

# **Khawaja Zahid Shakeel, Ex-DG (Design & Technical), PAEC**

**M.Sc (Mechanical (Power)) Engineering**

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## **1. DEVELOPING FIRST-OF-A-KIND (FOAK) RENEWABLE/ UNCONVENTIONAL POWER TECHNOLOGIES AND INFRASTRUCTURES FOR BUILDING INDIGENOUS POWER AND OTHER INDUSTRIAL PLANTS**

Attained an in-depth knowledge and hands-on professional experience in Pakistan Atomic Energy Commission (PAEC), Fauji Fertilizer & Co and HMC, Taxila, for developing projects and related technologies, and a passion to share it with dedicated teams consisting of scientists and engineers for achieving self-reliance in developing Projects, Nuclear Reactors/ Power technologies in the shortest timeframe. **The experience so attained can be utilized for developing Renewable and Unconventional Power Technologies and related infrastructures for building Indigenous Solar, Wind, Nuclear, Fuel cells etc. Power and other industrial plants. Seeking for a Management/ Executive tasks to manage and develop such First-of-a-Kind (FOAK) power technologies for Low-cost electrical power generation easily affordable by local Industry, trade, and populace. The vision and commitment is to make Pakistan self-reliant, self-sufficient in Renewable and Nuclear Power Technologies through developing/ upgrading requisite local infrastructures.**

## **2. PROFILE**

Joined PAEC in 09/1982 after serving in leading industries, i.e., Heavy Mechanical Complex-1, and Fauji Fertilizer & Co Ltd. Worked in planning and development of nuclear research and power projects based on safety and quality approaches before appointing as Director General (Design) and Director General (Technical) by the PAEC management. Diligent, visionary, committed and enterprising Director General (Technical)/ Chief Engineer of PAEC with over 35 years of invaluable leading experience and considered as instrumental by the Top Management, managed and participated in design and development of First-of-a-Kind Nuclear Power/ Research Projects of National Importance with demonstrated record of achievements. Driven by assiduous use of nuclear Safety and Quality approaches and efficient utilization of infrastructures and resources, resolved many long outstanding design/technical issues and executed projects and achieved goals in record time. Also presented improved versions of reactor designs besides preparing roadmap for developing nuclear power technology. During these endeavors, important documents concerning commercial nuclear power policy/ programme, were prepared for taking decisions by the Top Management of PAEC. Honored to be a part of the pioneering teams in important nuclear projects since November 1984 till July 2018, and contributed towards National Economy and Security resulting from the ability to coordinate and work with development teams to plan and implement, following nuclear safety guides and quality codes.

Precious time is saved by first developing First-of-a-Kind (FOAK) technology through building mock-ups, experimental rigs and prototypes, for qualification of various equipment/ systems and conceptual design. This approach pays-off in saving invaluable time and finances prior to proceeding on actual design, which otherwise could be wasted on reworking faulty design.

## **3. CORE COMPETENCIES/ EXPERTISE**

- Indigenous Development of Nuclear Projects (First-of-a-Kind (FOAK) Project Research and Development)
- Strategic Oversight/ Fore-Thinking
- Equipment/ Systems Development
- Civilian/ Commercial Nuclear Power Policy Development
- Decision Making

- Safety/ Quality Approach
- Infrastructure Development
- Visionary Leadership
- Teams Building
- Collaboration/ Coordination with Stakeholders
- Strategic Planning and Implementation
- Pursuance with logical reasoning
- Knowledge Management
- Negotiation with (Exposure to Foreign (European, Chinese) Industrialists & entrepreneurs)
- ASME Based Mechanical Equipment Design
- ASME Based Steel Structure Design/ Steel Containment Design
- Welding & Fabrication

