

# Course Synopsis VPS 2020



***Tuesday, September 15, 2020***

## **Day 1 Track 1 (Basic)**

*Welcome*

Marcus Davi

8:15 a.m. -8-30 a.m.

General overview of the school, history of Cornell Pump, and expectations for learning in the virtual environment .

*Pump Parts and Terminology*

David Haas

8:30 a.m. - 9:20 a.m.

Overview of centrifugal pump parts and general terminology. Designed to provide a baseline for learning later in the sessions.

*Basic Hydraulics*

Adam Lawler

9:30 a.m. – 10:20 a.m.

Section will answer these questions about pumps:

- What is a pump? How does it work?

- Types of pumps

- Pump Basics

1. Capacity
2. Head/Pressure/TDH
3. NPSH

- Specific Speed/Pump Geometry

- Fluid Basics (Viscosity)

### *Pump Curves, System Curves, TDH & Friction Loss*

Lloyd Spanke

10:30 a.m. – 11:20 a.m.

Address what pump curves are, what types of curves are commonly seen, and how to read a curve. System design describes how friction loss affects performance, the components to account for in determine a systems friction losses, and how that related to total dynamic head.

### *NPSH A/R*

Nick Ivers

11:30 a.m. -12:20 p.m

Basic section on Net Positive Suction Head and differences between Available and Required NPSH.

### *System Curves*

Bob Jansen

12:30 a.m. – 1:20 p.m.

Discuss graphical representation of the pump head required to move fluid through a piping system at various flow rates. The system curve helps quantify the resistance in a system due to friction and elevation change of the range of the flows, and how to create and understand this graph will be demonstrated.

### *Conclusion of Day 1*

1:20 p.m. – 1:30 p.m.

Marcus Davi

Discuss what lies ahead in the next two days, and ensure participants have signed up for the optional virtual networking event immediately following the school.

## **Day 1 Track 2 (Advanced)**

### *Welcome*

Marcus Davi

8:15 a.m. -8-30 a.m.

General overview of the school, history of Cornell Pump, and expectations for learning in the virtual environment .

### *NPSH A/R & HI Standards Advanced*

Jordan White

8:30 a.m. – 9:20 a.m.

Utilizing The Hydraulic Institutes standards in discussing Net Positive Suction Head Available and Required in pump operation. While some review of NPSH will be undertaken in this session, attendees are expected to have basic understanding of NPSH for this advanced section.

### *Advanced System Curves*

Andrew Enterline, PE

9:30 a.m. – 10:20 a.m.

Advanced section on System Head Curves and how that impacts pumps in series and pumps in parallel.

### *Vibration Analysis*

Aaron Weiss

10:30 a.m. - 11:20 a.m.

Seventeen percent of root causes for pump failure is resonance. Understating how vibration and harmonic frequency can shorten a pumps operating life allows smart practitioners to save time and money.

### *Slurry Pump Basics*

Bill Schlittler, PE

11:30 a.m. -12:20 p.m.

An introduction to pumping slurries, and how the volume and composition of materials can influence pump operation.

### *Metallurgies and Coatings*

Andrew Enterline, PE

12:30 p.m. – 1:20 p.m.

Demonstrate how various materials can be employed to pump liquids with different pH levels and chemical compositions, and how this effects wear, abrasion, corrosion, impact, and galling of pump metals.

### *Conclusion of Day 1*

1:20 p.m. – 1:30 p.m.

Marcus Davi

Discuss what lies ahead in the next two days, and ensure participants have signed up for the optional virtual networking event immediately following the school.

## ***Wednesday, September 16, 2020***

### **Day 2 Track 1 (Basic)**

#### *Welcome Day 2*

Marcus Davi

8:20 a.m. -8:30 a.m.

Housekeeping for Day 2

### *Pumps in Series and Parallel*

Bob Jansen

8:30 a.m. – 9:20 a.m.

Difference in piping and operation of multiple pumps, either in series, parallel, or a hybrid system, with valving.

### *Pump Flo Basic*

George Stephens, Engineered Software

9:30 a.m. -10:20 a.m.

A walk through of powerful software for picking the correct pump--from vendor Engineered Software

### *VFD's & Motors Basic*

Patrick Hoog, U.S. Motors

10:30 a.m. – 11:20 a.m.

Examine the basics of variable frequency drives and electric motor operation

### *Priming Systems*

David Haas

11:30 a.m. – 12:20 p.m.

Consider the pros and cons of various priming methods, including self primers, dry priming, submerged pumps and more.

