

TASK ORDER NO# 22-89

TASK ORDER NAME: S-Curve Track Slab Design

PROJECT CODE: SGR385 40-7385.68000.8003

This is Task Order No. 22-89 to the On Call Maintenance Contract entered into by and between Utah Transit Authority (UTA) and Stacy and Witbeck, Inc. (Contractor) as of February 2nd, 2021.

This Task Order is part of the On Call Maintenance Contract and is governed by the terms thereof.

The purpose of this Task Order is to specifically define the scope, schedule, lump sum price, and other terms applicable to the work identified herein.

UTA and Contractor hereby agree as follows:

1.0 SCOPE OF SERVICES

The scope of work for the Task Order #22-89 is hereby attached and incorporated into this Task Order.

2.0 SCHEDULE

The Substantial Completion Date for this Task is December 31st, 2023. The Final Acceptance Date for this Task is December 31st, 2023.

3.0 LUMP SUM PRICE

The price for this task order is a not to exceed \$339,342.00. Invoices will be billed on monthly basis for work completed to date.

4.0 APPLICABILITY OF FEDERAL CLAUSES


This Task Order does does not [Check Applicable] include federal assistance funds which requires the application of the Federal Clauses appended as Exhibit D to the On Call Maintenance Contract.

IN WITNESS WHEREOF, this Task Order has been executed by UTA and the Contractor or its appointed representative

UTAH TRANSIT AUTHORITY:

STACY AND WITBECK, INC.:

By: _____
Jay Fox, Executive Director > \$200,000 Date

By:  _____
ACA3AB62608B4E2...

By: _____
Mary DeLoretto, Chief Service Development Ofc. < 200,000 Date

Date: 2/6/2023

By: _____
Jared Scarbrough, Acting Director of Capital Construction < \$75,000 Date

By: _____
Kyle Stockley, Project Manager < \$25,000 Date

 _____
Legal Review Procurement Review

Stacy and Witbeck

January 19, 2023

On Call Services

Mr. Kyle Stockley
Rail Infrastructure Project Manager
Utah Transit Authority
2264 South 900 West
South Salt Lake City, UT 84119

Reference: On-Call Transit Infrastructure Construction, Maintenance and Repair
Project No: 20-03349VW

Subject: 22-631-R2 - S-Curve Track Slab Design

Dear Kyle:

We are pleased to provide the attached cost estimate to have Sener design the concrete track slab for the new Direct Fixation style track proposed to replace the current embedded track on the S-Curves on the University Line.

Exclusions:

- See attached proposal and Key Understandings

Clarifications:

- Please see detailed list of each bid item below.
- The unit costs for each bid item includes the costs of insurance, bond, and risk at the agreed upon rates.
- The scope of work is inclusive of only the items and scope that are listed below. Any other items of work or changes to the below scope will need to be repriced.
- Rail alignment and elevation are to be constructed per the original UTA drawings/as-builts provided by UTA. (Includes Restraining Rail Design)
- See attached Sener proposal for additional clarifications

Bid Item 1000 – Field Engineering and Project Controls – 1 LS – Total of \$7,101.00 – This bid item includes Stacy and Witbeck support from field engineer to manage coordination with Sener. The field engineer will also perform pre-task planning and coordination with Sener and UTA. This item also includes office manager time for payroll and accounts payable.

Bid Item 4000 – S-Curve Track Slab Design – 1 LS – Total of \$276,008.00 – This bid item includes the cost to have Sener provide a direct fixation track slab design using existing horizontal and vertical geometry as shown in the as-built drawings provided by UTA. The slab design will include required DF fastener spacing and slab reinforcement, as well as subgrade requirements per current UTA

1958 West North Temple
Salt Lake City, UT 84116
801.666.7840 (office) 801.432.7849 (fax)

Stacy and Witbeck

specifications and standards. Sener will also perform a drainage analysis of the current drainage system and provide design for any modifications required to drain the project limits. Please see attached detailed design scope and proposal.

Bid Item 100000 – Fee (7.5%) – 1 LS – Total of \$21,233.00 – This is the agreed to 7.5% GMGC fee.

Subtotal - \$304,342.00

Bid Item 110000 – Engineering Services and As-built Allowance – 1 PS – Total of \$35,000.00 – This is a provisional sum amount to be used to for services such as RFI responses, product and shop drawing review, and updating the RFC drawings for as-built conditions at the completion of the project. SWI will bill UTA for these services with an additional 2% insurance and 7.5% fee added onto Sener's cost to SWI.

The total price for this scope of work is **\$339,342.00**

If you have any questions, please contact me.

Sincerely,
Stacy and Witbeck, Inc.



Collin Christensen
Project Manager

01/19/2023 10:54
22-631-R2 S-Curve Track Slab Design
*** Collin Christensen, CC

BID TOTALS

<u>Biditem</u>	<u>Description</u>	<u>Quantity</u>	<u>Units</u>	<u>Unit Price</u>	<u>Bid Total</u>
1000	Field Engineering & Project Controls	1.000	LS	7,101.00	7,101.00
4000	S-Curve Track Slab Design	1.000	LS	276,008.00	276,008.00
Subtotal					\$283,109.00
100000	Fee (7.5%)	1.000	LS	21,233.00	21,233.00
Subtotal					\$304,342.00
110000	Engineering Services and As-built Allowance	1.000	PS	35,000.00	35,000.00
Bid Total =====>					\$339,342.00

UTA On Call – S-Curve Replacement Design Services Proposal

UTA TRAX Red Line S-Curve Replacement Design Services



Technical & Financial Proposal

**Stacy and
Witbeck**





UTA On Call – S-Curve Replacement Design Services Proposal

Control de firmas / Signature Control

Realizado Written	Aprobado Approved
Nombre y Apellidos / Name and Last Name Roberto Rodríguez Illanes Álvaro Relaño	Nombre Apellidos / Name and Last Name Mercedes Sierra
Fecha y Firma Date and Signature	Fecha y Firma Date and Signature
No precisa firma si está aprobado electrónicamente mediante ruta / Signature not needed if electronically approved by route	

Información del Documento Document Information	
Document nº	SW-SENER-UTA-S-Curve
Ref.	C0410197

W



UTA On Call – S-Curve Replacement Design Services Proposal

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Annex 1 – Curricula vitarum

UTA On Call – S-Curve Replacement Design Services Proposal

1 SENER COMPETENCE

SENER is a privately held engineering and technology group with over 60 years of global operational experience.

With a footprint that spans five continents and global revenue of over 375M EUR (80% outside of Spain), SENER operates in a broad range of markets, including infrastructure and transportation, aerospace, renewables, power, oil & gas, and marine. Combining local knowledge with international experience, SENER's 2,400+ professionals deliver innovation, quality, and efficiency for clients worldwide.

SENER's main characteristics are **Independence** (SENER is not attached to any construction, manufacturer or financial group, which allows us to provide professional and independent services to our clients), **Innovation** (through the achievement of the highest technological level in all our products), and **Commitment to Quality**.

SENER has delivered transit technical services (including design, planning and project management) for about 1,200 km of lines, in more than 70 different transit networks.

SENER has experience and references in all engineering tasks related to transit projects, from civil design to systems integration; including, track, traction power, comms and train control system.

Our team's design experience working in the highly regulated rail & transit environments is unparalleled. Our approach advocates on collaboration to add value to the design, relying on our ability to listen, but at the same time sharing our knowledge from past experiences around the world.

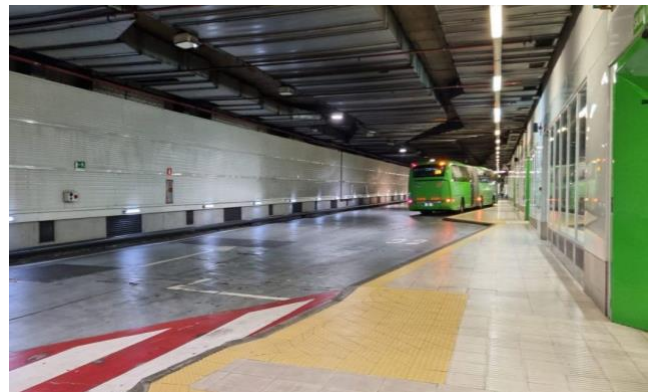


Global Recognition for Innovation

SENER has a long history in railway innovation, helping the industry evolve. From new construction techniques for the tunnels and stations for the Bilbao Metro in the '80s, to the state-of-the-art dynamic lateral wind detection system for the High-Speed Rail System in Spain, SENER has been present in dozens of R&D programs and partnerships.

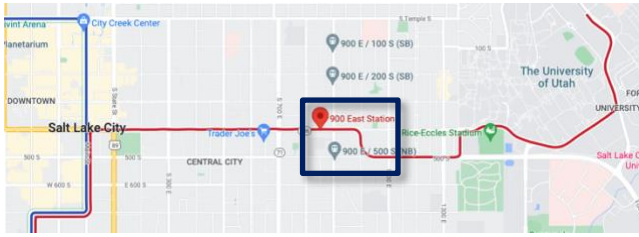
SENER offers a know-how and experience in civil engineering, in combination with specific, most advanced technologies applicable in the transport sector. Technology application is directly linked to SENER's innovation spirit. Innovation is one of SENER's corporate values. Some examples of this innovation applied to transportation systems are:

- **RESPIRA**, an intelligent HVAC management system that uses Artificial Intelligence (AI) to improve energy efficiency, thermal comfort and air quality in buildings and stations.



