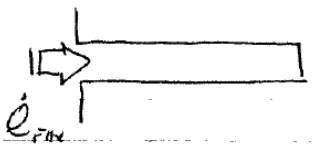
NOTES: **Fin effectiveness**

RECALL



$\dot{Q}_{FIN}$

$$\eta \equiv \frac{\dot{Q}_{FIN}}{\dot{Q}_{MAX}}$$

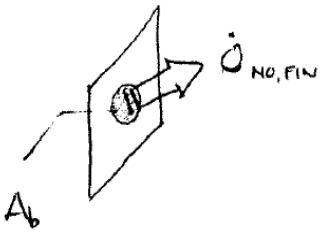
$$\dot{Q}_{MAX} = hA(\quad - T_\infty)$$

WHY?

$\eta = f(?, ?, \ldots$ GEOM, BC, h, $\ldots)$

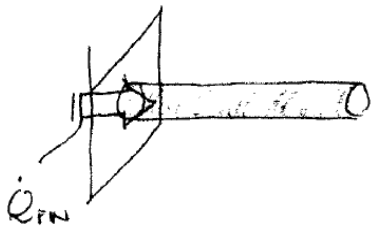
QUESTION: ¿WHEN IS IT EFFECTIVE TO USE A FIN?

FIN EFFECTIVENESS



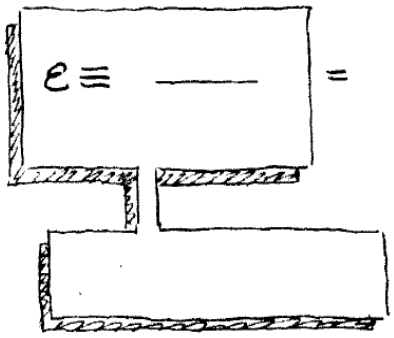
$\dot{Q}_{NO,FIN}$

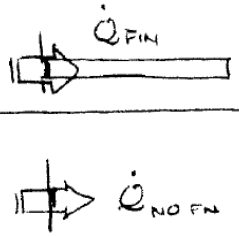
A_b



$\dot{Q}_{FIN}$

$$\varepsilon \equiv \frac{\dot{Q}_{FIN}}{\dot{Q}_{NO\,FN}} =$$





$\dot{Q}_{NO\,FN}$

- HOW IS IT LIKE η?
- HOW IS IT DIFFERENT

LIMITS ON ε

$\varepsilon <$

LET'S RELATE ε TO η ...

NOTES: Fin effectiveness

$$\varepsilon_{FIN} = \frac{\dot{Q}_{FIN}}{hA_b(T_b - T_\infty)} = \text{\_\_\_\_\_}$$

$\varepsilon_{FIN} =$ _____ TRENDS?

FOR ONLY LONG FIN

$\varepsilon_{FIN} =$ _____ (SINCE $A_b = A_c$)

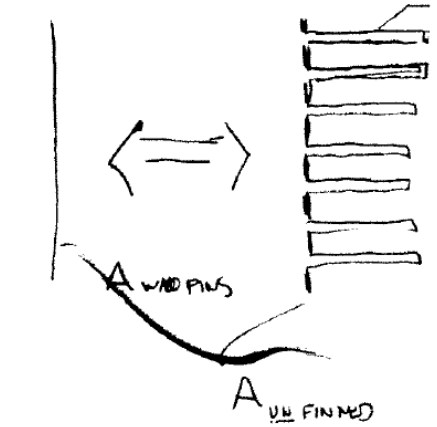
$$\varepsilon_{FIN} = \sqrt{\frac{kP}{hA_c}}$$

NOT TRUE IN GENERAL, BUT USEFUL FOR TRENDS.

WHEN IS A FIN EFFECTIVE?

-
-
-

ε FOR ARRAYS



$$\varepsilon_{OVERALL} = \frac{\dot{Q}_{TOT\ W/\ FIN}}{\dot{Q}_{TOT\ W/O\ FIN}}$$

$$\dot{Q}_{TOT\ W/\ FIN} = h \quad (T_b - T_\infty) + h \quad (T_b - T_\infty)$$

NOTES: **Fin effectiveness**

$$\dot{Q}_{\text{TOT W/ NO FIN}} = h \qquad (T_b - T_\infty)$$

$$\varepsilon_{\text{OVERALL}} = \frac{h A_{\text{UNFINNED}} (T_b - T_\infty) + h A_{\text{FINNED}} \eta_{\text{FIN}} (T_b - T_\infty)}{h A_{\text{W/NO FIN}} (T_b - T_\infty)}$$

$$\varepsilon_{\text{OVERALL}} = \frac{\quad}{\quad} + \quad \ldots$$

CAREFUL W/ AREAS!!!