



AFE BABALOLA
UNIVERSITY
ADO-EKITI (ABUAD)
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25th July, 2014.

PROPOSAL BY COLLEGE OF ENGINEERING FOR PARTNERSHIP BETWEEN JULIUS BERGER PLC AND AFE BABALOLA UNIVERSITY, ADO – EKITI (ABUAD)

It is our intention to take full advantage of the proposed partnership between Afe Babalola University, Ado – Ekiti and Julius Berger. Julius Berger, a major player in the Construction Industry in Nigeria, who has offered to collaborate with our Institution. The Engineering College wishes to propose five (5) key areas of interest listed below as follow:

- A. Research Partnership:** The development of an ABUAD – Julius Berger Research Centre.
 - B. Students Training & Professional Mentoring through SIWES & Holiday Volunteer Programs.**
 - C. Provision of Equipment for Laboratory Works and Researches.**
 - D. Scholarships and Grants for Staff's Postgraduate Research and Undergraduate Students.**
 - E. Continuous Professional Development(CPDs)& Hands-on Equipment Trainings;**
- 1. CIVIL & ENVIRONMENTAL ENGINEERING**

In respect of Civil & Environmental Engineering, the areas of collaboration will include:

- **Design**, detail and construction using structural steel, reinforced concrete and wood using Computer Aided Designs software (**CADs**).
- **Design** and construction of roads paved with concrete and asphalt.

PROFESSIONAL TRAINING FOCUS (CIVIL)

- **Building Construction**

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- Building Planning, Production & Batching.
- Cost Effective Construction Techniques in Mass Housing Schemes.
- Dampness and Its Prevention.
- Deep Foundations, Piling and Revetment.
- Super Structures.

- **Civil Engineering Materials**

- Concrete, types & grades used for different Construction stages.
- Reinforced Concrete: Practical Approach.
- Plain Concrete: Practical Approach.
- Pre - stressed Concrete.
- Various Tests on Concrete as a Constructional Material.

- **Disaster Resistant Building**

- Disaster Management and Planning.
- Disaster Resistant Buildings.
- Destructive and Non – Destructive Tests and Equipment.

- **Highway Engineering**

- Site Investigation for Road Construction.
- Field Test on Road Construction.
- Road Surveys (Horizontal & Vertical Alignments).
- Analysis of Areas and Volume; Cut and Fill.
- Plotting Survey Data.
- Road Maintenance & Projection.
- Present and Future Highway Planning.

- **Earthquake Engineering**

- Assessment of Seismic Hazard of Territory
- Bridge Embankments – Seismic Risk Assessment and Ranking
- Dynamic Behaviour of the Confederation Bridge under Seismic Loads.
- Full-Wave Ground Motion Forecast.
- Seismic Performance and Simulation of Behavior of Structures.
- Seismic Risk of Structures.
- Soil-Structure Interaction.

- Understanding the Multidimensionality of Earthquake Engineering.
- **Geotechnical Engineering**
 - Soil Investigation & Planning.
 - Soil Test carried out before the commencement of Construction Work.
- **Hydraulics**
 - Dam Construction
 - Surface Water Intake Works and Pumping programme.
 - Raw Water and Wastewater Treatment processes.
- **Masonry Structural design**
- **Project Management**
 - Contract Laws and conditions used for civil engineering work.
 - Earthworks and pipelines.
 - Health and safety regulations.
 - Interim monthly payments.
 - Measurement and bills of quantities.
 - Payment arrangements, risks and project cost estimating.
 - Preparing contract documents.
 - Procedures for design and construction.
 - Programme and progress charts.
 - Site concreting and reinforcement.
 - Site surveys, investigations and layout.
 - Starting the construction work.
 - Tendering.
 - The contractor's site organization.
 - The development of construction procedures.
 - The employer and his engineer.
 - The resident engineer's duties.
 - The resident engineer's office records.
 - Variations and claims.
- **Bridge Works**
 - Steel and Concrete Bridges (Design & Construction)
- **Structural Analysis**

- Structural Steel
- Analysis of Special Structures.
- Arch Bridges.
- Beam and Girder Bridges.
- Building Design Criteria.
- Cable-Suspended Bridges.
- Cold-Formed Steel Design.
- Connection.
- Design Criteria for Bridges.
- Fabrication and Erection.
- Floor and Roof Systems.
- General Structural Theory.
- Lateral-Force Design.
- Properties of Structural Steels and Effects of Steelmaking and Fabrication
- Truss Bridges.