- **BLOCKSAT**, an innovate traffic Management system to manage the railway operations within low density traffic lines.

UTA On Call – S-Curve Replacement Design Services Proposal



2 PROJECT BACKGROUND AND UNDERSTANDING

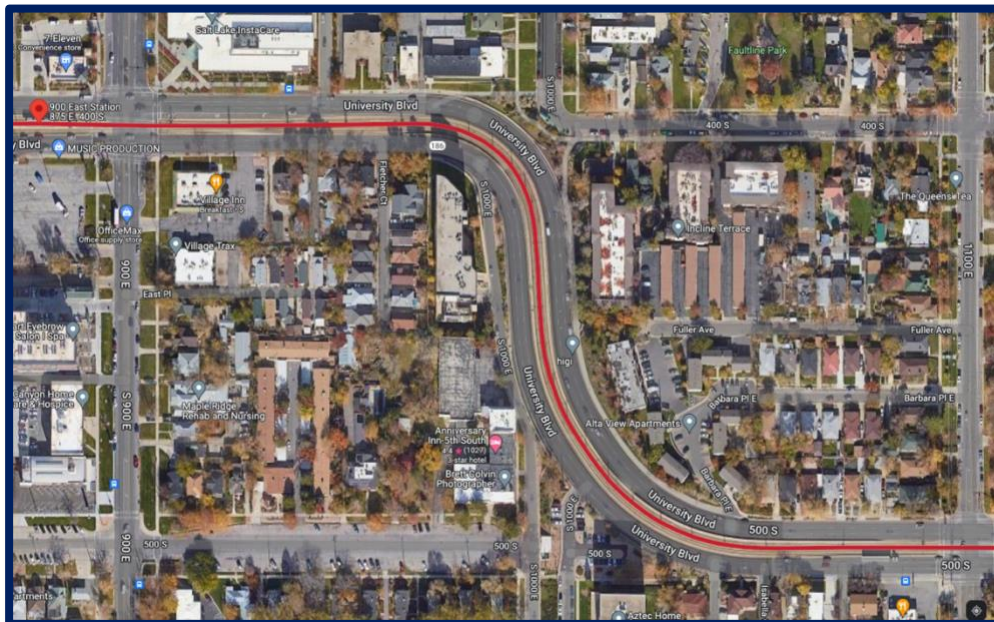
The Red Line is a light rail line on the TRAX system in the Salt Lake Valley of Utah operated by the Utah Transit Authority (UTA). It originally began operation in December 2001 as the Sandy/University Line, running from the University of Utah south to Sandy Civic Center on the Blue Line. It was later rerouted to South Jordan and renamed the Red Line in August 2011. The current line runs from the University of Utah Medical Center in Salt Lake City through the south end of Downtown Salt Lake City, South Salt Lake, Murray, Midvale, West Jordan, and South Jordan to the University of Utah's South Jordan Medical Center in Daybreak.

The focus area of this study on the Red Line is approximately 1,450 feet of double track between 400 S and 500 S within the limits of the 900 E and 1100 E grade crossings. The horizontal geometry of the tracks is in the shape of an “S” and is referred to as the “S-Curve”. The tracks within this study area are comprised of concrete embedded double track using

premium (head-hardened) rail. Due to the naturally undulating landscape and the track guideway running down the middle of the roadway, the tracks follow steep grades up to 7%, in conjunction with tight horizontal curves that go down to 190 ft of radius. The design speed through these curves is 20 mph – 25 mph.

As the track is now 20 years old in this area, it has begun to show severe wear on the top (head) and sides, specifically seeing the phenomena of rail corrugation. This is assumed to be caused by a combination of the track geometry and the frequent braking and acceleration for the adjacent intersections and station.

Stacy Witbeck has requested SENER to provide a proposal for the detailed design services needed to procure and install new rail and direct fixation fasteners on a new slab and remove the existing embedded track slab system from approximate sta. 76+50 to 91+00, on both the Westbound and Eastbound tracks on the Red Line.



UTA On Call – S-Curve Replacement Design Services Proposal

3 SCOPE OF THE DESIGN SERVICES

3.1 Assumptions

3.1.1 Input data

To produce a detailed design for the project, it is crucial to have access to all the data used in previous phases of the design, at least:

- detailed direct fixation drawings and specifications, specific for this project,
- detailed alignment of the track, including plan, profile and superelevations,
- all as-built drawings and reports,
- field inspections reports,
- track maintenance reports,
- latest field surveying and topography campaign,
- existing drainage elements,
- geotechnical report of the trackbed,
- design loads (axle loads),
- operations plan,

Also, the following input data needs to be available before the design starts:

- detailed (1":40') topographic map of the project area, including cross sections of the track each 50' and concise coordinates of all drainage elements, cable duct lines, manholes and any other element contained within the track ROW between the limits of the project.
- Survey data control plans

3.1.2 Submittals & review cycles

SENER is assuming the following scheme for the document review cycle (within the 1.5-month period):

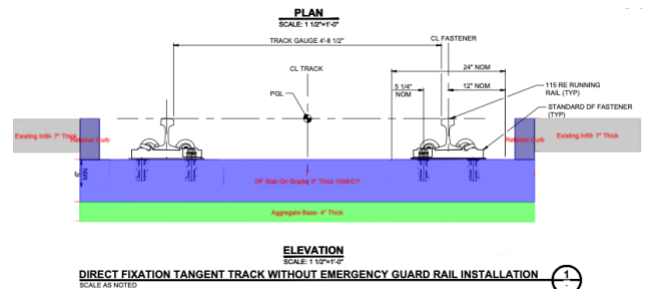
1. **Draft 90%** design submittal issued for 1 cycle of revision by SW. Assumes a ONE-week revision period by SW.
2. **Final Design** submittal with SW comments addressed.

No Bill of Quantities report will be produced.

Preparation of separate submittal packages for third parties or stakeholders is not included.

3.2 Detailed Design Drawings

3.2.1 Typical Cross Sections

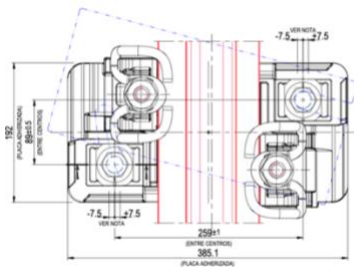
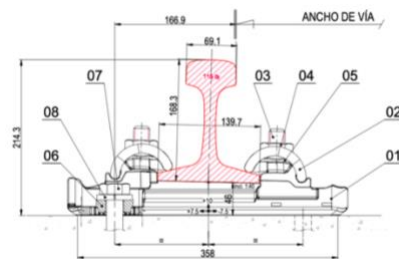


Typical cross sections drawings will be provided for all situations encountered in the project. These cross sections will detail the different dimensions of the new track cross section, including subbase, base and the track slab.

3.2.2 Track Components Drawings

These drawings will contain details for the track components provided by suppliers, like:

- Rail sections
- Rail fastenings
- Details of rail fastening anchorage to the slab



3.2.3 Emergency Guard Rail / Restraining rail location plan

This drawing will provide information on the general disposition of the emergency guard rails and or restraining rails to be placed following UTA design requirements, and a table with the locations along

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the alignment where these components need to be placed.

3.2.4 Rail fastening stiffness transition

This drawing will define the stiffness transition needed between the new direct fixation system and the existing embedded track system.



3.2.5 Concrete track slab

This set of drawings will define the concrete dimensions, steel reinforcement and construction notes and specifications.

3.2.6 Earthing and bonding

Earthing and bonding helps to avoid corrosion due to stray currents by providing a low resistance path for the stray current to flow to ground. The earthing and bonding design of the track in this section will be revised to minimize this issue, and the appropriate measures will be defined in this set of drawings.

3.2.7 Track drainage

This set of drawings will define the drainage system for the new track design, including gutters, catch water drains, drain pipes, French drains; plus the connection to the general storm drainage system of the City.

3.3 Detailed Design Reports

3.3.1 Slab track design validation

This report will include all the calculations needed to validate the concrete slab track structural design.

3.3.2 Drainage report (upon request)

This report will include all the calculations needed to validate the track drainage system design, if needed.

3.4 Optional services (not included in the scope)

Some services that could be provided in addition to the services described in the previous sections are the following:

- New barrier protection: due to the new track design, a new barrier protection might be needed to completely separate the road traffic from the LRT tracks.
- SENER could develop a study to analyze possible causes and solutions for rail corrugation and vibration problems that present the referred track section. A detailed inspection of the track and train wheels should be conducted to identify any potential issues, such as worn track components or misaligned wheels. Field measurements could also be taken to identify the vibration levels and frequencies. Once the cause of the problem is identified, simulations can be run to test potential solutions, such as adjusting the train speed, adding friction modifiers, or installing vibration dampers. It would also be important to consider other factors that could be affecting the problem, such as the track and train maintenance, or the weather conditions. The study could also define a monitoring and maintenance plan to verify the evolution of the problem.

These services are not considered part of the scope required by SW to SENER, and therefore, have not been included in the cost proposal that is included at the end of this document.

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4 SCOPE OF THE DESIGN SERVICES DURING CONSTRUCTION (DSDC)

After the Detailed Design phase has finalized, SENER will provide Design Services During Construction to support the project until its completion.