### *IloT Monitoring*

BJ Warren & Adam Lindeman

12:30 p.m. – 1:20 p.m.

Cover basics of Industrial Internet of Things and how it applies to pump operation.

### *Conclusion Day 2*

Marcus Davi

1:20 p.m. – 1:30 p.m.

Any house keeping for the day

## **Day 2 Track 2 (Advanced)**

### *Welcome Day 2*

Marcus Davi

8:20 a.m. -8:30 a.m.

Housekeeping for Day 2

### *Advanced IloT Monitoring*

BJ Warren & Adam Lindeman

8:30 a.m. – 9:20 a.m.

Examine how the Industrial Internet of Things allows for better pump monitoring, maintenance, diagnostics, and catastrophic failure warnings.

*Advanced VFDs & Motors*

Patrick Hoog, U.S. Motors

9:30 a.m. – 10:20 a.m.

An understanding of variable frequency drives and electric motors is expected of attendees. This advanced section will delve deeper into VFDs and their operation to most effective in an application. Presented by an engineer from US Motors with advance training on VFDs.

*Pump Flo Advanced*

George Stephens, Engineered Software

10:30 a.m. – 11:20 a.m.

Assumes a familiarity with Pump-Flo; advanced class looks at more involved methods for selecting pumps, how to fully utilize the software, and more.

*Mechanical Seal and Water Savings*

Tim Wegener, Flow Serve

11:30 a.m. -12:20 p.m.

Covers different methods for sealing pumps, including packing, mechanical, and cartridge seals, and examine how much flush water may be used on an annual basis.

*Ragging and Solids Handling*

Jason Davidson & Jordan White

12:30 p.m. – 1:20 p.m.

Tackle the number one problem in municipal pumps today - how ragging and plugging instances knock pumps out of service, and what can be done about it. Includes practical case studies of cities addressing the issue.

*Conclusion Day 2*

Marcus Davi

1:20 p.m. – 1:30 p.m.

Any house keeping for the day

## ***Thursday, September 17, 2020***

### **Day 3 Track 1 (Basic)**

*Welcome Day 3*

Marcus Davi

8:20 a.m. -8:30 a.m.

## Housekeeping for Day 3

### *Virtual Shop and Test Lab Exploration*

Andrew Enterline and Seth James

8:30 a.m. – 9:20 a.m.

Tour the Cornell Pump factory remotely, look at the test lab, and interact with shop employees live.

### *Pump Build*

Brandon Yoder

9:30 a.m. -10:20 a.m.

Watch as pump models are constructed, and ask assemblers questions as they are performing the build.

### *Pump Selection*

Bob Jansen

10:30 a.m. -11:20 a.m.

Tying knowledge of the last three days on how to properly select a pump.

### *Energy Efficiency*

Jordan White

11:30 a.m. -12:20 p.m.

See how wire-to-water efficiency affect energy costs, and how to make you pump more efficient.

### *Installation and Care*

Jason Davidson

12:30 p.m. – 1:20 p.m.

A show and tell of things that you should and should not do in operating, sizing, and installing pumps in the field.

### *Conclusion Day 3: Pump Quiz and Logistics Wrap Up*

David Haas

1:20 p.m. – 1:40 p.m.

A short quiz to test for knowledge and a wrap up to the first virtual Cornell Pump School!

## **Day 3 Track 2 (Advanced)**

### *Welcome Day 3*

Marcus Davi

8:20 a.m. -8:30 a.m.

## Housekeeping for Day 3

### *Virtual Shop and Test Lab Exploration*

Andrew Enterline and Seth James

8:30 a.m. – 9:20 a.m.

Tour the Cornell Pump factory remotely, look at the test lab, and interact with shop employees live.

### *Pump Build*

Brandon Yoder

9:30 a.m. -10:20 a.m.

Watch as pump models are constructed, and ask assemblers questions as they are performing the build.

### *Slurry Advanced 1*

Bill Schlittler

10:30 a.m. -11:20 a.m.

Advanced/ in-depth conversations about pumping slurries and mining, wastewater, and other applications.

### *Slurry Advanced 2*

Bill Schlittler

11:30 a.m. - 12:20 p.m.

Continue advanced/ in-depth conversations about pumping slurries

### *Installation and Care*

Jason Davidson

12:30 p.m. – 1:20 p.m.

A show and tell of things that you should and should not do in operating, sizing, and installing pumps in the field.

### *Conclusion Day 3: Pump Quiz and Logistics Wrap Up*

David Haas

1:20 p.m. – 1:40 p.m.

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