PROVISION OF EQUIPMENT FOR CIVIL

- Provision of Equipment for Testing of Concrete and Steel Structures in Tension, Compression and Shear
- Highway and Geotechnical Engineering Equipment
- Hydraulic, Water Supply and Waste Water Engineering Equipment.

SERVICES TO JULIUS BERGER

Civil Engineering Department will offer collaborative services to Julius Berger in the following areas:

- A.** Structural Reliability Checks
- B.** Auto CAD design
- C.** Finite Element Analysis
- D.** Research and Design (R&D)
- E.** Project Planning and Management

2. ELECTRICAL & COMPUTER ENGINEERING

- A.** Provision of Equipment for Electrical & Computer components like Sensors, Actuator, Motor, Relay, etc.

3. MECHANICAL, MECHATRONICS & CENTRAL WORKSHOP.

- A.** Provision of Equipment for Material and Metallurgical Laboratory such as Differential scanning calorimeter, Universal testing machine, Universal tensile machine, Compression machine, Magnetic crack detector.
- B.** Provision of equipment for mechanic of machines laboratory such as Quick return mechanism, Power regulation equipment, Vibration test rig.

- **WELDING TECHNOLOGY**

(((a) Electric Arc Welding (b) Gas Welding(Oxy-Acetylene) (c) Tungsten Inert Gas (TIG) welding (d) Nitrogen Inert Gas (NIG) welding

- **MACHINING**

(((a) Centre Lathe Work (b) Milling Work(Vertical, Horizontal and Universal)
(c) CNC Lathe (d) CNC Milling (d) Shaping machine work
(e) Slotting machine work (f) Surface grinder/cylindrical grinder
(g) Pillar drilling machine (h) Radial drilling machine (i) Pedestal
Grinder (j) Power Hacksaw (k) Bench Shearing machine (l)
Hydraulic Press

- **BENCH WORK AND FITTING**

All hand tools for Bench work and fitting work

Marking out table, marking out tools

- **FOUNDRY TECHNOLOGY**

(((a) Furnaces and Crucibles (for melting Steel, Aluminum, Copper, Brass, Bronze and Alloys)

(((b) Pattern Making tools/equipment

(((c) Foundry Hand tools/equipment

- **ROLLING MACHINE AND BENDING MACHINE**

For Metal Fabrication

- **POWERED HAND TOOLS**

- 1) Electric drills ii) Compressed air drills iii) Pneumatic drills
- 2) Powered screw driver (b) Reversible screw driver fitted with an angle head for aero-engine maintenance (c) Pneumatic screw driver with suction device
- 3) Tools for rapid tapping and driving screwed studs into tapped holes (b) Pneumatic spanners and Impact wrenches for rapid assembly work (c) Collect grinders, used for fine finishing work on dies (d) Portable grinders

- **AUTOMOTIVE WORK**

- ((((a) Electro-Mechanical Lift (b) Live demonstration engine (c) Balancing/Alignment Kit (d) Fault Diagnostic kit (e) Battery Charging units (f) Chassis (g) Transmission (h) 2stroke/4stroke engine (i) Steering Control (Teaching Aid) (J) Braking System (Teaching Aid) (k) Air Compressor (l) Diesel Engine Petrol Engine

- **WOOD WORK**

- ((((a) Polishing and Sanding machine (b) Spraying Machine (c) Air Compressor (d)Pallet truck

SERVICES TO JULIUS BERGER

Our service to Julius Berger will include:

- Mounting of courses for their staff and managers in area of repair and maintenance for mechanical machines and equipment
- Engineering project planning and control
- Quality control techniques
- AutoCad design.

4. CHEMICAL AND PETROLEUM ENGINEERING

Chemical and Petroleum Engineering Department has identified PrimeTech Design and Engineering (PDEN). This is a subsidiary of Julius Berger actively involved in providing engineering design for projects in the oil and gas sector in Nigeria. The Chemical and Petroleum Engineering Department will benefit immensely from their practical experience in the oil and gas business in several ways while also actively involved in activities that can add value to PDEN Ltd.

It is therefore proposed that PDEN Ltd should set-up a chemical/petroleum engineering design laboratory equipment with work stations that have specialist chemical/petroleum engineering software installed. Such software tools include:

Aspen HYSYS

Comsol Multiphysics

ECLIPSE

PETREL

We also suggest that any proprietary software of PrimeTech Design and Engineering Nigeria Ltd could be included in the aforementioned software tools.

CONTRIBUTIONS TO PrimeTech Design and Engineering Nigeria

The Chemical and Petroleum engineering staff can effectively help to solve engineering problems in the following areas for PrimeTech Design.

Finite element analysis

Reservoir simulation

Process design

Well data logging