In this phase, SENER shall provide, on a *Time and Material* basis, professional engineering services as follows:

- Prepare, provide, review, and/or approve, field changes to complex designs, project drawings and specifications associated with the project including, but not limited to, Issued for Construction (IFC) plans and specifications.
- Prepare designs in response to Design Change Requests (DCR's) or Field Changes Requests (FCR's) including calculations, drawings, or professional analysis, as required.
- Review, respond and/or approve Request for Information (RFI) or Approval (RFA) submittals involving shop drawings, material data information and specifications and/or samples, and recommend appropriate action based upon project requirements and specifications.
- Manage, coordinate, and verify the recordation of the Project's as-built situation including, but not limited to, reviewing, processing, and/or documenting (red-lining) as-built drawings to ensure that all changes during the course of construction are recorded.
- Coordinate with other subcontractors, material suppliers, and potential tradesmen working for the Contractor, as a representative of the Contractor regarding the execution of the Project.
- Provide field inspections and observations to ensure conformance with all Project plans and specifications at the direction of Contractor representatives.
- Represent the Contractor in the professional resolution of design and specification conflicts encountered during the course of construction and develop cost effective solutions without effecting the quality and functionality of the Project deliverables.

- Interpret/verify the intent of Project construction drawings and specifications with field personnel and confirm understanding of the design to ensure the most effective execution of the Project.
- Coordinate and interface with SW, UTA, other subcontractors, and other entities and subsystems related to the Project (civil, rolling stock, traction power, OCS, train control systems and comms).



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5 PROJECT ORGANIZATION AND PROPOSED STAFF

The experience and know-how SENER staff will cover the full range of the required relevant expertise to perform and successfully deliver the services.

The key staff presented below has proven experience in successfully supporting clients during bid stage. Our team is used to work hard under tight schedules and time constraints, and to plan and coordinate internal and client's teams and efforts.

All SENER staff to be involved in these services will do every effort, be dedicated, and make itself responsible to provide a satisfactory advice to the UTA On Call team.

Key staff:

Role	Name	Exp. (yrs)
Design Manager	Álvaro Relaño, PE	34
Deputy Design Manager	Roberto Rodríguez, PE	20
Earthing & Bonding Lead	Pere Busquet, PE	30
Track Lead	Raúl Arroyo	19
Structures Lead	Santiago Ferri	6
Drainage Lead	Juan Ramón Bartolomé	30



Álvaro Relaño, PE is a Professional Engineer in Utah (amongst other states) with 34 years of experience as Project and Design Manager. He is a renowned rail expert that has successfully contributed over the last three decades to the planning, design and implementation of rail & transit infrastructures internationally. Álvaro's experience includes projects encompassing all the disciplines (civil, track and systems) and he has a deep knowledge of the interactions between all the disciplines, being able to anticipate problems derived from the integration of the different disciplines.



Roberto Rodríguez, PE is a Professional Engineer in CA based in LA and will be the Deputy Design Manager. He will lead the design team, carrying out and being responsible for the content of the work and the timely production and submission of the deliverables for every Task. Roberto is a Civil Engineer with 20 years of experience managing and coordinating railway infrastructure projects, both in the private sector working for SENER, as well as in the public sector, managing rail contracts working for the Spanish Railways Infrastructure Manager (ADIF). Two of his areas of expertise are rail track design and FL & Safety facilities for tunnels.



As a Traction Power Expert, **Pere Busquet, PE** is a chartered electrical engineer in CA that brings 30 years of experience in electrical power supply systems engineering, specifically in the rail system environment: medium/low voltage power supply & distribution systems, traction substations, and high voltage supply. Pere is based in Barcelona and will serve as the back-office lead in this task.



Raúl Arroyo is an expert in Track Technology and Manager of multidisciplinary contracts related to this area of activity. He has extensive knowledge in railway dynamics, ballastless track and ballasted track, anti-vibration solutions (floating slab tracks and ballast mats), EN and AREMA regulations, vibrations, noise, railway pathologies, track materials, instrumentation, signal analysis and post-processing, simulation, validation and approval of railway fastening systems, buckling, railway inspections and auscultations, obstacle implementation gauging and railway interoperability.



Santiago Ferri has specialized in civil structures calculations, analysis and design, focusing in structures for urban transport and railway projects (elevated structures or slab tacks) and designing singular civil structures (parametric vaults) and building structures. He also has experience in BIM projects as a modeller.

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Juan Ramón Bartolomé is a seasoned Project Engineer with over 30 years of experience in hydraulic & drainage projects. Currently he is a senior project engineer in the Water Technology Section of SENER. He is the person in charge of coordinating hydrology and drainage for lineal projects (highways, rail, transit, airports and ports).

In addition to the key staff presented above, SENER will provide a complete set of specialists that will be available on-demand to carry out the specific analysis and studies or clarify any doubts as they may arise during the services.

Services under this proposal are assumed to be performed in Los Angeles (CA) and Spain.

Also, to complement the scope of services that SENER can provide to this project and focusing on the regional knowledge of other rail stakeholders, SENER is open to collaborate with other third parties.



UTA On Call – S-Curve Replacement Design Services Proposal

6 SUMMARY OF TASKS AND WORK PACKAGES

6.1 Detailed Design Drawings

- WP 2.1 Typical Cross Sections
- WP 2.2 Track Components Drawings
- WP 2.3 Emergency Guard Rail / Restraining rail location plan
- WP 2.4 Rail fastening stiffness transition
- WP 2.5 Concrete track slab
- WP 2.6 Earthing and bonding
- WP 2.7 Track drainage

6.2 Detailed Design Reports

- WP 3.1 Slab track design validation
- WP 3.2 Drainage report

6.3 DSDC

Work packages will be defined in later stages, based on the proposed scope.



UTA On Call – S-Curve Replacement Design Services Proposal

7 SCHEDULE

SENER assumes the following duration of its services:

- **Detailed Design: 1.5 months** (Jan–Feb 2023)
- **DSDC: 3-4 months** (May– Sept 2023)

The SENER team will develop the scope described in this proposal during the period described above, provided that all the necessary documentation is available at the beginning. The detail design project works are assumed to start on January 15th, 2023.



UTA On Call – S-Curve Replacement Design Services Proposal

8 COST PROPOSAL

8.1 Assumptions

The design assumptions considered in this proposal are the following:

- The existing track corrugation and vibration problems described in the Project Understanding section are assumed to be diagnosed, and SENER will not re-evaluate the situation, nor propose any other solutions as part of this scope.
- The track alignment design is not included in SENER's scope.
- The track and track components design, and specifications are not part of SENER's scope, and will be an input from SW.
- No cable troughs or cable crossings are included in this scope.
- No hard copies will be provided, all submittals will be electronic
- Duration of the detailed design phase: 1.5 months
- Periodic trips of the team based in Spain and Los Angeles to Salt Lake City to attend meetings.

8.2 Lump Sum Fee

Due to the nature of the services, a lump sum fee is proposed. This target price is based in the estimated workload for the proposed staff.

The estimated lump sum fee for the detailed design phase scope described in this proposal is 250,000 USD. This amount is exclusive of any indirect taxes.

This fee is based on a scope and a timeframe as described in this document. **If case of change of scope or schedule, SENER will be entitled to reconsider this financial proposal.**

8.3 Detailed Design lump sum payment schedule

The proposed payment schedule for the Detailed Design phase (lump sum price) is:

- Down payment at contract signature: **10%**
- 40% when SENER submits the **Draft 90%**
- **25%** when SENER submits the **Final detailed design**

- **25%** upon **acceptance of the Final detailed design** at the end of the project timeframe.

The invoices will be submitted on a monthly basis.

All payments will be done in USD, 30 days after invoicing.

8.4 DSDC Time & Material fees proposal

For the DSDC phase, the following rates are proposed:

Role	Activity	Hourly Rate (\$) FY 22/23
Design Manager	Project Management	\$ 325.00
Deputy Design Manager	Engineering Management	\$ 325.00
Track Lead	Track Engineering	\$ 175.00
Earthing & Bonding Lead	Earthing & bonding design	\$ 225.00
Structures Lead	Slab design	\$ 175.00
Drainage Lead	Track drainage design	\$ 225.00
Project Engineer	Engineering	\$ 175.00
Draftsman	CAD	\$ 125.00
Administrative Staff	Administration	\$ 100.00

The **estimated cost** for this phase would add up to **35,000 USD** for a 3-month period.

8.5 Terms and conditions

This proposal is valid for 3 months.

The sole liability of the Consultant for any errors, mistakes or defects in the Engineering Services caused by his negligence shall be to correct at his cost any such errors mistakes or defects and correctly re-perform the services provided. The maximum aggregate liability of the Consultant for a cause whatsoever shall be limited to an amount equal to 100% of the Contract Price.

The Consultant shall not assume any liability for indirect or consequential damages or losses of any kind.

The Consultant shall not be responsible nor assume any liability whatsoever under any circumstances in the performance of the works for errors or inadequacies in the documentation, information and instructions provided by the Client, or for defects or errors that may exist on existing Project documents.

The Intellectual Property (hereinafter IP) of the Consultant embedded in the works or developed while executing the works remains the property of the Consultant and the Client shall receive a non-exclusive, limited, royalty free license over such IP



UTA On Call – S-Curve Replacement Design Services Proposal

embedded in the works for the sole purposes of the exploitation of the Project by the Client.

