

Track 1

Welcome and Logistics

An introduction to Cornell Pump Company's origins and history, and Cornell's Pump School program.

Pump Parts & Terminology

A discussion about centrifugal pump components, their proper and common names, and a review of a available mounting configurations.

Basic Hydraulics

Cursory review of centrifugal pump hydraulics and fluid dynamics. Common units and measures will be defined such as flow rate, head, pressure, specific gravity, atmospheric pressure, horsepower, efficiency, and net positive suction head.

Pump Curves

Attendees will learn about all the attributes of a pump curve and their meaning with respect to pump performance. Different curve shapes will be compared and contrasted, as well as learning how to apply the pump performance affinity laws.

TDH & Friction

Participants will explore essential topics such as Total Dynamic Head (TDH), Friction, Suction Conditions, and Discharge Conditions. Learn how to calculate duty points and apply friction loss principles for efficient pump selection and operation.

System Head

System friction is expanded to analyze system resistance curves (SRC's) and how pumps interact with their system. Topics include static versus dynamic head, and how to determine or modify where the pump will operate on the curve.

Pumps in Parallel / Series

This course will define Parallel and Series pumping, their effects and interaction with the system, and when and why each should be utilized.

Morning quiz/recap/Q&A

An interactive quiz to ensure participants have gained understanding of the morning's topics. Prizes will be awarded for high scores!

NPSH

In this course, participants will delve into the essential topics of NPSH, how pump suction operates, and understand the crucial distinctions between NPSHa vs NPSHr, suction lift vs flooded suction, and open vs closed systems. Additionally, learn about cavitation, and develop troubleshooting skills to ensure worry-free pump operation.

Pump-Flo Selection Software

A hand-on demonstration of how to select a pump utilizing Pump-Flo's pump selection software, starting with a duty point. Multiple basic and advanced features of the tool will be reviewed.

Pump Selection

Centrifugal pumps have many options above and beyond their performance conditions. This conversation will cover other pump selection decision's that must be made such as driver type, fluid considerations, physical orientations and mounting options, sealing, and materials of construction.

Energy Efficiency

Multiple pump and electric motor selections will be analyzed to compare initial purchase price and cost of ownership over the life of the pump equipment. A wire to water analysis will included.

Drivers & Couplings

An overview of driver types and power transmission (from the driver to the pump). Selection of appropriate couplings will be evaluated based upon pump torque/power requirements and vibration considerations.

Install & Troubleshooting

The final topic will cover best and worst practices of pump installations with topics ranging from suction and discharge piping accessories, ways to avoid air entrainment/priming issues, and foundation dos and don'ts.

Afternoon quiz/recap/Q&A

An interactive quiz to ensure participants have gained understanding of the afternoon's topics. Prizes will be awarded for high scores!

Features & Benefits

A discussion of the various product families offered by Cornell Pump and their features and benefits, including accessories available like priming systems and packaging options.

Priming Systems

A dive into the operation and application of pump priming options. Why does a pump need to be primed, how do you prime it, what is dry-prime and what is wet-prime, when and why would you use each?

Ragging and Solids Handling

Cornell Pump has developed a set of products that maximize uptime in municipal lift station by reducing ragging and clogging. This presentation will focus on these product improvements and illustrate their efficacy by analyzing case studies.

IoT Products & Applications

An overview of features, options, and uses for Internet of Things (IOT) monitoring technologies. Real-world examples of pumps, dollars, and labor hours saved via remote monitoring and control.

Applied Vibration

The applications of pump and system vibration monitoring, from troubleshooting misalignment to exposing cavitation and predicting bearing failure, will be discussed. A demonstration of Cornell's Pulse vibration sensor follows.

RPM2 Software Tool

A demonstration of Cornell's web-based remote equipment monitoring and management platform, RPM². Will show how the software injects data from a monitoring device and displays it for the user.

Track 2

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Pump Curves

Attendees will learn about all the attributes of a pump curve and their meaning with respect to pump performance. Different curve shapes will be compared and contrasted, as well as learning how to apply the pump performance affinity laws.

System Head, TDH, & Friction

A condensed review of Total Dynamic Head (TDH), system friction, and system resistance curves. Walk through an example of calculating a duty point, plotting performance on a pump curve, and determining the total system resistance curve and its interaction with the pump curve.

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VFD's / Motors - Advanced

An advanced delve into AC induction motors, how they function and interact with Variable Frequency Drives (VFD), and how this interaction may effect pump performance.

Engines

Engine driven and portable pumping applications will be explored. Topics of conversation will include engine emissions and tier 4 standards, effects of engine operation on pump performance, engine selection, and engine controller options.

Couplings & Rdds

Couplings connect the driver to the pump shaft and perform a critical function to protect both elements. Attend this course to learn about different types of couplings and when they should be used, how to size them to handle loads, and how they play a part in managing vibration.

Vibration

An in-depth review of rotodynamic vibration in turbomachinery, this course will review causes pump vibration, how to detect and measure it, and what that means for your pump's operation and longevity.

Sealing Systems

To keep the fluid inside the pump the rotating shaft must be sealed from the stationary components. This talk will present different sealing methods, their pros and cons, common seal failure methods and how to avoid them.

Metallurgies

How do metals impact the way a pump works? This presentation will cover material composition, compatibility, wear considerations, and selection.

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Slurry Basics (incl metallurgies & seals)

Overview of different types of slurry, definition of Hydraulic Institute Slurry Class, and some of the basic pump materials of construction and sealing options.

Slurry Applications

Overview of the different slurry applications and how to match pump selection to the application.

Slurry Calculations using Slurry Cor

The tool that makes all of the math of slurry class, tip speed, and wear life easier. Will explain how to use the tool and a high level overview of the different variables.

Topics are repeated from track #1