## 4. PROFESSIONAL EXPERIENCE/ EXPERTISE

### 4A. PAKISTAN ATOMIC ENERGY COMMISSION (MAIN PROJECTS AND TASKS ACCOMPLISHED)

#### COMMERCIAL NUCLEAR POWER PLANTS (NPPs)

##### **Nuclear Power Policy for developing Indigenous NPPs (2013-2018)**

- Prepared Nuclear Power Policy in 2013 in line with the National Power Policy - 2013, for developing Nuclear Technology and Indigenous Nuclear Power Plants (NPPs). Offered services to the Chairman PAEC, Dr. Anser Pervez in 2014 for developing INPPs. Revised the Nuclear Power Policy and presented to Chairman PAEC, Mr. Muhammad Naeem in 2015 and in July 2018 for review and approval. In this connection, participated in an International course on NPPs system Technology arranged by UNDP (RAS-0.021-004) regarding NPPs planning and implementation, held in Taejon from 3-21 November 1997, organized by Korea Atomic Energy Research Institute (KAERI) and Korea International Cooperation Agency (KOICA) of Republic of Korea (ROK).
- Similar approach and expertise can be utilized in the development of Power Projects related to Renewable Energy Resources as part of Energy Mix.

#### NUCLEAR POWER PLANTS (SNPP)

##### **SNPP: (2012-2016) (Major design problems resolved and proposed standard SNPP development roadmap)**

- As Director (Equipment Design) in April 2012, for developing SNPP, designed various mechanical equipment, prepared equipment layout etc. Also highlighted design deficiencies and proposed upgradation/ improvements for developing standard nuclear power plant design.
- As Director General (Design) in Feb. 2016, prepared technical reports for resolving design deficiencies and adopting standard approach/practices for building SNPP. Prepared Case Study/ Roadmap for SNPP, which includes preparing conceptual design to prototypes as part of the developmental process for developing First-of-A-Kind (FOAK) SNPP. Presentations given to senior PAEC officials in this regard.

##### **High Power Nuclear Power Plant (SNPP): (July 2016 - July 2018)**

- As Director General (Technical) studied standard high power SNPP designs and persuaded PAEC Management for adherence to international/ standard approaches/ practices for developing SNPP. Prepared conceptual design and presented to Chairman PAEC in Dec. 2016. Presented Conceptual high power SNPP design to senior PAEC officials. Proposals submitted for award of high power SNPP project after fulfilling the requirements of Chairman PAEC.
- Prepared SNPP Programme/ Roadmap for its development. Presented it to Chairman PAEC, in 2018.

#### PAKISTAN's RESEARCH NUCLEAR PLANTS

### **First Research Nuclear Plant (1984-1997) (Mechanical design, Fabrication, Installation, Upgradation)**

- Part of the pioneering team consisting of 06 officials in 1984, designed and developed Pakistan's first Research Nuclear Plant. Assigned also tasks for assembly of critical reactor equipment. Responsible for equipment fabrication and installation at Nuclear Plant site.

### **Other Research Nuclear Projects (2001-2015) (Mechanical design & its Upgradation, provided consultation for resolving fabrication/ Installation issues)**

Assigned independent projects for designing other nuclear related equipment/ systems, their layout and assembly. Proposed design upgrades/ improvements (mechanical) in their design and got them approved by Chairman PAEC. Design upgradation yielded number of advantages including enhancement of power, saving of finances and process/ mechanical equipment and early completion of design work even incorporating design upgrades/ improvements.

Similar approach/ practices were applied in other nuclear projects for design, planning and implementation.

## **4B. FAUJI FERTILIZER & CO LTD**

### **04/1982 - 08/1982: Apprentice Engineer, Fauji Fertilizer (Pvt) Co Ltd. Goth Machi, District Rahim Yar Khan**

Appointed at FFC, Goth Machi Site after passing selection test and interview. Placed in Planning Department. Opportunities to work with Italian firms (design & operation) were availed for enhancement of knowledge about planning, designing, erection and maintenance.

#### **Main Jobs & Tasks Executed**

- Prepared activity and production targets schedule.
- Prepared maintenance schedules and flow diagrams for executing jobs in time.
- Surveyed site areas where jobs are being carried out under difficult process and weather conditions.
- Coordination with other divisions regarding the delays during execution of activities.
- Discussion held with Italians (Heads of Departments/ Sections) for resolving the matters and obtaining advices.
- Coordinated with Training Division for information about the chemical process and operation of Fertilizer Plants.

## **4C. HEAVY MECHANICAL COMPLEX**

### **01/1982 - 04/1982: Apprentice Engineer, Heavy Mechanical Complex, Taxila,**

Joined Heavy Mechanical Complex (HMC) Taxila, near Islamabad, after completing B.Sc (Mechanical) Engineering. Orientation of all the departments was arranged. Finally, posted in Planning Division.

