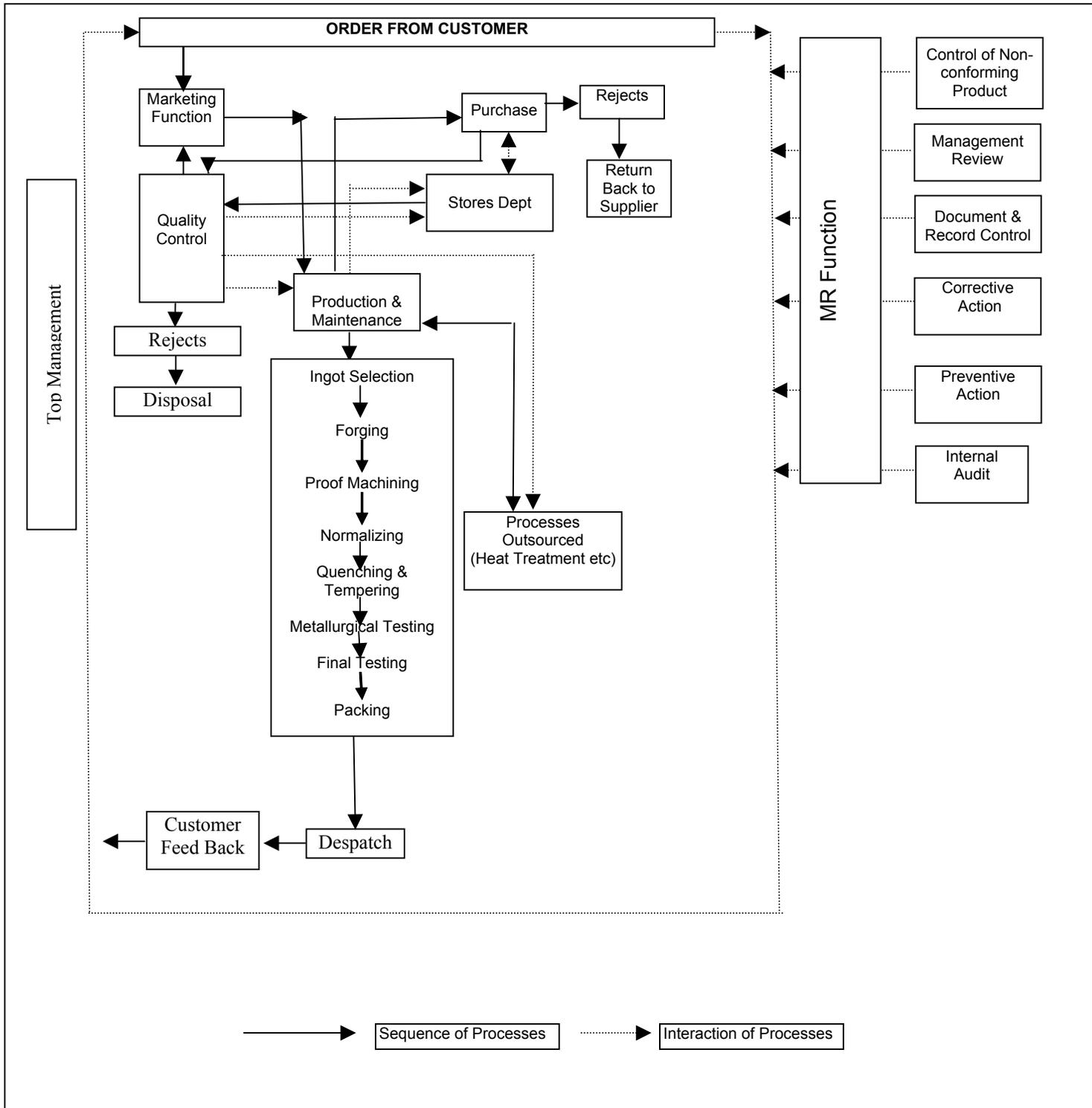
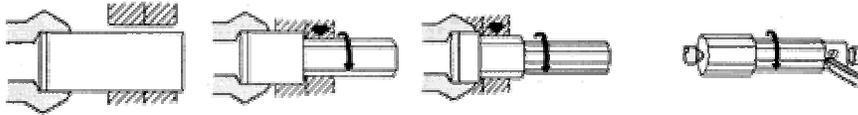


TITLE: SEQUENCE OF PROCESSES
Annexure - I



PROCESS OPERATIONS

SHAFTS



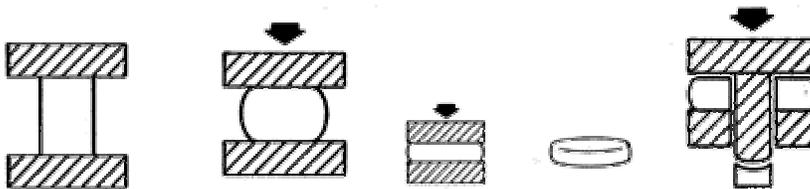
1. Starting stock, held by manipulator.

2. Open-die forging.

3. Progressive forging.

4. Lathe turning to near net-shape.

DISCS



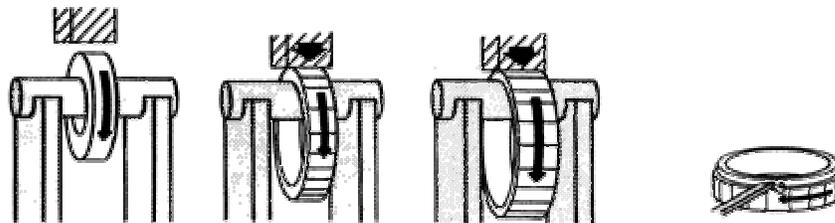
1. Starting stock.

2. Preliminary upsetting.

3. Progressive upsetting/forging to disc dimensions.

4. Pierced for saddle/mandrel ring hollow "sleeve type" preform.

SADDLE/MANDREL RINGS



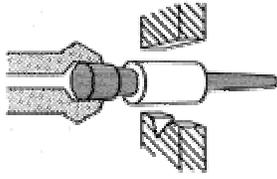
1. Preform mounted on saddle/mandrel.

2. Metal displacement-reduce preform wall thickness to increase diameter.

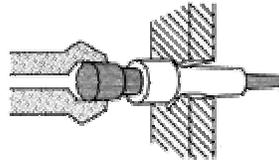
3. Progressive reduction of wall thickness to produce ring dimensions.

4. Matching to near net shape.

HOLLOW "SLEEVE TYPE" FORGING



1. Punched or trepanned disc on tapered draw bar.



2. Progressive reduction of outside diameter (inside diameter remains constant) increases overall length of sleeve.