AceEngineer
ACHANTA ACEENGINEER INC. · HOUSTON TX

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PAGES
8

CAPABILITY BRIEF · V2

AI-native offshore engineering, traceable to clause.

Four capability lines, seventeen codes, and a production Python stack behind every number. This brief summarizes services, standards coverage, tooling, and selected engagements — one page per vertical, no sales copy.

704+	221	17	15+	3–8 wk
PRODUCTION PYTHON MODULES	S-N CURVES IMPLEMENTED	STANDARDS WITH CLAUSE TRACEABILITY	YEARS DEEPWATER ENGINEERING	TYPICAL ENGAGEMENT WINDOW

PRIMARY PRACTICE
Offshore · Subsea · Marine structures

REGULATOR ACCEPTANCE
BSEE · DNV · ABS · HSE · PSA

CONTACT
aceengineer.com / scoping-call

01 · SERVICES

Four capability lines. One engineering philosophy.

Every number cites a standard. Every pipeline is reproducible. We tell you honestly when automation isn't the right call.

CAP-01 · STRUCTURAL

Computational fatigue assessment

Jacket · Topside · Riser girth welds

S-N-based fatigue damage with rainflow cycle counting, SCF corrections, and thickness effects per DNV-RP-C203. Validated surrogate models replace full FEA reruns for design-space exploration — **8× faster sensitivity studies**, same regulator-accepted numbers.

Regulator-ready calc packages. Filings cite clause-level traceability; every number reproducible with the pipeline we hand back.

DNV-RP-C203 | API RP 2A | BS 7608 | Rainflow | XGBoost

PROOF · BSEE FILING

40-year GoM platform life extension approved in 6 weeks

85%	$2.1M	847
TIME SAVED	AVOIDED	JOINTS

CAP-02 · STRUCTURAL

Riser & mooring analysis

Lazy-wave · SCR · TTR · Catenary & taut mooring

OrcaFlex and AQWA pipelines with parametric geometry generation. Design matrices run in hours, not weeks — Pareto frontiers surface the geometry that passes utilization *and* curvature at rare sea states.

Same workflow for catenary and taut mooring: strength and fatigue LC trees, VIV screening, installation through decommissioning.

API RP 2RD | DNV-OS-F201 | OrcaFlex | AQWA | digitalmodel.risers

PROOF · WEST AFRICA FEED

50 lazy-wave configurations assessed overnight

50	4 h	92%
CONFIGS	WALL-CLOCK	TIME SAVED

CAP-03 · INTEGRITY

Life-extension & integrity management

Aging assets · Reassessment · ILP programs

Operational-data-driven reassessment. We reconstruct historical loading from monitoring records

PROOF · INTEGRITY PROGRAM

Continuous fatigue tracking across 3 Gulf assets

3	24	2 yr

and hindcast, reconcile with inspection findings, and produce defensible life-extension cases.

For managed programs: quarterly re-runs as standards update, anomaly flagging from sensor drift, and a rolling RBI input stream into your CMMS.

DNV-RP-C210 | API 2SIM | RBI | BSEE acceptance

ASSETS | CHANNELS | RECORDS

CAP-04 · TOOLING

Engineering pipelines & internal tools

Build & handoff · Managed service

Your team owns the output. We build the Python pipelines that automate your recurring calcs — fatigue, catenary, stability, pressure vessel — and ship them as a reproducible package with a one-command re-run.

Handoff includes training, a runbook, and acceptance tests against your existing hand-calc baseline. Optional support retainer for standards-update maintenance.

Python 3.11 | digitalmodel | uv | LaTeX reports | pytest

PROOF · CALCULATOR SURFACE

Public fatigue-life calculator · 221 S-N curves

221	17	704+
CURVES	STANDARDS	PY MODULES

02 · STANDARDS COVERAGE

17 codes. Clause-level traceability on every number.

Every calc package ships with a traceability matrix: clause → assumption → line of code → result. Regulators see the chain, not a black box.