#### **Main Jobs & Tasks Executed**

- Prepared activity lists for fabrication and machining of components.
- Prepared maintenance schedules and flow diagrams for executing jobs in time.
- Checked workloads in machine shop, fabrication shop etc. for assessment of other jobs to be handled for early completion of boilers and sugar/ cement plants.
- Kept liaison with sales/ marketing departments regarding preparation of contract/ orders for the clients.
- Prepared timelines for completion of the projects.

## **5. PARTICIPATION AND PRESENTATION OF TECHNICAL PAPERS IN INTERNATIONAL/ NATIONAL NUCLEAR WORKSHOPS/ SEMINARS, ADVANCED TECHNICAL COURSES**

ASME Advanced Nuclear Courses/ IAEA Technical Meetings

- Participated in “ASME Advanced Nuclear Course (PD443), B&PV Code, Section-III, Division-I: Combo course” held in Istanbul, Republic of Turkey, in collaboration with Pakistan Engineering Council (9-13 February, 2015).
- Participated in ASME advanced nuclear course, “Advanced Design and Construction of Nuclear Facility Components per ASME B&PV code Section III, PD644, held in Milan, Italy, in collaboration with Pakistan Engineering Council (22-25 June 2015).
- Participated and presentation given in IAEA organized Technical Meeting on “Safety of Experiments of Research Reactors” held in Vienna, Austria (11-15 June, 2012).
- Participated in International Seminar on Small Modular Reactors (SMRs) and presentation given on “Planning for Design and Development of SMRs” held in Islamabad, Pakistan.

### **International IAEA/ UNDP Technical Courses/ Trainings & Exhibition/ Conferences**

Participated in UNDP Regional (RCA)/ IAEA Training Course in System Technology for Nuclear Power Plants with emphasis on “ Planning and Implementation of Nuclear Power Projects (RAS-0.021-004), held in Taejon from 3-21 November 1997, organized by the Korea Atomic Energy Research Institute (KAERI) and Korea International Cooperation Agency (KOICA) of the Republic of Korea (ROK).

- Participated in UNDP Regional (RCA)/ IAEA Industrial Training—“Demonstration Course on Radiation Sterilization of Medical Products”, held at Bhabha Atomic Research Centre, Bombay (Mumbai), India (10-23 September, 1984) and at Korea Atomic Energy Research Institute (KAERI), Seoul, Republic of Korea (ROK) (24-29 September 1984).
- Participated in an International course on NPPs system Technology arranged by UNDP (RAS-0.021-004) regarding NPPs planning and implementation, held in Taejon from 3-21 November 1997, organized by Korea Atomic Energy Research Institute (KAERI) and Korea International Cooperation Agency (KOICA) of Republic of Korea (ROK).
- Participated in 2<sup>nd</sup> Middle East Aluminium Metal & Metallurgical exhibition and conference at Dubai, UAE (10-12 December, 2002).

### **Participation and Presentation of Technical Papers in National Seminars and Technical Courses**

- Participated and Paper presented in 3<sup>rd</sup> National Seminar about Welding Technology on “ Design Aspects of Welding Thick Aluminium Plates for Fabricating Large Vessels” organized by Pakistan Welding Society (PWS) PAEC at Islamabad (10-11 August, 2009).
- Participated and Paper presented on “Quality Welding in Self-Reliance/ Indigenization” in 1<sup>st</sup> National Seminar about Welding Technology on “Role of Quality Welding in Self-Reliance”, organized by Pakistan Welding Society (PWS) PAEC at Islamabad (12-13 March, 2001).
- Participated in and completed the course on “NDT Appreciation Course for Managers” held at Islamabad, organized by National Centre for Non-Destructive Testing (NCNDT) of Scientific and Engineering Services Directorates, PAEC (07-11 April 2003).
- Successfully completed week long course on Auto CAD and Autodesk Mechanical Desktop, conducted at Authorized Autodesk Training Centre in October 2002.
- Presented papers in the following Technical Seminars (1995-1996):
  - Installation of Reactor Vessels and Heavy Equipment (24 August, 1995).
  - Past, Present and Future targets for the Nuclear Power Projects (21-22 August, 1995).
  - Safety during plant construction, commissioning and operation (23-24 August, 1995).
  - Research Reactors Utilization (12/1996).
- Participation in a Seminar on Structural Integrity at Islamabad, organized by Pakistan Science Foundation and Mechanical Engineering Department, Sheffield, University U.K (21-25July, 1989).

