

CHAPTER 7

DISLOCATIONS AND STRENGTHENING MECHANISMS

PROBLEM SOLUTIONS

Basic Concepts of Dislocations**Characteristics of Dislocations**

7.1 The dislocation density is just the total dislocation length per unit volume of material (in this case per cubic millimeters). Thus, the total length in 1000 mm^3 of material having a density of 10^5 mm^{-2} is just

$$(10^5 \text{ mm}^{-2})(1000 \text{ mm}^3) = 10^8 \text{ mm} = 10^5 \text{ m} = 62 \text{ mi}$$

Similarly, for a dislocation density of 10^9 mm^{-2} , the total length is

$$(10^9 \text{ mm}^{-2})(1000 \text{ mm}^3) = 10^{12} \text{ mm} = 10^9 \text{ m} = 6.2 \times 10^5 \text{ mi}$$