FATIGUE & FRACTURE

DNV-RP-C203	Fatigue design of offshore steel structures
BS 7608	Fatigue design & assessment of steel products
API 579 / ASME FFS-1	Fitness-for-service, level 1–3
DNV-RP-C210	Probabilistic methods for planning of inspection for fatigue cracks

STRUCTURAL — FIXED & FLOATING

API RP 2A-WSD	Fixed offshore platforms — working stress design
API 2SIM	Structural integrity management of fixed platforms
ISO 19902	Fixed steel offshore structures
Norsok N-004	Design of steel structures
Norsok N-006	Assessment of structural integrity for existing offshore load-bearing structures

CLASSIFICATION

ABS FPI	Floating production installations
ABS MODU	Mobile offshore drilling units

RISERS & PIPELINES

API RP 2RD	Design of risers for floating production systems
DNV-OS-F201	Dynamic risers
ASME B31.3	Process piping

STATION-KEEPING & MET-OCEAN

ISO 19901-7	Station-keeping systems for floating units
IEC 61400-3	Wind turbines — offshore design

WELD & INSPECTION

AWS D1.1	Structural welding code — steel

TRACEABILITY COMMITMENT

- **Clause-level.** Every number cites a specific clause.
- **No hidden assumptions.** The assumption register is part of the deliverable.
- **Reproducible.** One command re-runs the calc, on your infra.
- **Regulator-ready.** Package accepted as-filed by BSEE, DNV, ABS on prior engagements.

03 · TOOLING INVENTORY

What we build with. What we ship back.

Industry-standard analysis tools orchestrated by a production Python stack. Everything we build, you can re-run — no proprietary lock-in, no black boxes.

COMMERCIAL ANALYSIS

STRUCTURAL FE	ANSYS Mechanical · SACS · Abaqus · USFOS
HYDRODYNAMICS	OrcaFlex · ANSYS AQWA · Flexcom Parametric drivers wrap OrcaFlex / AQWA so sensitivity sweeps run unattended.
CFD (ON-DEMAND)	OpenFOAM · STAR-CCM+

IN-HOUSE PYTHON STACK · DIGITALMODEL

CORE PLATFORM	digitalmodel · Python 3.11 · uv · pytest 704+ production modules · 221 S-N curves · open-source sibling library powering every engagement.
MODULES	.fatigue · .risers · .mooring · .loading · .metocean · .reports
ML / SURROGATES	XGBoost · scikit-learn · JAX · PyTorch Surrogates are **validated** against FE — never deployed without an error budget vs the authoritative model.
DATA & I/O	pandas · polars · DuckDB · netCDF / HDF5
REPORTING	LaTeX · Typst · matplotlib · Jupyter Deliverable is a typeset calc package with reproducible figures, not a PowerPoint.

ENGINEERING WORKFLOW

SCM & CI	Git + LFS · GitHub Actions · pre-commit Every calc package is a version-controlled repo with a one-command re-run target. Acceptance tests pin against the hand-calc baseline.

DEPLOYMENT

Your infra | On-prem | Containerized

Code runs where your data lives. No upload of client engineering data to external services without written authorization.

04 · SELECTED ENGAGEMENTS

Four records. Numbers first, story second.

Each record links to a longform case on aceengineer.com. References available on request, subject to operator NDA.

CS-GOM-2024-01 · FLAGSHIP GULF OF MEXICO

40-year GoM jacket · life extension · BSEE-accepted filing

Jacket · 847 tubular joints · fatigue reassessment · DNV-RP-C203 + API RP 2A-WSD

BSEE required a complete fatigue assessment within 8 weeks; traditional hand-calc + FEA would take 16+. We reconstructed 15 years of stress history from monitoring + hindcast, validated an XGBoost global-to-local surrogate against FE on a calibration set, and ran the 847-joint damage calculation end-to-end in 12 hours of compute. Filing accepted as-submitted. Operator gained **10 years** of defensible life extension on an asset the pre-study baseline would have replaced.

