PROBLEMS

13.1. The power of deformation in strip rolling is given by

$$J^* = \frac{2}{\sqrt{3}}\sigma_0 \dot{U} t_f \left\{ \ln\left(\frac{t_0}{t_f}\right) + \frac{1}{4}\sqrt{\frac{t_f}{R_0}}\sqrt{\frac{t_0}{t_f}-1} + \frac{m}{\sqrt{t_f/R_0}}\left[\sqrt{\frac{t_0}{t_f}-1} - \tan^{-1}\sqrt{\frac{t_0}{t_f}-1}\right]\right\}$$

(a) Identify the various powers contributing to this result.

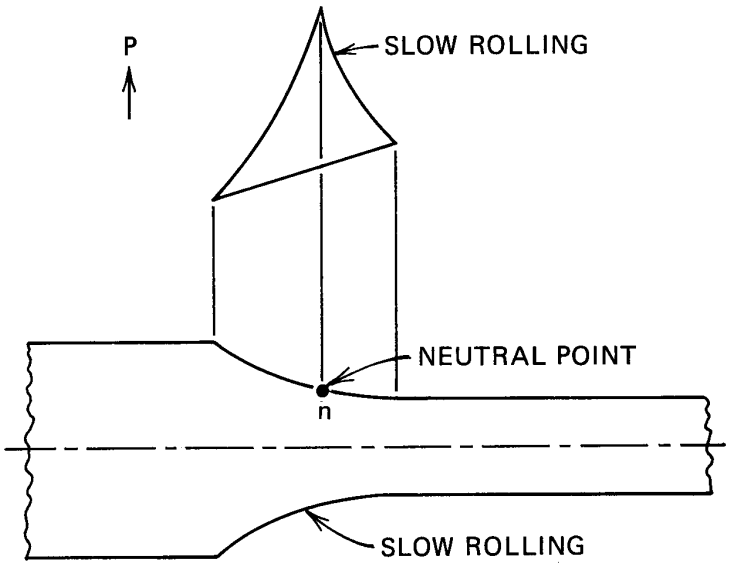
(b) How will the following parameter changes affect the neutral angle?

	Increases	Decreases	Remains unchanged
(1) Increase in friction			
(2) Increase in reduction			
(3) Increase in roll diameter			

13.2. For the process of rolling you are to propose the proper change to cause the desired result.

	Increased	Decreased	Unchanged
(a) Pressure is too large;			
(1) The roll diameter should be			
(b) Skidding occurs;			
(1) The roll diameter should be			
(2) The friction should be			
(c) You want the neutral point closer to the exit;			
(1) The roll diameter should be			
(2) The friction should be			

13.3. Describe and explain the differences in strip thickness, mill frame stretching, and friction-hill characteristics when the rolling speed increases with no other changes in mill setup. Superimpose sketches of the strip and the friction hill for high-speed rolling on the accompanying sketch for slow rolling. (*Hint*: Assume friction decreases as velocity increases).



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