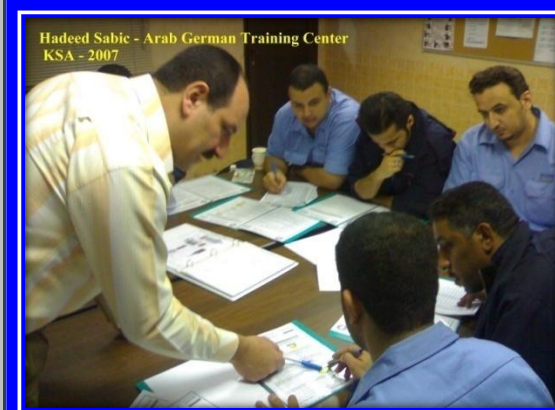


## Training Courses for Hydraulic Control Systems

2010 - 2011



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## **1. Introduction to Training Courses**

Experience has shown that hydraulics and pneumatics is now indispensable as a modern method of transferring energy.

Hydraulics and pneumatics drives and controls have become more and more important due to automation and mechanization. Today, a very large amount of modern and powerful machinery is controlled either partly or completely by hydraulics or pneumatics .

However, in spite of the wide range of application, the knowledge of this specialized field has not yet been circulated to a high enough degree. As a result of this, the application of hydraulics and pneumatics systems has been restricted.

Therefore, we hope with these courses, to give participants an insight into hydraulics and pneumatics world.

In brief, the word hydraulics means “the transmission and control of forces and movement by means of fluid”

### **Aims of the training courses**

These courses are designed for engineers and technicians who are working in industries and factories as a responsible for design or maintain hydraulic or pneumatic units to:

- keep them aware with latest technology in those fields
- improve their skills
- quickly and properly trouble-shoot and repair malfunctioning hydraulic and pneumatic systems
- reduce the down-times of the machines and preserve their productivity

## **2. Target Clients**

Any client has a machines or equipment working with hydraulic or pneumatic power, we consider it as target clients

So, the clients can be classified into the following categories:

- **Metal and Minerals Industries**
- **Iron and Steel Cos.**
- **Metal Forming Cos.**
- **Automotive Assembly Cos.**
- **Plastics Factories**
- **Cement Factories**
- **Construction and Building Cos.**
- **Petroleum Industries**
- **Food and Medicines Industries**
- **Tile and Ceramics Industries**

### 3.Eng. Wael Sobhy Soliman C. V.

- Born in Cairo on 1966
- Graduated from faculty of Engineering 1990 - Mechanical Dept. Egypt
- Member of International Fluid Power Society IFPS - USA
- Member of Egyptian Engineers Association in Riyadh – KSA
- Member of Egyptian Society of Mechanical Engineers - Egypt
- Member of Federation of Arab Engineers
- Certified as Automation Studio Instructor from Famic Technology Inc. – Canada
- Certified as Instructor from International Civil Aviation Organization – ICAO
- Certified as Master Hydraulic & Pneumatic Instructor in Reform of the TVET Systems
- Certified as Instructor of Hydraulic and Pneumatic and PLC systems from Technical and Vocational Training Corporation – KSA
- Certified as Principle instructor in Rexroth Bosch Group Training Partner
- Instructor of Hydraulic & Pneumatic Systems in Egyptian Aviation Academy - EAA
- Winner of the Second conference for Egyptian Engineers Association Prize, May 2010 for his research in field of “Fault Analysis of Hydraulic Systems”
- Winner of the Academy of Scientific Research and Technology Prize, 1992 for his research in field of "Atomic Power and its Peaceful Uses".