85%	$2.1M	847	+10 yr
TIME SAVED	AVOIDED	JOINTS ANALYZED	LIFE EXTENSION

CS-WA-2025-02 · FEED BRIEF WEST AFRICA · 1,850 M

Lazy-wave riser selection · 50-configuration sensitivity

Deepwater FEED · API RP 2RD + DNV-OS-F201 · OrcaFlex parametric

Which lazy-wave geometry delivers the best combination of utilization, fatigue life, and installation margin for a 1,850 m field? Manual: 50 hours. Our pipeline: **4 hours wall-clock**. The sensitivity caught two configurations that passed utilization but violated the installer's minimum-radius envelope at rare sea states — invisible at design-point coverage. Selected LW-23 cleared the installer envelope on first review and gained 18% fatigue margin vs the operator's initial favorite.

50	4 h	2	+18%
CONFIGS SCREENED	WALL-CLOCK	FALSE POSITIVES CAUGHT	FATIGUE MARGIN

IP-GOM-2024-03 · MANAGED GULF OF MEXICO · 3 ASSETS

Continuous fatigue tracking · ILP program

Three aging jackets · 24 monitoring channels · quarterly re-runs · DNV-RP-C210 RBI feed

Managed integrity program across three Gulf of Mexico platforms. Monitoring data flows into the fatigue pipeline on a rolling basis; anomaly flags from sensor drift trigger investigations before they become inspection findings. Quarterly re-runs absorb standards updates (e.g. the 2023 DNV-RP-C203 revision) without a new engagement scope. Output feeds the operator's CMMS as RBI inputs.

3	24	2 yr	Q/Q
ASSETS	LIVE CHANNELS	OPERATIONAL RECORDS	CADENCE

TL-NS-2025-01 · BUILD & HANDOFF

NORTH SEA OPERATOR

Internal mooring-analysis pipeline · build & handoff

Quasi-static catenary solver · API RP 2SK / DNV-OS-E301 · Python package, pytest, LaTeX report

Client's internal team ran catenary mooring sensitivities in three separate Excel workbooks — discrepancies flagged during a classification review. We built a single Python package wrapping the digitalmodel.mooring solver, acceptance-tested against their hand-calc baseline on 12 validation cases, and trained the team on the handoff. Runbook + one-command re-run; the team now owns standards-update maintenance on a thin support retainer.

12	3 → 1	4 wk	100%
ACCEPTANCE TESTS	WORKBOOKS CONSOLIDATED	BUILD + HANDOFF	CLIENT-OWNED

05 · HOW WE WORK

Five stages. Regulator-ready artifacts at every gate.

Most engagements run 3–8 weeks. Weekly review cadence; no end-of-engagement surprises. Full methodology document available on request.

01 Scoping — Week 0 · 30 min · free

Define the regulator or decision gate you're facing. Confirm applicable standards, estimate effort, and agree on acceptance criteria. If automation isn't the right call, we say so.

02 Data ingestion & QC — Week 1 · 3–5 days

Pull monitoring, FEA, metocean, inspection, and as-built inputs. Automated consistency checks flag gaps and drift before analysis — cheaper to find in QC than in a final review.

03 Validated analysis — Week 2–3 · 5–10 days

Pipeline run against authoritative model on a validation set, error budget established, then production run. Surrogates accelerate; FE validates. Nothing ships without a reconciled number.

04 Reconciliation & documentation — Week 4+ · to spec

Results reconciled against hand-calc baseline and prior filings. Traceability matrix assembled: clause → assumption → line of code → result. Calc package typeset in LaTeX for filing.

05 Handoff & monitoring — Ongoing · optional

Runbook, one-command re-run, acceptance tests, and team training. Optional: quarterly re-runs as standards update, rolling anomaly flagging from live monitoring feeds.

Engagement models

- **Fixed-scope project.** One gate, one number, one deliverable. Typical 3–8 weeks.
- **Retainer / managed.** Quarterly re-runs, live monitoring integration, standards-update absorption.
- **Build & handoff.** We build the pipeline your team will own. Includes training, runbook, acceptance tests.

