ALBERTO BAZZONI – MATERIALS & CORROSION EXPERT

PROFESSIONAL RESUME

Name:	Alberto Bazzoni
Job Title:	Corrosion & Materials Expert
Nationality:	Italian
Qualifications:	Master's Degree in Mechanical Engineering Material Science, Polytechnic University of Milan
Languages:	English + Italian
Years of Experience:	25+
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SUMMARY OF EXPERIENCE

Over twenty-five years' industry experience in materials and corrosion engineering in subsea, offshore, and onshore Oil & Gas Industry, Upstream Sector, working for major Oil Companies, EPCI Contractors and Consultancies in several projects world-wide. Leading and advisory roles across all Project phases: Design: from feasibility to conceptual, front end engineering and detail design; Execution: procurement, fabrication, construction, commissioning; Operation: integrity and corrosion management, fitness-for-service assessment, subsea repair, requalification, and life extension. Covering all upstream and midstream assets: subsea pipelines, SPS, risers; well completion; umbilicals, rigid and flexibles flowlines; onland pipeline systems; topside, floating and onland plant processing facilities.

Key areas of expertise include:

- **Corrosion Engineering:** corrosion studies, corrosion assessment and corrosion modelling using industry and in-house developed models; corrosion design and mitigation to industry standards.
- **Materials Engineering**: material selection and specification; requirements, limitations and qualification for severe application (sour service, deepwater, arctic); metallurgy, fracture mechanics and welding.
- **Subsea & Pipelines**: SPS, risers & linepipe requirements, offshore installation and welding, fracture control, fatigue welds, hydrogen and stress corrosion cracking, strain-based design and ECA requirements.
- **Well Completion & Processing Facilities**: well completion, onshore and offshore topside processing and utility facilities, FPSO, LNG, storage tanks.
- **Cathodic Protection & Coatings**: cathodic protection design and specification; non-metallics material solution, insulation requirements, anticorrosion coatings, and field joint coatings.
- **Asset Integrity & Life Extension**: corrosion management, corrosion monitoring, corrosion risk assessment and risk-based inspection, in-line-inspection and pigging technologies, direct assessment, fit-for-service.
- **Tender, Procurement, Fabrication**: purchase materials specification and installation contracts; material requisition, technical bid evaluation, support to procurement services and follow-up for project execution.
- **Technical Authority & Advisory Roles**: acting on behalf of Company during design, procurement, execution. Editing of Company's Engineering Standards for various operators. Independent review.
- **Failure Analysis & Root-Cause Investigation**: Technical advisor for materials and corrosion related failures in arbitrations and insurance claims.

ASSIGNMENTS & EMPLOYMENT HISTORY

ENI MOZAMBIQUE ENGINEERING	Rovuma LNG Deepwater Project *Principal Materials & Corrosion (Contract)*	2015 – on
S2V CONSULTING PTY LTD	Subsea & Pipelines *Senior Consultant, Materials & Corrosion*	2012 – 2015
APACHE CORPORATION WA	Projects' Execution *Materials & Corrosion Advisor (Part Time Secondment)*	2012 – 2015
INDEPENDENT CONSULTANT	*Materials & Corrosion Consultant*	2009 – 2012
CESCOR SRL	Materials & Corrosion *Engineering Coordinator*	2006 – 2009
ENI TECNOMARE (AGIPKCO)	Kashagan Project Offshore Topside *Materials & Corrosion Lead Engineer*	2002 – 2006
CESCOR SRL	*Corrosion Engineer*	1993 – 2001

PROJECT TEAM ROLES

ENI MOZAMBIQUE ENGINEERING (EME) – ROVUMA LNG PROJECT UPSTREAM: MATERIALS & CORROSION PRINCIPAL
SIX (6) YEARS FULL TIME ROLE (2015-ONGOING)

Principal Materials & Corrosion engineer for FEED, FEED-optimization, & Tendering phases. Corrosion studies, material selection, coating selection, corrosion prevention, cathodic protection, asset integrity, corrosion management and risk-based inspection (RBI) for subsea pipelines and subsea production system (upstream system). Pipeline construction welding and fatigue requirements. Review-approval of Contractors engineering for competitive FEED optimization and EPCI. Material specification and requisition for carbon steel and nickel alloy clad linepipe and subsea components. Review of welding specification for carbon steel and 625 clad pipelines. Pipeline coating specifications (3LPP, FBE, FJC). Requirements for offshore pipeline welding & girth-weld fatigue design for fatigue sensitive sections along the escarpment crossing. Technical review of bids for linepipe, umbilicals, installation & construction, assisting contract awarding process.

APACHE CORPOR. WA – GREATER EAST SPAR, NINGALOO VISION, CONISTON, BALNAVES, VARANUS ISLAND, JULIMAR
THREE (3) YEARS PART TIME SECONDMENT (2012-2015)

Materials & Corrosion Advisor for Apache WA Projects' Execution Team. Acting as Company's TA, providing relevant engineering support for the development and upgrading of Western Australia Projects, dealing with materials and corrosion issues arising during the project execution phase. Subsurface well completion, subsea equipment, FPSO, topside and surface facilities. Support to the Well Completion Team for corrosion assessment, material suitability assessment, material selection review and laboratory corrosion testing specification for well completion components of Julimar Brunello production wells.