He designed and performed since 2000 till now, many training courses and specialized diplomas in field of Hydraulics and Pneumatics Systems in:

- American University in Cairo (AUC)
- Egyptian Aviation Academy
- Mubarak–Kohl Project for Dual System Technical Education
- Technology Competency Center of the Ministry of Industry
- Faculty of Engineering – in both of Ain Shams, Zakazyk and Helwan Universities
- Egyptian Engineering Syndicate in Cairo
- HADEED SABIC Co., Al – Jubail - KSA.
- First Vocational Industry Institute in Riyadh – KSA
- Proctor and Gamble Co. – October City – Egypt
- Suez Cement Co. – Suez – Egypt Yamama Cement Co. Riyadh - KSA

The training courses during that period were:

- Basic Principals Of Hydraulic Systems ( BPHS )
- Advanced Course In Hydraulic Systems (ACHS)
- Electro Hydraulic Control Systems (ELHS)
- Maintenance And Fault Analysis Of Hydraulic Systems (MFHS)
- Design And Manufacturing Of Hydraulic Systems (DMHS)
- Hydraulic Systems For Sales Representative (HSSR)
- Basic Principals Of Pneumatic Systems (BPPS)
- Electro Pneumatic Control Systems ( ELPS)

He also submitted specialized courses related to field of applications such as:

- Hydraulic systems for Plastic factories applied on ( Demag – Batenfield )
- Hydraulic systems for construction factories applied on ( Cat. equipment )
- Hydraulic systems for Steel factories applied on ( Danielle lines )
- Hydraulic systems for Tile and Ceramics factories applied on ( Sacmi lines)
- Hydraulic systems for Cement factories applied on ( Pulesus lines )

Also he designed and contributed in the following projects:

- Hydraulic unit for hole digging m/c ( 300 ton – 2 cylinders – 6 m ) for Motlaq Algoery Co.
- Hydraulic unit for binding m/c ( 100 ton – 4 cylinders ) for Shebh El jazera Co.
- Hydraulic unit for road blockers ( 50 ton @ 60 km/hr ) for Anfal Co.
- Mobile filtration unit ( 40 lit/min – 10 micron ) for Al-rajhy Steel Co. & Al-Babteen Co.
- Hydraulic unit for Solid waste mobile screen ( 20 ton/hr ) for ENTAG Co.
- Supervisor of Manufacture 25 skid steer loaders from proquirment to final test ( F-200 )
- Modification of hydraulic circuits for 14 American windrow m/c SCARAB ( F-100 )
- Modification of hydraulic circuits for 13 South Africa agriculture tapping m/c ( F-999 )
- Hydraulic unit for rising bag opener m/c for Malaysian waste recycle factory (ARESCO)

He worked also in the following:

- **Atos and Marzocci Agency in KSA (Hydraulic City) – (2008– 2010)**  
As a Technical Support Manager for Hydraulic and Pneumatic Systems
- **Bosch Rexroth Training Partner Agency in KSA (AGETC) – (2007– 2008)**  
As a Technical advisor & Principle instructor for Hydraulic, Pneumatic and PLC Control Systems
- **Engineering Task Group (ENTAG) – (2003 – 2006)**  
As a Hydraulic Manager for Design & implementation of Hydraulic systems for Equipment related to solid waste and Agricultural Residues treatment projects.
- **Kawasaki Agency in Egypt – EMA Group, (2000 – 2002)**  
As a Technical Office & Training Manager Design & implementation of Hydraulic Power Units for different applications, Marketing Manager for Hydraulic & Pneumatic Systems in October Branch
- **Mannesmann Rexroth Agency in Egypt – Yasser Fahmy Co., (1995 – 1999)**  
As a Sales Engineer for Hydraulic Power units and Pneumatic components
- **Arab Organization for Industrialization - Aircraft Factory (1993 -1994)**  
As a Maintenance Engineer for Hydraulic and pneumatic equipment.
- **Egyptian air Force Command - Vehicle Department (1990 – 1992)**  
As a Developer of an integrated software Program to follow-up and Control the State of Spare Parts Store

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#### **4. General Information about Training Facilities**

##### **Courses Duration**

Courses are designed to take five days and are equivalent to 15 hours of instruction. Classes begin at 6:00 pm and end at 9:00 pm

##### **Who should attend**

The courses are designed for engineers and technicians who are working in industries and factories as a responsible for design or maintain hydraulic or pneumatic units to keep them aware with latest technology in those fields and also to improve their skills