In the event of termination for any reason, the Consultant shall be entitled to payment of the price for all work effectively carried out in accordance with the contract, up to the date of termination.

Other terms and conditions are to be agreed by the parties upon signature of a specific contract, and which will be executed between the Parties after the Client has officially accepted the Consultant's proposal.

Annex 1 – Curricula vitarum



Alvaro Relano-Rojo, P.E.

HSR Track & Alignment Lead Designer



Current Position

Project Manager for Transport Projects in SENER (USA)

Years of Experience

30+ years

Qualifications

M. Eng., M. Sc. Civil Engineering,

Specialty: Transportation Polytechnic University of Madrid (Spain) - 1988

Professional Licenses

PE California #C82257

PE Nevada #026277

PE Maryland #4605900

PE Washington #55533

PE Texas #129980

PE New York #100170-1

PE Colorado #055468

PE Virginia #0402060671

PE Alabama #38491-E

PE Hawaii #PE-18716

PE Florida #88837

Spain Association of Civil

Engineers #9617

Employment History

SENER Ingeniería y Sistemas, S.A., Project Manager (1994 - Ongoing), Project Engineer (1988 - 1989)

Engineering Solutions S.A. (1989 - 1994), Technical Manager and Software Developer

SENER Ingeniería y Sistemas, S.A. (1988 - 1989), Project Engineer

EXPERIENCE SUMMARY

Alvaro Relano-Rojo, P.E. with 30+ years of professional experience as Project Manager and Design Leader in Transportation and Infrastructure engineering projects. He has successfully contributed over the last two decades to the planning, design and implementation of High Rail Infrastructures internationally. Professional Engineer in Civil Engineering in the States of California, Texas and Florida, among others. Holding an MSc degree in Civil Engineering, Alvaro's experience includes projects encompassing all the disciplines (civil, track and systems) and he has a deep knowledge of the interactions between all the disciplines. He designs and leads teams with a holistic approach, providing the best solutions. He is able to anticipate the key elements for track and systems whether they are in one contract or separate contracts.

Alvaro is a renowned expert that has participated as Design Manager and High Speed Rail expert in the latest projects being delivered in the USA, such as the E&E services for the Palmdale to Burbank section, and the CP-4 Design & Build section of the California HSR or the bid design for Los Angeles Regional Connector, and the most relevant HSR projects undertaken in Spain, such as the HSR Madrid-Barcelona-French Border (with 500 miles of preliminary studies and 270 miles of detailed design) and the Spanish Eastern HSR corridor Madrid-Valencia (with over 600 miles in preliminary studies and 430 miles of detailed design).

Alvaro has a comprehensive experience and relies on his knowledge and the organizational capacity to successfully deliver and provide identity to the services under execution.

RELEVANT EXPERIENCE

Environmental and Engineering services for the Palmdale to Burbank section of the California high speed line, California/USA (2015-Ongoing), Design Manager. Preliminary Engineering Design of Civil Works, Track and Systems.

Client: California High-Speed Rail Authority (CHSRA)

Alvaro currently serves as Engineering Design Manager responsible for the preliminary design of the highly complex 44-mile high-speed line section from Palmdale in the north, to Burbank in Los Angeles County in the south. Alvaro has provided technical advice and recommendations based on cost, rail operations, track design, constructability, and environmental feasibility.

SENER is the Prime Designer for this California HSR Authority Environmental & Engineering contract. SENER provides engineering services that include conceptual design engineering, analyzing different alternatives before selecting the preferred one, as well as the preliminary engineering design and the development of conceptual-level area plans for two multimodal HSR stations: Palmdale and Burbank Airport. Interphases with freight Railroads, and connections with Metrolink, airport services and other modes of transportation, come along with TOD measures to facilitate the success of the city



Alvaro Relano-Rojo, P.E. HSR Track & Alignment Lead Designer

development and the HSR system. Furthermore, SENER will prepare the bid documents for design and build (D&B) contracts.

The Environmental Clearance (Record of Decision) for that section and the Engineering for Procurement are among the most relevant goals within the scope. The alternatives considered include base tunnels (over 12 mi length). SENER is the Prime Designer for the team, which includes more than 30 local sub consultants. Services comprise Concept Design, 15% Engineering & 35% Engineering Detail. The total budget is \$74 M over 6 years.

Detailed Design for the CP4 High-Speed Rail segment in California, California/USA (2016-present), Engineer of Record

Client: California Rail Builders (CRB)

Selected in 2016, Alvaro is the Engineer of Record for Railways, Roadways and Civil Works portion of the Detail Design Project of Section CP4 (Construction Package 4), subsection WS1, 4 mi length south of Wasco. The client is California Rail Builders (CRB). CRB is the design/build entity for the civil infrastructure of this section from the Kern County line to Shafter, approximately. SENER'S scope includes Alignment, Track Bed, Roadways, Structures, Grading, Hydrology & Drainage, among others. The total budget is \$2.7 M over 10 months. SENER is currently providing support during construction to the contractor.

Los Angeles Union Station Master Plan, Los Angeles (2012-2015), High Speed Rail Discipline Lead

As a Railway Design Expert Alvaro led the transit engineering for High-Speed Rail (HSR), design criteria review and analysis, HSR alternatives proposal and evaluation for the alignment, track configuration, concourse layout, functional analysis, parking facilities, platform design, traction systems, signaling & communication, accessibility, safety, fare collection and integration with other transit modes. His contribution included expertise in HSR, including track design, and state-of-the-art stations to provide advisory services, and developed the functional analysis for this multimodal hub. He worked closely and helped to implement the design parameters established by the CHSRA. SENER provided rail consultancy services as a key subconsultant to Gruen-Grimshaw, the lead designers for the conceptual design of the project.

High Speed Rail connection France – Spain, International Section Figueras-Perpignan, Spain–(2004-2009)

Client: TP Ferro

Alvaro was responsible for the Design on alignment, track engineering and civil engineering through the preliminary design, Final design project, construction management, and works supervision. This included the completion of the Environmental reports required to get the construction permits. This High-Speed Link (27 miles), designed for mixed traffic (passenger and freight), was the first International Railway Connection being executed under a P3 scheme. SENER has also been the company responsible for the Project Management and the technical leader. SENER has directly developed the design and supervision of the works on the Spanish side. It has also carried out the detailed design for the Perthus Tunnel (5.3 miles) and the proposed railway and non-railway installations in tunnel (electrification, signaling and communications, control centers, track, safety installations, etc).

Spanish Railway Line Sevilla-Cádiz, Section Jerez de la Frontera Airport – Cádiz, sub-section “El Portal”. (Spain, 2000-2002)

Client: Spanish Ministry of Civil Works

Alvaro served as Project Manager. Preliminary and Detailed design for a 6.2 miles section of double track duplication and double track variants to upgrade this rail corridor to High-Speed Rail. The work includes the detailed design of the civil works, track, and systems. The project includes the design of a new viaduct of 1.8 miles, as well as a new power substation and its connection line.



Alvaro Relano-Rojo, P.E. HSR Track & Alignment Lead Designer

HSR Urban Connection in Barcelona, Section: La Torrassa-Sants Station (Spain), Project Management

As Project Manager and design lead, Alvaro's role included the overall management of the project, alignment, grading, detailed project of structures and underpasses, detailed drainage system design, geological and geotechnical works, track design for existing line affected by the new HSR line, and the environmental compliance for the detailed design. The contract encompassed preliminary design, detailed design and construction oversight for the new High-Speed Railway Line Madrid – Barcelona to Barcelona's major Railway Station (Sants). Its components include passenger access, with a new 1.4-mile HSR tunnel in a congested urban environment, including a challenging construction phasing and management of traffic of other commuter and metro railway lines during construction. Additionally, the criteria included a new railway branch to Barcelona's El Prat Airport.

High-Speed Railway Line Madrid-Valencia-Alicante-Murcia, Section: Madrid - Albacete/Valencia, Spain (1997-2006)

Client: ADIF (Spanish Railway Infrastructures Authority)

Alvaro was the Deputy Technical Chief in charge of Alignment and Civil Design during the different stages to eventually define a selected high-speed railway corridor (electrified double track section, maximum design speed 215 mph) between Madrid and Valencia (249 miles), including 10 passenger stations. This process included the following phases:

- Feasibility Study and Environmental Impact Assessment Studies of the HSR: more than 1,553 miles of alignment alternatives were studied, 435 miles for the selected solution, 10 passenger stations, 31 miles of tunnel and 25 viaducts.
- 10 passenger stations. Functional and Final design.
- Feasibility Study, Environmental Impact Assessment Study and Final Design Projects of the access section to the city of Valencia, including the renewal of the entire railways network in the city, the Central Station and a 3.7-mile-long tunnel under the city of more than 700,000 inhabitants.
- Feasibility Study and Environmental Impact Assessment Study of HSR access to Cartagena and refurbishment of Murcia's railway network. The study includes more than 155 miles of alternatives and two stations.

Project Management for the new railway complex at Madrid "Atocha" Railway Central Station and upgrading of "Chamartin" Northern Railway Station, Madrid, Spain (2010-2013)

Client: ADIF (Spanish Railway Infrastructures Authority)

Alvaro was the Project Manager for the Design review and management of the projects related to the improvements on Madrid's high-speed railway network, comprising the system formed by the two main stations, at Atocha (South) and Chamartin (North), which includes an enlargement of Chamartin Station, a new underground station in Atocha, relocation of the Railway Traffic Control Centre of Atocha, and the redesign of historical buildings of Atocha Station. The development of this complex rail system, and upgrade of the HSR Stations is key for linking the two main HSR sub-networks now in operation in Spain: North&West, with its main terminal in Chamartin, and South&East, with Atocha as main terminal.