OXY OCCIDENTAL | QP – IDD EL SHARGI NORTH DOME PHASE 5: SUBSEA SOUR OIL PIPELINE SYSTEM
TWO (2) YEARS PART TIME ROLE (2013-2015)

Corrosion assessment and materials selection of the subsea pipeline network system. This project required extensive stakeholder engagement including assessment of corrosion inhibition requirements and constraints leading to final hybrid materials selection. Fast track development of technical documentation to support procurement milestones for the project. Procurement support of carbon steel and nickel alloy 625 clad linepipe, bends, fittings and valves for subsea flowline system and trunkline system. Preparation of ITT documentation (Specifications, Technical Datasheets and Material Requisitions), tender bid evaluation, technical authority role on behalf of Company during procurement and execution.

HESS AUSTRALIA – EQUUS DEEP WATER PROJECT: SUBSEA PIPELINE SYSTEM & TOPSIDE PROCESSING FACILITIES
ONE (1) YEAR PART TIME ROLE (2012-2013)

Responsible for materials, corrosion and welding aspects acting as Company's TA in the review and approval of Contractors' engineering deliverables for corrosion assessment, material selection and material specifications for subsea pipeline system and FPSO topside assets of the deepwater Equus FEED project.

KPO – KARACHAGANAK SOUR HP GAS INJECTION UNIT PROJECT: LOW TOUGHNESS PIPING MITIGATION & REPLACEMENT
TWO (2) YEARS PART TIME ROLE (2006-2008)

Risk mitigation and replacement of low toughness pipework within sour HP gas injection unit. Metallurgy and corrosion expert support within KPO partners (ENI, BG, Chevron) for the replacement of out of specification low-toughness fittings detected while in service in high-pressure, low-temperature and high-H_2S service. Selection and specification of replacement material. Assessment and definition of safe operation envelope and conditions requiring gas injection unit shutdown for out-of-spec fittings in service before replacement.

AGIP KCO – KASHAGAN FIELD: OFFSHORE TOPSIDE FACILITIES CONCEPT, FEED, TENDERING, EXECUTION
FOUR (4) YEARS FULL TIME SECONDMENT (2002-2005)

Materials & Corrosion Lead Engineer for Offshore Kashagan Development Project. Within the offshore section of KDPC organization, engineering was assigned to Tecnomare (KDPC Milan) for topside processing facilities and offshore structures design, and to Fluor Worley Parsons (KDPC London) for the intrafield trunklines and export pipelines design. Corrosion assessment, material selection, corrosion prevention, cathodic protection, coating and insulation, corrosion management, materials specification, tendering and procurement.

OIL & GAS PROJECTS CONSULTANCIES

PERITUS | TOTAL E&P QATAR – AL KHALIJ FIELD: RISER REPAIR & REMEDIATION DESIGN GALVANIC CORROSION 2020

Riser replacement project. Corrosion prediction, mitigation and material selection. Design criteria for prevention of galvanic corrosion at dissimilar metal interface between carbon steel and alloy 625 clad pipe.

APACHE ENERGY WA – CONFIDENTIAL PROJECT: SUBSEA PIPELINE TOP OF LINE CORROSION REPAIR 2014-2015

Subsea repair project involving the replacement of the inlet section of a subsea pipeline damaged by top of line (TLC) corrosion. The inlet carbon steel pipeline operating at high temperature is replaced by Alloy 625 internally clad flanged spool linepipe and bends connected to existing CS pipeline by subsea repair connector.

BECA | GENESIS ENERGY | ORIGIN – KUPE FIELD NEW ZEALAND: OFFSHORE GAS FIELD PROJECT 2013-2014

Independent Engineer's review of Genesis Energy Generating Assets and the Kupe Facilities, including offshore wellhead platform, offshore section pipeline, onshore section pipeline, onshore gas treatment, storage tanks and export pipelines. Alberto was the materials & corrosion expert in Engineer's Reviewer Team.

SANTOS ENERGY – FLETCHER FINUCANE DETAILED DESIGN SUPPORT FOR SUBSEA EQUIPMENT 2012-2013

Materials & corrosion support for Santos Fletcher Finucane Subsea Project. Advisory role, acting as Company technical authority in the review and approval process of Contractor engineering deliverables and materials specification for subsea equipment during detail design and execution phase.

KUWAIT ENERGY IRAQ LIMITED (KEIL) – SIBA FIELD ONSHORE PROJECT: PDP, CONCEPT DEFINITION, FEED 2012-2013
Concept Development Plan (PDP), Concept Definition, and FEED phases of the Project. materials selection for gathering flowline system. Value opportunity study for pipelines material optimization; material specifications for flowlines, trunklines and export pipelines.

KOGAS – AKKAS GAS FIELD IRAQ: ONSHORE FLOWLINES AND GAS PROCESSING PROJECT (PDP + FEED) 2012-2013
Development Plan (PDP) and FEED phases: corrosion study, corrosion assessment, material selection, corrosion mitigation design for onshore flowline gathering system, central processing facilities and export pipeline network, corrosion management and cathodic protection system specification.