##### **Method of instruction**

We use the best ways to improve communications between lecturers and participants such as:

- Modern simulators to learn how to build circuit diagrams
- Transparency and animated programs
- Real cutaway component
- Visits to factories that concerned with those fields
- Handouts selected from recent references are presented to each participants
- Real case studies and dissections

##### **Attendance Prerequisites**

- For first and sevens courses, Engineers and technicians with adequate background in mechanical drawings
- For all other courses its necessary to take in sequence to get best benefits

##### **Certificate of Participation**

- Participants will be awarded a certificate after completion each course
- Those who successfully complete a series of courses from 1 to 6 and submit a project will be awarded **Specialized Diploma in Hydraulic Systems**
- Those who successfully complete a series of courses from 7 to 8 and submit a project will be awarded **Specialized Diploma in Pneumatic Systems**
- Those who successfully complete a series of courses from 1 to 7 and submit a project will be awarded **Specialized Diploma in Hydraulic and Pneumatic Systems**

## 5. Training Courses

1. **Basic Principals Of Hydraulic Systems ( BPHS )**
2. **Advanced Course In Hydraulic Systems (ACHS)**
3. **Electro Hydraulic Control Systems (ELHS)**
4. **Maintenance And Fault Analysis Of Hydraulic Systems (MFHS)**
5. **Design And Manufacturing Of Hydraulic Systems (DMHS)**
6. **Hydraulic Systems For Sales Representative (HSSR)**
7. **Basic Principals Of Pneumatic Systems (BPPS)**
8. **Electro Pneumatic Control Systems ( ELPS)**

Also we can submit tailor made courses according to field of applications such as:

9. **Hydraulic systems for plastic factories applied on ( Demag – Batenfield )**
10. **Hydraulic systems for construction factories applied on ( Cat. equipment )**
11. **Hydraulic systems for Steel factories applied on ( Danielle lines )**
12. **Hydraulic systems for Tile and Ceramics factories applied on ( Sacmi lines)**
13. **Hydraulic systems for Cement factories applied on ( Pulesus lines )**
14. **Logic elements Valves applied on Hydraulic Presses**
15. **Hydraulic systems for Petroleum Industries**
16. **Pneumatic systems for Food and Medicines industries applied on ( Tetrapac )**



## 6. Courses Descriptions

<b>1. Basic Principals Of Hydraulic Systems ( BPHS )</b>	
<b>Course Objectives</b>	<p><b>By the end of the course, participants will:</b></p> <ul style="list-style-type: none"> <li>• Understand the Application of hydraulic systems</li> <li>• Understand the function, construction and operation of the main hydraulic control components</li> <li>• Be able to read and understand the hydraulic circuit diagrams of many machines and equipment</li> </ul>
<b>Course Contents</b>	<ul style="list-style-type: none"> <li>• Introduction to hydraulic systems</li> <li>• Units and dimensions used in hydraulic systems</li> <li>• Gear, vane and piston pumps</li> <li>• Constant and variable displacement pumps</li> <li>• Direct and pilot operated directional control valves</li> <li>• Direct and pilot operated pressure control valves</li> <li>• Temperature and pressure compensated flow control valves</li> <li>• Hydraulic cylinders and motors</li> <li>• Applications of some hydraulic circuit diagrams</li> </ul>

<b>2. Advanced Course In Hydraulic Systems (ACHS)</b>	
<b>Course Objectives</b>	<p><b>By the end of the course, participants will:</b></p> <ul style="list-style-type: none"> <li>• Be able to deal with the formulas and equations used in most hydraulic systems</li> <li>• Understand the function, construction and operation of most of the hydraulic control components used in advanced hydraulic systems</li> </ul>
<b>Course Contents</b>	<ul style="list-style-type: none"> <li>• Formulas and equations used in hydraulic systems</li> <li>• Pumps control systems</li> <li>• Functions and applications of open and closed hydraulic circuits</li> <li>• Functions and applications of proportional and servo valves</li> <li>• Functions and applications of logic control valves</li> <li>• Hydraulic accumulators and the safety blocks</li> <li>• Implement of practical hydraulic circuits</li> </ul>