High-Speed Railway Line Madrid-Valencia-Alicante-Murcia-Almeria, Sections: Valencia-Puzol & Vera-Los Gallardos, Spain (2008-2010)

Client: ADIF (Spanish Railway Infrastructures Authority)

Alvaro was the lead Design Manager (Valencia-Puzol) and the Project Manager (Vera-Los Gallardos) for the Preliminary and Detailed Design of these projects included in the railway line between Madrid, Valencia and Almeria. These 9.9 miles & 6.4 miles sections were designed for mixed traffic (passenger and freight), double track including 2 tunnels (1.2 miles), 4 viaducts (1.3 miles) and a long railway viaduct of 1.4 miles. He served as



Alvaro Relano-Rojo, P.E. HSR Track & Alignment Lead Designer

Project Manager responsible for the correct execution of the services considering stringent time restrictions and technical challenges.

High-Speed Railway Line Madrid-Valencia-Alicante-Murcia-Almeria, Section: Aranjuez-Ocaña, Spain (2005-2007)

Client: ADIF (Spanish Railway Infrastructures Authority)

Alvaro served as Project Manager. Preliminary and Detailed Design for this high-speed railway section of 1.5 miles. This section included the "El Regajal" tunnel.

High-Speed Railway Northern Line, section: Madrid – Zaragoza. Spain (1993-2000)

Client: ADIF (Spanish Railway Infrastructures Authority)

SENER carried out the Preliminary Design project by different step process to finally define a select high-speed railway corridor (double-electrified track section) between Madrid and Zaragoza for a 217 mph design speed. As the Project Manager Deputy and Technical Chief, Alvaro was in charge of alignment and civil design. This process included all the Environmental Process until the Final approval of the selected alignment.

Final design for the new ADIF's Railway Test Ring in Malaga (Spain), section V (2012-2013)

Client: ADIF (Spanish Railway Infrastructures Authority)

Alvaro served as Project Manager. This infrastructure is designed for High-Speed rolling stock and allows speeds up to 310 mph for testing, research and certification purposes. The section V has a length of 8.7 miles and consists of a single standard-UIC-gauge track. Power Supply is designed for the whole ring. Some outstanding features along the section are two artificial tunnels (2,300 ft and 1,650 ft) to avoid big cuts, and a 330 ft tunnel under the A-45 freeway.

Spanish High Speed Railway section between Mondragón - Amorebieta/Etxano (Spain, 2003-2004)

Client: ADIF (Spanish Railway Infrastructures Authority)

Alvaro served as Project Manager. Preliminary design for 13.7 miles of high-speed rail line between Mondragón and Amorebieta/Etxano (Basque Country), comprising several tunnels and railway bridges.

Spanish High-Speed Railway north-eastern corridor, section Lleida – Martorell (Spain, 2001-2003)

Client: ADIF (Spanish Railway Infrastructures Authority)

Alvaro served as project engineer specialist in alignment. Detailed Design for the 4 miles of high-speed railway including 1 mile of viaducts and 0.35 miles of tunnels. The contract also included preparing all Bid documents, Bid assessment and construction management.

Spanish Eastern High-Speed Railway line, section Albacete-La Encina (Spain, 1994)

Client: Spanish Ministry of Civil Works

Alvaro served as Civil Engineer specialist. SENER was entrusted the railway upgrade of the line in order to adapt it to speeds up to 124/137 mph.



Roberto Rodríguez-Illanes, PE

HSR Track Expert



Current Position

Senior Project Manager

Years of Experience

19 years

Qualifications

MSc Civil Engineer, Polytechnic

University of Madrid (UPM)

Madrid, Spain, 2003

Doctorate studies in the

railways field, Polytechnic

University of Madrid, Spain,

2006

Professional Licenses

Member of the Spanish

Association of Civil Engineers

(CICCP)

California PE

Employment History

SENER Engineering and

Systems, Inc. (2015 - Present),

Senior Rail Project Manager

SENER Ingeniería y Sistemas,

S.A., (2013 - 2015) Project

Manager & Railways Expert

ADIF (Spanish Railways

Infrastructure Manager, 2007 –

2013) Chief Project Manager

SENER Ingeniería y Sistemas,

S.A., (2002 - 2007) Project

Engineer

EXPERIENCE SUMMARY

Mr. Rodriguez is a civil engineer with 19 years of experience managing and coordinating railway infrastructure projects, both in the private sector working for SENER, as well as in the public sector, managing rail contracts working for the Spanish Railways Infrastructure Manager (ADIF)

Mr. Rodriguez is an experienced PM of complex railway projects (transit, conventional & high-speed rail). He has a wide international experience, having worked in Europe, USA, Middle East, and Latin America. He is seasoned in all the different development phases: feasibility studies, preliminary design, detailed design, construction and finally, operation & maintenance.

Based in California since 2015, Mr. Rodriguez is a **licensed Professional Engineer** in this state and has a broad experience in the North American market.

He currently holds the Deputy Project Manager and Engineering Manager positions for the Engineering & Environmental contract for the Palmdale to Burbank project section, working directly with the CaHSRA and the RDP.

He is also the project manager for the Verification & Validation contract for the CP2-3 construction section of the California High Speed Rail program.

Two of his **areas of expertise are rail track design** and Fire Life & Safety facilities for tunnels. He has experience also managing interfaces between the different rail systems and subsystems, performing risk analysis for rail lines and directing risk-based design projects.

Mr. Rodriguez has advanced doctorate studies in the railways field, and he was member of the CEN/TC 256/WG 32 Railways Standards Group, in charge of developing the European Standard EN 15273 (*Railway Applications – Gauges*). He was also member of the *UIC High Speed Rail Committee*, in representation of SENER, and is currently member of the equivalent body at APTA (*APTA Committee on High-Speed & Intercity Passenger Rail*).

RELEVANT EXPERIENCE

California High Speed Rail, Construction Package 2-3, California/USA (2015 – present), Verification & Validation subcontract Project Manager

Client: Dragados USA - Flatiron JV

Mr. Rodriguez is the current Project Manager for Verification & Validation subcontract, being developed for the main Contractor (DRAGADOS-FLATIRON JV). SENER provides System Engineering services for the Construction Package 2-3 high-speed rail line section from Fresno to Tulare.

California High Speed Rail, Construction Package 4 Section, California/USA (2015-Present), Engineering QC & Peer Review

Client: Dragados USA - Flatiron JV

Mr. Rodríguez-Illanes has QC and Peer Review responsibilities on the engineering submittals for this 22-mile-long project. CP4 is located within the counties of Tulare and Kern. SENER subsection is part of the WS1 alignment and is approximately four miles in total length between Wasco and Shafter. Major work elements for this alignment subsection include civil works for at-grade and aerial sections (approach to the non-standard structure at the BNSF railroad crossing), two grade separations at Kimberlina Road and Merced Avenue, realignment of local roads, and realignments of BNSF tracks.



Roberto Rodríguez-Illanes, PE

HSR Track Expert

California High Speed Rail, Palmdale to Burbank Project Section, California/USA (2015 – present), Deputy Project Manager & Engineering Manager

Client: California High-Speed Rail Authority (CHSRA)

Mr. Rodriguez is the current Deputy Project Manager and Deputy Engineering Manager for this +\$70M contract. SENER is the prime contractor providing Engineering & Environmental services for the 45 mi high-speed line section from Palmdale Station to the Burbank Airport Station. Services include: Environmental Impact Report/Environmental Impact Statement development, preliminary design engineering and analysis of various alternatives before selecting the preferred one, geotechnical investigations, station area planning, and public outreach. The Palmdale to Burbank section is one of the most challenging sections for the entire CHSRA program, as it includes the longest rail tunnels ever designed in the US, and two station integrations within the cities of Palmdale & Burbank. Additional design challenges are the numerous interfaces with both SCRRRA and UPRR lines along the alignments, plus multiple elevated Type I structures for High Speed Rail, with some nonstandard designs like great height pile viaducts, or high-span concrete and steel arch bridges.

Technical & Detailed Design Projects for the Extension of the L5 Rubber-Tire Metro Line Santiago de Chile/Chile (2007), Track Design Lead

Client: EFE (Empresa de Ferrocarriles del Estado, Chile)

Mr. Rodriguez was the **Track Design Lead** for this complex rapid transit project, involving very unconventional track technology (rubber-tire), which involved interfacing not only with the client, but also with the French suppliers that owned the technology.

Preliminary Study, Technical & Detailed Design Projects for the Track Laying & Maintenance Bases of the High-Speed Line Madrid – Levante, Spain (2006 – 2007), Project & Design Manager

Client: ADIF (Spanish Railway Infrastructures Authority)

Mr. Rodriguez was both the Project Manager and Design Manager of this project. The project scope included the preliminary and detailed design (ready for construction) of **four (4) track laying bases & heavy infrastructure maintenance facilities** for the Madrid — Levante line: Villarrubia de Santiago, Gabaldón, Albacete and Requena. These projects were completed and began operation in 2008. These facilities currently serve 283 miles of HSR double track and include interfaces with the conventional rail network to allow delivery of heavy haul trains with ballast, track & rail systems supplies.

