

# TRAINING

## EFFECTIVE MAINTENANCE OF HYDRAULIC SERVO SYSTEMS

A two day course to help you eliminate expensive down time and repair costs



The downtime of machinery causes delays which has implications on customers and costs can often be traced to simple causes such as contaminated fluids. Moog estimates that the root cause of 90% of their servo valve repairs is due to poor system maintenance.

Moog and the National Fluid Power Centre have formed a professional training partnership to provide hands-on training for those involved in the maintenance of servo controlled systems.

### WHY YOU SHOULD ATTEND

Develop a proactive and effective maintenance schedule through a better understanding of your system and its needs.

- Work with confidence on your system through practical demonstrations and advice including video of practical examples from the NFPC.
- Dramatically reduce costly breakdowns by understanding the true significance of contamination and learning to control it.
- Protect the safety of you and your colleagues by learning about the current best practices and legislation in the industry.
- Increase the reliability of your system by learning how to select the right components for your system, and when to replace them such as sampling techniques, monitoring methods, oil and cleanliness levels.

### WHO SHOULD ATTEND

This course is aimed at those involved in the maintenance and management of fluid power systems involving servo control and anyone considering introducing a system to their business.

It is assumed that the learner will have a basic knowledge of fluid systems. Attendees will receive a comprehensive set of course notes, Moog technical literature and Certificate of Attendance.

**Course Duration:** 2 days

### Dates/Location

Contact Moog for the latest dates.

All courses will be delivered at the NFPC, Carlton Road, Worksop Nottinghamshire S81 7HP  
[www.nfpc.co.uk](http://www.nfpc.co.uk).

**Cost per candidate:** £725 + Vat

Number of Candidates per Session:  
Minimum 6  
Maximum 12

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### Oil Analysis Service

Cut your oil costs, get a full analysis of the oil within your hydraulic machinery and Moog technical support.

Email: [oiltest.uk@moog.com](mailto:oiltest.uk@moog.com)

Web: [www.moog.co.uk/oiltest](http://www.moog.co.uk/oiltest)

## THE REAL HARD FACTS ABOUT CONTAMINATION

- Acquire the real hard facts associated with ingress such as percentage failures and costs likely to be incurred.

## THE BUSINESS BENEFITS OF GOOD MAINTENANCE

- Understand the business benefits of good maintenance, such as performance, availability, services and costs, and become aware of what constitutes a good maintenance routine.

## MOST COMMON MAINTENANCE ISSUES

- Learn about the most common maintenance issues by focussing on staff knowledge, their skills and competence.
- Value the importance of contamination control and apply the control procedures associated with all maintenance operations.
- Know the effects of poor maintenance on system and component performance, and the results of failing to adhere to manufacturer's recommendations.

## THE ORIGIN AND NATURE OF CONTAMINANTS

- Gain knowledge about the origin and nature of contaminants, such as what they are, where they come from and what actions can be taken to reduce ingress.

## THE EFFECTS OF CONTAMINATION

- Understand the effects of contamination on hydraulic fluid such as performance and life, and understand how micronic size can affect component performance ranging from catastrophic failure to internal wear, leakage, heat generation and poor performance.
- Learn about valve sensitivity in servo and industrial valves and how it affects performance.
- Become acquainted with the golden rules for reliable servo systems, and learn when to replace components.

## THE BENEFITS OF USING THE RIGHT OIL

- Recognise the value of using the right oil and understand its characteristics and performance of the oil in use, and the importance of good oil storage and transfer procedures.

## THE IMPORTANCE OF OIL CLEANLINESS

- Review manufacturer's and BFPA guidelines and understand the importance of establishing a system target cleanliness level with regard to the requirements of servo valves.

## METHODS OF MEASURING FLUID CLEANLINESS LEVELS

- How to establish cleanliness levels of your system and look at the methods available with pros and cons for options for measurement such as bottle sample and microscopy, through to online/offline monitoring systems and the use of APCs.
- Interpret all the standards such as ISO 4406, NAS 1638 and SAE 4059E and become familiar with the actions to be taken.

## HEALTH AND SAFETY

- Gain valuable knowledge on how to handle hydraulic fluid and follow risk assessment profiles, wearing the right clothing and following safe working practices.

## THE USE OF FILTERS

- Learn how filters perform, the types, location and effectiveness, with reference to the Beta Ratio and dirt holding capacity.
- Become aware of their performance relating to differential pressure and bypass or non bypass, and the action to be taken to maintain required cleanliness levels.

## THE IMPORTANCE OF THE FLUSHING PROCESS

- Become familiar with the term flushing and with reference to flushing plates, the parts of a system requiring this process.
- Know how the flushing process is achieved and become familiar with the basic formula used by engineers to establish flushing flow rates.

## COURSE OBJECTIVES

On the completion of this course the delegate will have a greater understanding of the:-

- Origins of contamination and actions to be taken to minimise ingress.
- Factors that affect system and component performance.
- Symptoms associated with changes in performance.
- Importance of implementing and maintaining effective contamination control systems.
- Fundamental principles that underpin the operation of all systems.
- Ability to read and interpret hydraulic circuit diagrams.
- Importance of establishing clean and safe working procedures.

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