- Participated in course on Reliability Techniques held at Islamabad from 18-29 November 1984, organized by Directorate of Nuclear Safety and Radiation Protection Pakistan Atomic Energy Commission (PAEC).

## 6. HONORS/ AWARDS AND DISTINCTIONS

- Awarded Pakistan's Prestigious National Award, "**PRIDE OF PERFORMANCE**" by the President of Pakistan in the year 2009, in recognition of professional excellence and dedicated contribution/ meritorious services in nuclear research and nuclear projects.
- Honored to be part of team assigned to design and develop Nuclear Research and Power Plants".
- Awarded PAEC's Gold Medal by the Chairman PAEC in recognition of outstanding performance in the field of Mechanical Engineering and contribution towards design improvements in Nuclear Projects (2003).
- Awarded merit certificate for the year 1993 in recognition of excellent contribution and devoted to assignments and duties alongwith ranking among 10% of Mechanical group.
- Awarded Merit Scholarship by Ministry of Education for doing PhD in Xi'an Jiaotong University, China in 1991.
- Accelerated promotions attained throughout service in PAEC from Senior Engineer upto the Chief Engineer.
- Honored to be the Chief Guest of the concluding ceremony of a Course on "Signal Analysis for Eddy Current Magnetic Flux Leakage (MFL) and Remote Field Testing (RFT), NDT-280" at Scientific and Engineering Services Directorate, PAEC, on 31<sup>st</sup> August, 2012

## 7. EDUCATION

- Doctor of Philosophy, PhD in Mechanical Engineering from Xi'an Jiaotong University, China, (06/ 1992 –?)**  
Obtained "**Merit Scholarship**" from Ministry of Education (Pakistan), for doing PhD in Mechanical Engineering from Xi'an Jiaotong University, China but was not allowed to proceed by PAEC due to engagement in pressing assignments of in-progress National Special Nuclear Projects.
- Master of Science, Mechanical (Power) Engineering from University of Engineering and Technology (UET), Lahore ( 06/ 1987 – 09/ 1992)**  
Obtained distinction of achieving 3<sup>rd</sup> position and 80.1% overall average. Major Coursework focused on Heat Transfer, Nuclear Engineering, Thermodynamics, Mathematical Techniques, Instrumentation & Control, Mechanical Vibration, Gas Turbines and I.C Engines.
- Bachelor of Science, Mechanical Engineering from University of Engineering and Technology (UET), Lahore ( 10/ 1976 – 11/ 1980)**  
Graduated with distinction, 6<sup>th</sup> position in the overall merit and 78.4% overall average. Major Coursework focused on Mechanics of Materials, Machine Design, Thermodynamics, Heat Transfer, Materials and Processes, Automotive Engines.

## 8. MEMBERSHIPS - PROFESSIONAL SCIENTIFIC, ENGINEERING AND SOCIETIES

- Pakistan Engineering Council (PEC), (MECH/03352)
- Pakistan Nuclear Society (PNS), (PNS-2437)
- Pakistan Society of Non-Destructive Testing (PASNT), (PASNT-147)
- The Institution of Engineers Pakistan (IEP), (M/10376-I-445)
- Defense Club FF, DHA, Phase:4, Lahore (R-397)

## **9. COMPUTER SKILLS**

- Microsoft Office, Microsoft Word, Microsoft Power Point
- Internet, Web Browsing
- AutoCAD 2D/3D, CAD (Knowledge)

## **10. PERSONAL DETAILS**

- Date of birth: 13-07-1956
- Marital Status: Married
- Nationality: Pakistani
- Languages Known: English, National and Regional language(s)
- Games: Squash
- Hobbies: Reading books on Purposefulness of Human Life (Research on Quran), Technical (Policies/ Programmes for Developing Civilian and Strategic Nuclear Power Technologies )/ Philosophy