International High-Speed Line Figueres – Perpignan. Location: Girona (Spain) & Languedoc-Rousillon (France), (2004 – 2007), Assistant to the Project Manager and HSR Track Design Lead

Client: TpFerro

Mr. Rodriguez was assistant to the Project Manager and **Track Design Lead** responsible for the design of 28 mi of HSR double track including both **ballast and slab track state-of-the-art design technologies**. He also was in charge of the interface management between the civil, track and rail systems disciplines. The \$1.1 billion EUR Figueres–Perpignan project was the first International Public Private Partnership (PPP) High-Speed Rail project developed in the world. It consisted of 28 mi of double track electrified High-Speed Line for up to 220 mph operation, for mixed traffic (passenger & freight).

The section included a 5.2 mi double bore tunnel (Perthus Tunnel) through the Pyrenees, connecting both countries. The project has been in operation since 2010. The scope of works included detailed design (ready for construction) and construction management for both infrastructure and rail systems. It included a Heavy Maintenance Facility (HMF) and an Operations Control Center (OCC).

RAUL ARROYO GONZALEZ

PERSONAL INFORMATION

E-mail: raul.arroyo@sener.es

Contact telephone numbers: 647986313

ACADEMIC TRAINING

- **M.SC. INDUSTRIAL ENGINEERING** (Level 3 MECES - **MASTER**). July 2007
Polytechnic University of Burgos. Spain.
- **B.SC MECHANICAL ENGINEERING** (Level 2 MECES - **DEGREE**). February 2003.
Polytechnic University of Burgos. Spain
- **MASTER'S DEGREE IN SUPPLY CHAIN MANAGEMENT. INTEGRAL LOGISTICS / OPERATIONS. February 2018.** ICIL Foundation.
- **MASTER'S DEGREE IN INTERMODAL FREIGHT TRANSPORT. December 2016.** Polytechnic University of Catalonia (UPC).
- **UNIVERSITY EXPERT IN THEORY AND APPLICATION OF FINITE ELEMENTS. February 2013.** UNED Foundation.
- **FP II SPECIALIST TECHNICAL DRAFTIST (BUILDINGS AND WORKS). June 1998.** Burgos, Spain.

FURTHER TRAINING

- **WORKSHOP VERTICAL DYNAMIC OF THE TRACK AND DIGITAL SIGNALS IN RAILWAYS.** Agustin de Betancourt Foundation.
- **WORKSHOP SPECTRAL ANALYSIS AND DIGITAL FILTERING OF DIGITAL SIGNALS IN RAILWAYS.** Agustin de Betancourt Foundation.
- **TRAINING IN CALIBRATION AND VERIFICATION OF MEASUREMENT AND TESTING EQUIPMENTS.** Weather Control Techniques.
- **SEMINAR ON CALCULATION WITH MATLAB OF THE FORCES IN THE WHEEL-RAIL CONTACT.** Polytechnic University of Madrid.
- **MONOGRAPHIC ON DATA PROCESSING AND PERFORMANCE OF CONTROL PANELS.** CEF- CENTER FOR FINANCIAL STUDIES.

- **MS-EXCEL ADVANCED. ADR TRAINING.**
- **INTERPRETATION OF GEOMETRIC AUSCULTATIONS. INECO.**
- **MANAGEMENT OF FUNDAMENTAL PROJECTS. INECO.**
- **COURSE ON RAILWAY OPERATION. BASIC CONCEPTS AND ITS EVOLUTION. INECO.**
- **STRUCTURE GAUGE. INECO.**
- **QUALITY ASSURANCE-INSPECTION GUIDELINES. INECO.**
- **SPECIALIST IN COMPUTER AID DESIGN (AUTOCAD).** Duration: 220 hours (Year 1996). Taught by: ABC Academy.
- **OCCUPATIONAL RISK PREVENTION COURSE.** Duration: 70 hours (From 10/13/98 to 03/24/99) Taught by: Trevysa.

COMPUTING

- **Mastery of PULSE, Bruel&Kjaer software for the acquisition, post-processing and real-time viewing of acoustic-vibration measurements.**
- **Signal processing: Matlab, Python, Dewesoft.**
- **Management of Office package (word, excel, power point, project). Excel expert level.**
- **AutoCAD.**
- **ANSYS basic level.**

LANGUAGES

- **ENGLISH:** B2 (Spoken and written)

EMPLOYMENT RECORD:

- *06/2022 – Currently. **TRACK RESPONSIBLE - SENER Engineering and Systems S.A. (Railway infrastructures Department).***
- *2012 – 06/2022 **TECHNICAL MANAGER - INECO (Track Pre-maintenance and Technology Department).***

- *Dimensioning and management of technical, economic and human resources to achieve the objectives and needs of the different projects efficiently.*
 - *Preparation of technical and economic bids for the works.*
 - *Client portfolio management.*
 - *Responsible at INECO for vibration studies. Effects generated by railway infrastructures in urban environments and their adaptation to regulations.*
Highlighting two fields of action:
 - *Project: studies prior to the commissioning of the railway infrastructure, using simulation techniques and experimental tests.*
 - *Maintenance: study of the different vibratory problems generated by railway infrastructures throughout their life cycle.*
 - *Responsible at INECO for acoustic tests in the field.*
 - *Tests for the characterization of railway systems using vibration and laser measurements.*
 - *Quality tests and homologation of track materials.*
 - *Study of anti-vibration materials and their behavior.*
 - *Design and improvement of test methods.*
- ***June 2007 – 2012. CONSULTING ENGINEER – INECO-TIFSA (Track Management and Exploitation Department).***
 - *Vibratory and acoustic tests.*
 - *Design and implementation of test methods.*
 - *Dimensioning of technical means.*
 - *R&D projects.*
 - *Supply and storage of road materials.*
 - *Quality tests and homologation of track materials.*
 - *Characterization tests of track systems.*
 - *Road inspections.*
 - *Track technology studies, track renovations.*
- ***January 2004 – June 2007. RESEARCH ENGINEER AND QUALITY TECHNICIAN – GRUPO ANTOLIN INGENIERIA S.A. (Research Department – Acoustics and Vibrations Laboratory).***
 - *Vibratory and acoustic tests in fatigue benches, anechoic chamber, reverberant chambers, Alpha cabin, kundt tube, on seats, roofs, doors and window motors of automotive vehicles.*
 - *Design and implementation of test methods.*
 - *Dimensioning of technical means.*
 - *R&D projects.*
- ***February 2003 - January 2004. POSTGRADUATE SCHOLARSHIP - GRUPO ANTOLIN INGENIERIA S.A. (Research Department - Acoustics and Vibrations Laboratory).***
 - *Learning different vibration and acoustic testing methods.*
 - *Performance of test methods.*
 - *R&D projects.*
- ***June 2002 - February 2003. FINAL DEGREE PROJECT SCHOLARSHIP – GRUPO ANTOLIN INGENIERIA S.A. (Research Department - Acoustics and Vibrations Laboratory).***

- *Location of sound sources by means of acoustic pressure and intensimetry techniques.*

June 2022



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Curriculum Vitae

Personal Data

Name : FERRI MATEU, SANTIAGO

Date of birth : December, 1993

Nationality : Spanish

Education : BEng Civil Engineering, Universitat Politècnica de València (UPV), Spain, 2015 (Structural Engineering Specialist).
 MEng Civil Engineering, Universitat Politècnica de València (UPV), Spain, 2017 (Structural Engineering Specialist).
 Master BIM - Construction information management, Universitat Politècnica de València (UPV), Spain, 2018.

Languages : Spanish (Native), Catalan (Native), English (B2-CEFR)

Other data : Courses & Technical Conferences:
 -Modern Urban Track Solutions Rheda City Workshop, Schwihag Iberica & Rail.One, 2021.
 -First Technical Conferences of Education, Development & Innovation in the field of Construction Engineering, Universitat Politècnica de València (UPV), 2020.
 -Technical Conference of progressive collapse of structures, Universitat Politècnica de València (UPV), 2019.
 -Technical Conferences of BIM and industrialization, Universitat Politècnica de València (UPV), 2019.
 -Course The Art of Structural Engineering: Bridges, Princeton University 2019.
 -Course The Art of Structural Engineering: Vaults, Princeton University 2019.
 -Technical Conferences on design and calculation of D-regions with FEM using IDEA StatiCa, Construsoft, 2018.
 -Certification in Tekla Structures 2018i, Construsoft, 2018.
 -Basic BIM introductory course with Revit Architecture, Universitat Politècnica de València (UPV), 2017.
 -Course on graphic project planning with Microsoft Project, Universitat Politècnica de València (UPV), 2016.
 -Conference "The harmony of the bridges" of MEng PhD Javier Manterola, Universitat Politècnica de València (UPV), 2015.
 -Course on AutoCAD 2D & 3D, Universitat Politècnica de València (UPV), 2013.



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Congresses & Symposiums:

- International fib Symposium on Conceptual Design of Structures, Attisholz (Switzerland), 2021.
- International fib Symposium on Conceptual Design of Structures, Madrid (Spain), 2019.
- EUBIM 2019 - 8th BIM International Congress, Valencia (Spain), 2019.