BASISENGINEERING ROSETTI | TOTAL – ELGIN B & WEST FRANKLIN 2011-2012
FEED endorsement and material selection topside facilities Elgin B and West Franklin. Corrosion prevention and material selection concepts for the extreme service conditions of the field combining: HP/HT, sour service, high chlorides formation water with SSCS issues related to flash effect chlorides concentration.

ENI E&P (ENI NORGE & STATOIL) – GOLIAT FIELD, NORWAY: CORROSION & MATERIAL ENGINEERING 2006-2009
Goliat Field subsea system corrosion assessment, material selection, corrosion integrity management of the offshore asset, including subsea wells, subsea production system, intra-field flowlines system, FPO process topside facilities and export pipeline.

DRAFTING OF COMPANY ENGINEERING STANDARDS FOR O&G OPERATORS'

APACHE ENERGY – DRAFTING OF APACHE CORPORATION ENGINEERING STANDARDS 2013-2015
Apache Company Standards of guidelines for the selection of materials for a) subsea production equipment and b) for topside and on-land processing facilities to assist Apache Projects in setting fit-for-purpose requirements for subsea production and topside equipment supplied within Apache Projects in Australia.

WOODSIDE – DRAFTING OF WOODSIDE ENGINEERING STANDARDS 2013
Woodside Engineering Standards: Company Specification for Corrosion Resistant Alloy (CRA) Solid and Clad Ball Subsea Pipelines Valves.

STATOIL – DRAFTING OF STATOIL ADVISORY STANDARDS 2009-2011
Statoil Advisory Standards: Best practice for the selection of materials for tubing and casing "OCTG"; Best practice for the selection of materials for wellhead and x-mas tree components.

ENI E&P – DRAFTING OF ENI COMPANY ENGINEERING STANDARDS, DESIGN CRITERIA, BEST PRACTICES 2007-2011
ENI Engineering Standards: Design Criteria for Internal Corrosion; Corrosion Inhibition of Pipelines; Material Selection of Processing Equipment; Material Selection for Seawater Handling Systems; Cathodic Protection; Clad & Lined Linepipe Specification; Requirements for Pressure Vessels in H_2S Service; Corrosion Monitoring.

RESERCH & DEVELOPMENT PROJECTS

KBR | NCOC – KASHAGAN FIELD: STATE OF THE ART TMCP LINEPIPE FOR EXTREME SOUR SERVICE APPLICATION 2019
Comprehensive review and state of the art of TMCP-ACC linepipe technology, in relation with the SSC failure of Kashagan sour dry gas export pipeline, providing guidance and recommended criteria for the application, qualification, and prequalification of TMCP carbon steel linepipe for the extreme sour service conditions of production and gas injection of Kashagan Field in Kazakhstan.

SAIPEM (ENI+ENEL CCTS JV) – CARBON SEQUESTRATION TRANSPORTATION STORAGE PILOT PROJECT 2009-2011
Corrosion investigation and material studies in pipeline transportation of supercritical (dense) CO_2. Report 1: State of the art of CO_2 pipeline transportation in dense or supercritical conditions. Report 2: Corrosion assessment in dense-supercritical CO_2 pipeline transportation. Report 3: Corrosion monitoring and measurements in experimental Pilot Plant's test-loop.

TECHNICAL ADVISORY IN ARBITRATIONS

CHEVRON – CONFIDENTIAL PROJECT: INDEPENDENT EXPERT OPINION: FAILURE OF LARGE PIPELINE BALL VALVES 2015
Independent expert opinion regarding the suitability for service and the causes of corrosion damage detected on the sealing mechanisms of large bore valves during the commissioning of an onshore gas pipeline metering station in Western Australia.

SAIPEM | BP – TANGGUH PROJECT NEW PAPUA: INCONEL 625-CLAD RISER FAILURE INSURANCE CLAIM 2009-2011
Saipem technical advisor for insurance claim in a field golden-weld failure of Inconel 625 clad production riser of BP Tangguh offshore platform. Root-cause identification of the mechanisms of failure, possible alternative failure paths and responsibilities.

GE O&G NUOVO PIGNONE – REACTORS WELD FAILURES: ARBITRATION GENP VS OERLIKON ETC AIR LIQUIDE 2011
Investigation on the cause of reheat cracking failure occurred during fabrication of in 2¼Cr-1Mo-¼V Steels for Heavy Wall Reactor Vessels in association with welding consumables impurities. Arbitration between GE Nuovo Pignone and Oerlikon ETC Air Liquid.

SOFTWARE FOR CORROSION PREDICTION, MATERIAL SELECTION, CP

STATOIL | ENI – WELLMATE: WELL MATERIAL EXPERT IN-HOUSE EXPERT SYSTEM FOR WELL COMPLETION 2005-2008
Development of a decision-support in-house expert system application to aid corrosion assessment, corrosion rate prediction, and material selection of well completion components, including: OCTG, wellhead, x-mas tree & downhole equipment materials for well completion.