NUCLEAR TRAINING COURSE

COURSE 223

2 - Level
2 - Science Fundamentals
3 - FLUID MECHANICS

Index

January 1977

Fluid Mechanics - Course 223

COURSE OBJECTIVES

223.00-1 - Viscosity

The student should be able to explain viscosity as the fluid property which causes the fluid to have resistance to shear in a dynamic situation and does not effect the fluid at rest.

The student should be able to explain that viscosity depends only upon temperature.

The student should be able to explain the difference between dynamic and kinematic viscosity and state the need for kinematic viscosity.

223.00-2 - Reynold's Number

The student should be able to explain the difference between laminar and turbulent flow and explain the effect of viscosity on the type of flow.

The student should be able to explain why we need to know whether the flow is laminar or turbulent.

The student should be able to explain the concept of R_E and detail the variables upon which it is dependent. The student should also be able to write the limiting values of R_E for laminar and turbulent flow.

The student should be able to calculate various quantities employing the R_E relationship.

223.00-3 - Friction in Fluid Flow

The student should be able to explain why energy is considered lost from a fluid system and the form that the energy loss takes and the type of energy that has to be replaced as a result.

The student should be able to detail the dependent variables associated with the friction loss in turbulent flow.

The student should be able to explain friction factor and show how this dimensionless ratio is achieved.

January 1977

The student should be able to write the relationship between E_{LOSS} and friction factor and perform calculations based on this relationship.

223.00-4 - Minor Losses

The student should be able to explain the causes of minor losses and explain how they are accounted for in pipe flow. The student should be able to perform calculations associated with minor losses.

223.00-5 - Pipe Flow Problems

The student should be able to perform complete fluid calculations using - R_E, 'f', Continuity Equation and Bernoulli's Equation.

223.00-6 - Force - Momentum

The student should be able to explain why the resultant force on a fluid, subjected to a change in velocity, is equal to the rate of change of momentum.

The student should be able to calculate forces involved due to directional, sectional and flow rate changes.

223.00-7 - Water Hammer

The student should be able to explain the mechanism of water hammer, stating

(a)   that when all the momentum has been lost, the fluid is at an elevated pressure.

(b)   that the velocity of the shock wave is the speed of sound in the fluid.

(c)   that the rate of closure determines the magnitude of the elevated pressure.

The student should be able to explain

(a)   how water hammer may be reduced.

(b)   how the effects of water hammer may be reduced.

(c)   where water hammer may be found in O/H plant.

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