Papers & Publications:

- Llopis, C., Ferri, S. y Martins, M. (2019). Conceptual design process of the structural systems of the Multi-Modal Transfer Center of Observatorio in Mexico City. International fib Symposium on Conceptual Design of Structures, Madrid (Spain).
- Llopis, C. y Ferri, S. (2021). Design experience of a thin steel frame folded plate envelope for the new railway station of Vasco de Quiroga. International fib Symposium on Conceptual Design of Structures, Attisholz (Switzerland).
- Ferri, S. y Llopis, C. (2021). Conceptual design of the structure of architectural pergolas for La Sagrera multimodal transfer center in Barcelona. International fib Symposium on Conceptual Design of Structures, Attisholz (Switzerland).

Honours & Awards:

- InnoTrans Career Award, Railgrup, Messe Berlin, 2020.
- Second Prize in the XII Edition of the Master's Thesis Awards, Juan Arizo Serrulla Foundation, Universitat Politècnica de València (UPV), 2018.
- Graduated with honours supporting the Bachelor's Thesis entitled "Basic Design Project for the South Access Bridge to the Tempelhof Park, Berlin", Universitat Politècnica de València (UPV), 2015.
- First Prize in the X Edition of the BASF Construction Chemicals Awards, BASF The Chemical Company, Universitat Politècnica de València (UPV), 2013.

Software:

- Analysis and structural design: SAP2000 (advanced proficiency), AUTODESK ROBOT STRUCTURAL ANALYSIS (advanced proficiency), CYPECAD (average proficiency), IDEA StatiCa (basic proficiency).
- BIM Modelling: AUTODESK REVIT (advanced proficiency), TEKLA STRUCTURES (basic proficiency), ARCHICAD (basic proficiency).
- BIM Coordination and Management: AUTODESK NAVISWORKS (average proficiency), SOLIBRI MODEL CHECKER (basic proficiency).
- BIM programming: DYNAMO (advanced proficiency).
- Computer-Aided Design (CAD): AUTODESK AUTOCAD 2D y 3D (advanced proficiency).
- Bills of Quantities, Construction Costs and Project Planning: PRESTO (average proficiency), MICROSOFT PROJECT (average proficiency)
- Office Automation: MICROSOFT WORD (advanced proficiency), MICROSOFT EXCEL (advanced proficiency), and MICROSOFT POWERPOINT (advanced proficiency).



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Summary of experience

Six (6) years of experience in civil structures calculations, analysis and design, specializing in structures of urban transport and railway projects (elevated structures or track slabs) and designing singular civil structures (parametric vaults) and building structures. Experience in BIM projects as a modeller, reviewer and programmer in innovation developments, as well as BIM coordinator of structure model discipline.

The most experience focuses on structural engineering, but has also experience in coordination and integration of structures with other disciplines, such as architecture of technical buildings or, specially, for the integration of track and railway communication systems. He has also performed tasks of leader of civil structures discipline for international tramway projects. For the different projects he has contributed as a checker of drawings, bill of quantities and reports of design and structural calculations.

Some of the singular projects in which he has worked as a project engineer for the discipline of civil structures are: Panama Metro Project (Panama), Monorail Cairo New Capital City & 6th October Lines (Egypt), Guadalajara Metro Project (Mexico) or Mexico-Toluca Interurban Railway Project (Mexico). The projects in which he has worked as a structural engineer leader are the Finch West Tram in Toronto Project (Canada) and Edinburgh Tram York Place-Newhaven Project (UK).

Work experience

Since 2018 SENER INGENIERÍA Y SISTEMAS, S.A

Roles: Project Engineer / Discipline Leader Engineer / BIM Coordinator / BIM Expert / Construction Technician

Projects:

- HS2 (HIGH SPEED TWO LIMITED). Washwood Heath Depot Basic Design Project. (United Kingdom). 2021-2022.

Activities: Project Engineer. Structural design and calculation of technical, administrative and railway maintenance buildings. Drafting of calculation and technical reports. Technical review of structural drawings.

- SACYR. Value Engineering Works for the Tender Design Project of the new Bologna Tram Linea Rossa. (Italy). 2021.

Activities: Discipline Leader Engineer. Calculation and optimization of track slabs at grade and over existing bridge structures. Analysis of potential aspects of design improvement and integration of track slabs.

- CJV OC/AC (ORASCOM-ARAB CONTRACTORS). New Capital City and 6th October Lines Monorails Detail Design Project. (Egypt). 2020.

Activities: Project Engineer. Structural design and calculation of the deep foundations for the main columns of elevated stations.



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- ADIF/BSAV (ADIF-BARCELONA SAGRERA ALTA VELOCITAT). Tender Engineering Services for detailed projects for the architecture, facilities and urbanization of La Sagrera station in Barcelona. Section A & Section B (Spain). 2020.

Activities: Project Engineer. Structural feasibility analysis, design and calculation of wooden structures for architectural pergolas.

- AENA. Project Management and Technical Assistance for the Direction, Control and Supervision of constructions developed at airports. Batch 5. East Region. Valencia Airport (Spain). 2020-2022.

Activities: BIM Expert and Construction Technician. Control and supervision of the BIM model and BIM construction certifications. Approval of BIM Execution Plans. Technical assistance, control and supervision of the construction work. Approval of materials, reports and planning of work. Supervision of certifications.

- CJV SFN (SACYR-FARRANS-NEOPUL). Edinburgh Tram. York Place to Newhaven Project (United Kingdom). 2019- till date.

Activities: Discipline Leader Engineer. Structural design and calculation of track slabs at grade and over existing bridge structures. Integration of systems discipline in track slabs. Structural design and calculation of OLE poles foundations, technical buildings and architectural equipment of tram stops. Drafting of calculation and technical reports. Technical review of structural drawings.

- ARUP. Finch West Avenue (Toronto) Light Rail Transit. Systems & Track Design Project (Canada). 2018-till date.

Activities: Discipline Leader Engineer. Structural design and calculation of track slabs at grade and over underground structures. Integration of systems discipline in track slabs. Drafting of calculation and technical reports. Technical review of structural drawings.

- UNIÓN METRO CAPITAL CJV (SACYR, CAF, HYUNDAI & STOA). Engineering project for Tender Design of the First Metro Line of Bogota - Section 1 (Colombia). 2019.

Activities: Project Engineer. Bill of quantities of structures for maintenance and depot buildings.

- CL3 (CJV Line 3: FCC, CARSO & SK). Design engineering project, construction of civil Works, auxiliary line installations and stations, supply and installation of the integral system that includes the rolling stock (Monorail), and commissioning of the system for line 3 of the Panama metro (Panama). 2018.

Activities: Project Engineer. Bill of quantities of structures for underground and elevated stations.



Ref.: 64505279

- RAILWAY INFRASTRUCTURE SPANISH ADMINISTRATION. Construction Project of acoustic protection of the Madrid-Asturias High Speed Rail Line. La Robla-Pola de Lena Section (Spain). 2019.

Activities: Project Engineer. Bill of quantities of structures for auxiliary installations. Technical review of drawings and of bill of quantities of structures for auxiliary installations.

- APEX-BRASIL. Brazil Pavilion Expo 2020 Dubai Tender Design (Emirates). 2018.

Activities: Conceptual design of the structure of the singular wooden roof of the pavilion. Author of tender structural documents.

- SCT (MINISTRY OF TRANSPORT AND COMMUNICATIONS OF MEXICO). Adaptations, updates and modifications to the executive Project of the Mexico-Toluca Interurban Railway that are required during the construction phase. (Mexico). 2018-till date.

Activities: Project Engineer. Design and calculations of structures for elevated stations, technical buildings and auxiliary structures. Conceptual design and structural calculations of the Multi-Modal Transfer Center of Observatorio. Bill of quantities of structures for elevated stations. Drafting of calculation and technical reports. BIM Coordinator of the structural models.

2016-2018 SENER INGENIERÍA Y SISTEMAS, S.A

Roles: Project Technical Engineer

Projects:

- SCT (MINISTRY OF TRANSPORT AND COMMUNICATIONS OF MEXICO). Adaptations, updates and modifications to the executive Project of the Mexico-Toluca Interurban Railway that are required during the construction phase (Mexico). 2016-2018.

Activities: Project Technical Engineer. Design and calculations of structures for elevated stations and auxiliary structures. Drafting of calculation reports. Technical review of structural drawings.

- FERROVIAL-ACCIONA. Melbourne Metro Rail Project Tender design service. Tender design project for Tunnel and Stations PPP (Australia). 2016.

Activities: Project Technical Engineer. Bill of quantities of structures for underground stations.

- SCT (MINISTRY OF TRANSPORT AND COMMUNICATIONS OF MEXICO). LIGHT RAIL TRAIN OF GUADALAJARA SITEUR (Mexico). 2016.

Activities: Project Technical Engineer. Bill of quantities of structures for elevated stations.



Ref.: 64505279

- FAST RIYADH METRO ALLIANCE - PACKAGE 3 (LINES 4, 5 AND 6). Shopdrawing Checking Of The Riyadh Metro Package 3 (Lines 4, 5 And 6) (Saudi Arabia). 2016.

Activities: Project Technical Engineer. Technical review of structural shop drawings of reinforced concrete structures: underground, elevated and at grade structures.



