A commercial concurrent-flow (CCF) dryer is to be used in a mill operation in Texas. The dryer has a capacity of 1667 wet bushels of rice per hour. The rice is to be dried under August-October conditions to a final moisture content of 13.5% wet basis.

A) Select the dryer by specifying:

- dryer dimensions
- drying air temperature
- airflow rates
- grain flow rates
- fan HP
- static pressures
- fuel consumption
- electricity usage
- energy cost
- total quality as % - stress crack increase
B) Assume the following:

- The cooling operation removes 1% in moisture, and decreases the outlet moisture rice temperature
- The bed depth of the drying stages is between 2 and 3 ft
- The tempering stage(s) is (are) 17 ft
- The inlet air temperature in the 1-st stage is between 250 and 350-F, in the 2-nd stage between 200 and 300-F, and in the 3-rd stage 190 and 250-F
- The airflow rate in the first stage is between 235 and 268 cfm/ft², in the 2-nd stage between 115 and 145 cfm/ft², and in the 3-rd stage between 95 and 125 cfm/ft²
- The three standard dryer sizes are 8’x8’, 8’x12’, and 12’x12’

Design a three stage CCF-dryer. The rice (medium) has an initial moisture content of 23.5% w.b. What operation changes would you recommend to adjust the dryer for short grain rice?

USE THE CCFPC.EXE PROGRAM
FIGURE 1: MOISTURE VERSUS DENSITY OF DIFFERENT GRAINS
FIGURE 2: PSYCHROMETRIC CHART