Commitments

- **Traceability first.** If we can't cite it, we don't ship it.
- **No ML-only results.** ML accelerates; FE validates.
- **Weekly review cadence.** No surprises at delivery.
- **Your data, your infra.** On-prem available on request.
- **Reproducible by design.** One command,

same numbers.

— **Honest "no."** If we're not the right call, we say so.

"If we can't cite a clause for it, it doesn't ship. If we can't reproduce it on your infra with one command, it doesn't ship. If ML replaces FE, it doesn't ship."

— ACEENGINEER · OPERATING PRINCIPLES · SHORT FORM

06 · WHEN WE'RE NOT A FIT

Four honest "no"s.

Engineering consulting is project-scoped; we're not a one-size-fits-all shop. Knowing when to decline saves everyone a bad engagement. Here's where we refer out.

You need	Why we decline	Who to talk to instead
Class society approval	We are not a classification society. We produce filings that class accepts, but the stamp itself comes from DNV / ABS / LR / BV.	Your preferred class society directly. We routinely engage with all five majors.
Detailed fabrication drawings	Our deliverables are calc packages and acceptance cases, not fabrication-yard workshop drawings. Different tool stack, different quality system.	A fabrication-yard detailing house, or your EPC's drawing office.
Field inspection / NDT services	We do not operate field crews, magnetic-particle, UT, or ROV inspection. We consume inspection data; we don't generate it.	Your incumbent inspection vendor. We build to their data formats.
"Just run FEA for us"	Body-shop FEA without a reasoning frame around it isn't our model. If you have the FEA team but need a tricky calc resolved, scope us for *that* calc, not the shop hours.	Generalist FEA consultancies — we keep a short list we can share.

Jurisdictions we regularly file into

We carry no residency preference. On prior engagements we have produced or co-produced filings accepted under:

BSEE U.S. GULF OF MEXICO	HSE UNITED KINGDOM
PSA NORWEGIAN CONTINENTAL SHELF	DNV CLASS SOCIETY (GLOBAL)
ABS CLASS SOCIETY (GLOBAL)	Lloyd's Register CLASS SOCIETY (GLOBAL)
ANP BRAZIL (FPSO / RISER FILINGS)	NOPSEMA AUSTRALIA (NWS PROJECTS)

> "A 30-minute scoping call is always free. We don't sell during scoping — if your question needs 40 hours of hand-calc, we'll say so and recommend who to talk to."

— SCOPING-CALL POLICY · ACEENGINEER.COM/SCOPING-CALL

07 · CONTACT

Tell us the problem. We'll tell you if we're the right call.

The fastest path in is a 30-minute scoping call. Free, and we don't sell during scoping.

FIRM

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United States of America

INCORPORATED	Delaware
PRIMARY PRACTICE	Houston, TX
TIME ZONE	Central · UTC-6

WHERE TO REACH US

WEB	aceengineer.com
SCOPING	aceengineer.com/scoping-call
ENGINEERING	engineering@aceengineer.com
NEW ENQUIRIES	hello@aceengineer.com
ECOSYSTEM	github.com/vamseeachanta/digitalmodel

START A SCOPING CALL

Thirty minutes. No deck. Bring the problem.

One sentence on the decision gate you're facing, the asset type, whatever data you have, and a fixed timeline if there is one. We'll confirm applicable standards and estimate effort — or tell you honestly that we're not the right call.

REQUEST A CALL

aceengineer.com/scoping-call

What makes a scoping call go further

Bring	Why it helps
Decision gate	One sentence on the regulator, class society, or internal gate you're facing. Anchors the conversation in the acceptance criterion, not the tool.
Asset type	Platform, riser, mooring, subsea structure, pipeline. Lets us confirm standards coverage in the call.
Data you have	Monitoring records, FEA models, metocean hindcast, inspection findings. We work with what exists; we don't demand a clean slate.

Bring	Why it helps
Fixed timeline	If a gate is locked, we'll say so in the call and agree whether the window is achievable — or recommend scope that is.

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