<b>3. Electro Hydraulic Control Systems (ELHS)</b>	
<b>Course Objectives</b>	<p><b>By the end of the course, participants will:</b></p> <ul style="list-style-type: none"> <li>• Learn the construction and operation of electro hydraulic control systems</li> <li>• Be able to interconnect electro hydraulic control systems</li> <li>• Learn the basic trouble-shooting procedures for the practical electro hydraulic systems</li> <li>• Be able to read and draw the step-function diagrams for electro pneumatic circuits</li> <li>• Learn the difference between conventional electrical systems and PLC</li> </ul>
<b>Course Contents</b>	<ul style="list-style-type: none"> <li>• Studying the sequence of operation for electro-hydraulic circuit diagrams</li> <li>• Electric switches; types and symbols, direct control circuits</li> <li>• Solenoids; types and symbols</li> <li>• Relays and contactors; types, symbols and numbering and indirect control circuits</li> <li>• Limit switches, proximity switches, pressure switches, ..etc</li> <li>• Studying the electronic cards used in proportional valves</li> <li>• Implement of practical electro hydraulic systems</li> <li>• Studying the most common faults in electro hydraulic systems</li> </ul>

<b>4. Maintenance And Fault Analysis Of Hydraulic Systems (MFHS)</b>	
<b>Course Objectives</b>	<p><b>By the end of the course, participants will:</b></p> <ul style="list-style-type: none"> <li>• Gain the necessary skills of properly repairing most of the hydraulic components, which should be reflected on the spare parts costs</li> <li>• Learn the proper preventive maintenance procedures for the hydraulic systems including the necessary planning for this work</li> <li>• Be able to quickly and properly trouble-shoot and repair malfunctioning hydraulic systems to reduce the down-times of the machines and preserve their productivity</li> </ul>
<b>Course Contents</b>	<ul style="list-style-type: none"> <li>• Introduction and types of maintenance</li> <li>• Preventive maintenance of hydraulic systems; timing and planning</li> <li>• Studying the most and common faults on hydraulic systems</li> <li>• Safety precautions before, during and after operation of hydraulic systems</li> <li>• Trouble-shooting procedures for hydraulic systems</li> <li>• Tools for test and inspections of hydraulic components</li> </ul>

<b>5. Design And Manufacturing Of Hydraulic Systems (DMHS)</b>	
<b>Course Objectives</b>	<p><b>By the end of the course, participants will:</b></p> <ul style="list-style-type: none"> <li>• Learn how to get the necessary information from customer to build hydraulic systems</li> <li>• Be able to prepare the technical proposal to introduce it to customer</li> <li>• Learn how to prepare list of component and hydraulic circuit diagram</li> </ul>
<b>Course Contents</b>	<ul style="list-style-type: none"> <li>• Studying the customer needs and determine the sequence of operations</li> <li>• Studying the available alternatives to achieve the suitable solutions</li> <li>• Case study for hydraulic application</li> <li>• Prepare List of component and hydraulic circuit diagram for workshop</li> </ul>

<b>6. Hydraulic Systems For Sales Representative (HSSR)</b>	
<b>Course Objectives</b>	<p><b>By the end of the course, participants will:</b></p> <ul style="list-style-type: none"> <li>• Learn the differences between hydraulic circuits in industrial and mobile applications</li> <li>• Be able to deal with different catalogues and select the alternatives</li> </ul>
<b>Course Contents</b>	<ul style="list-style-type: none"> <li>• Sales skills to achieve the maximum target for your company</li> <li>• The main features for mobile and industrial hydraulic systems</li> <li>• Read and understand the codes of component to find the alternatives</li> <li>• Prepare the technical offer for customers</li> <li>• Examples of hydraulic circuits used in mobile and industrial systems</li> </ul>