Curriculum Vitae

Personal Information

Name: Juan Ramón BARTOLOMÉ SUALDEA
Date of Birth: December 1966
Nationality: Spanish
Education: 1992: Technical University of Madrid
 MSc: Civil Engineering, Sp: Hydraulic and Energy
Languages: Spanish, English
Software Skills: HEC-1 and HEC-HMS for hydrologic calculations
 HEC-2 BOSS HEC-2, HEC-RAS and GEO-RAS for hydraulic calculations
 channels and channels in steady and unsteady state
 DAMBRK, and HEC-RAS FLDWAV for propagation in variable rate of dam
 break wave.
 MIKE11 hydraulic calculations channels and canals in variable rate
 DYAGATS for calculating transient and water hammer in pipes
 EPANET, for calculation of branching networks of pipes in pressure
 EPA SWMM ver 5.0, for the simulation of dynamic models of rainfall-
 runoff
 CRS, for the analysis and design of sewerage
 MEMPHIS, SISPRE and PRESTO, budgets and measurements
 AUTOCAD 2015

Professional Profile:

Project Engineer with 30 years' experience specialized in Hydraulic Works (Hydrology, River Hydraulic, Supplies and Drainage). Currently he is a senior project engineer in the Water Technology Section of SENER. Ability to coordinate multidisciplinary teams in projects for different fields of the Infrastructure and Architecture Business Unit of SENER, specifically for projects involving design, design review, and construction management and supervision.

Person in charge of for hydrology and drainage of lineal projects related to the main fields of expertise of the company such as Motorways and Highways, Railway, Urban Transport, Airfield and Air Navigation, Ports and Hydraulic projects. In SENER, he has participated in a senior role for many lineal (roads, highways and railways) projects, specialized in Hydraulic Works and Drainage.

Work Experience:

Since 2000 SENER, Engineering and Systems, S.A. - Water and Environment

FFC Construction - HITACHI. Services for the Analysis and proposals of design alternatives for the Sydney Metro - Western Sydney Airport - Stations, Systems, Trains, Operations and Maintenance PPP Tender Project. Functions: Responsible for flood studies and design of the necessary works. January - March 2022.



OHL. Design Engineering Services, Construction of civil works, auxiliary line facilities and stations and Interfaces with the integral railway system for the extension of Line 1 of the Panama Metro to Villa Zaita. Functions: Coordinator of the drainage systems design team. February - August 2021.

CJV (Hyundai E&C - Posco - Hyundai E). Design Engineering Project, Construction of civil works, auxiliary line and station facilities, supply and installation of the integral system that includes rolling stock (Monorail) and Commissioning of the System for Line 3 of the Panama Metro. Functions: Responsible for the drainage of the line and the rainwater, sanitation and supply networks of workshops and garages. November 2020 - Present.

ADIF. Service Contract for Dynamic Supervision in ADIF-AV in Open Order Regime. Functions: Hydrology and Drainage advisory expert. October 2019 - Present.

ADIF. Basic and Construction Project for the implementation of the 4+4+2 scheme at the Atocha Cercanías Station. Functions: Responsible for the drainage system design team. October 2020 - Present.

VAUBAN - GINGKO TREE INVESTMENT LTD. Irrigation Area of Canal de Navarra Water Demand and Technical Due Diligence Project Samba. Functions: Responsible Director of the works. September - October 2020.

GENERAL SECRETARIAT OF INFRESTRUCTURES. Informative Study of the Valencia - Castellón High Speed Line. Functions: Head of Hydrology and Drainage works. September - December 2020.

ADIF. Environmental Processing and Construction Projects for the electrification of the Puertollano - Mérida section. Functions: Responsible for the line drainage system design team. January - December 2020.

EUSKAL TRENBIDE SAREA (ETS) - ADIF. Construction platform Projects in the new railway network of the Basque Country on the Astigarraga - Irún section of the Gipuzkoana Branch. Functions: Responsible for the design team of the line drainage system. January - November 2020.

ADIF. Constructive Project for the duplication of the Ferrol - Gijón railway line platform. Section: Trasona - Aboño. Functions: Responsible for the line drainage system design team. September 2019 - August 2022.

SACYR. Design Project Tender for Construction of the First Line of the Bogotá Metro - Section 1. Functions: Responsible for the drainage system of the line design team. May - August 2019.

CPBJH JOINT VENTURE (CPB CONTRACTORS - JOHN HOLLAND). Engineering Services for Independent Checking for the verification of compliance with PSR (Project Scope and Requirements) and FPS (Functional Performance Specifications) in the West Gate Tunnel Project. Functions: Drainage Expert. June - July 2019

SACYR. Design Project Tender for Construction of the RegioTram de West Railway Corridor project in Colombia Functions: Expert advisor Hydrology and Drainage for the design of the drainage system of the line. May - August 2019.

ADIF. Preliminary studies, Basic and Constructions Projects for the Railroad Integration in Almería. Phase 2. Functions: Coordinator of the design team



for hydrological and hydraulic studies and flood studies and the design of the drainage system. September 2019 - Present.

STATE DEPARTMENT OF ROAD OF SPAIN. Update Layout and construction Duero Highway A-11 Project. Section: North Zamora Ronda - Ricobayo. Features: Expert advisor Hydrology and Drainage. Person in charge of workgroup. October 2019 - November 2020.

GROUPE NOUCLR (EJV Group). Engineering Services for Independent Checking for the Engineering, Supply and Construction Contract of the Metropolitan Express Network in Montreal (Canada). Functions: Drainage Expert Advisor. January 2019 - Present.

COBRA INSTALACIONES. Analysis and proposal of solutions for the drainage system implemented in the Photovoltaic Plant 493 Mw Mula. Functions: Person in charge of teamwork of drainage system. December 2018 - January 2019.

YAPI-MERKEZI. Independent Checking Engineer Services for the Design and Build for the Standar Gauge Railway (SGR) Line from Morogoro to Makutupora Project. Functions: Drainage Expert Advisor. November 2018 - Present

TERMINAL INVESTMENT LIMITED. Conceptual Project for Construction of Valencia North Port Expansion. Functions: Person in charge of the design of storm drain network, wastewater network, drinking water and fire system. September - October 2018

OHL. Design Project Tender for Construction of Central Railroad Project "Montevideo - Pasos de los Toros". Functions: Person in charge of teamwork of drainage platform of the line. March - May 2018.

ADIF. Consultant specializing in Hydrology and Drainage Project in the new Platform high-speed rail Pamplona - Y Basque. Functions: Expert advisor Hydrology and Drainage. November - December 2017

ADIF. Consultant specializing in Hydrology and Drainage in the Contract for the Dynamic Supervision of Projects (Preliminary studies, Basic and Constructions Projects) in ADIF-AV. Functions: Expert advisor Hydrology and Drainage. December 2017 - Present.

CALIFORNIA HIGH-SPEED RAIL CP 4 - CALIFORNIA RAIL BUILDERS, LLC (Joint Venture between Ferrovial Agroman US and Griffith Company, Inc). Detail Design Project for the new California High Speed Rail - Wasco/Shafter Section (EEUU). Functions: Coordinator of the design team for hydrological and hydraulic studies and flood studies and the design of the drainage system. September 2017 - Present

QATAR PORTS MANAGEMENT COMPANY. Independent Checking Engineer Services for the design of the New Port Project of Doha (Qatar) developed by SALAM TECHNOLOGY. Functions: Drainage Expert Advisor. July 2017 - Present

CONSTRUCTURA LAS PAMPAS DE SIGUAS. Analysis Studies and Alternatives Ideas for Design of the Regable Zone of Las Pampas de Siguas (Peru). In JV with INCISA Company. March 2018.

OHL. Design Project Tender for Construction of TALASA Hydroelectric Project (Colombia). Three hydroelectric plants of 180 Mw of total power. Functions: Manager Director. October - December 2017.



NUCLENOR. Technical assistance for the resolution of comments from Nuclear Safety Council to Stress Testing of the Santa María de Garoña Nuclear Power Plant (Burgos, Spain). Functions: Director of Contract. March - May 2017.

CALIFORNIA HIGH-SPEED RAIL CP 2-3 - FLATIRON JOINT VENTURE (Joint Venture between Dragados USA, Inc. Flatiron West, Inc). Detail Design Project for the new California High Speed Rail - Palmdale/Burbank Section (EEUU). Functions: Coordinator of the design team for hydrological and hydraulic studies and flood studies and the design of the drainage system. September 2017 - Present

TEXAS CENTRAL PARTNERS -TCP- (Joint Venture between Ferrovia Agroman US Corp. and Archer Western, LLC). Design Project Tender for Construction of the new Texas High Speed Railway Dallas - Houston (Texas, USA). Functions: Coordinator of the design team for hydrological and hydraulic studies and flood studies and the design of the drainage system. March - July 2016

GUADIANA RIVER BASIN (MINISTRY OF AGRICULTURE, FOOD AND ENVIRONMENT OF SPAIN). Management plan in accordance with the Flood Risk European Directive 2007/60/EC on Guadiana River Basin. Functions: Contract Director. July 2014 - February 2016.

OHL. Design Project Tender for Construction of Phase 1 of the Port Terminal of Antioquía, located at the mouth of the Leon River in the Uraba Gulf, Antioquía (Colombia). Functions: Responsible for design of the supply network, sanitation, rainwater network, fire and collection network oily waste - oily. September - October 2015.

DIRECTORATE GENERAL OF RAILROADS OF MINISTRY OF DEVELOPMENT. Project Feasibility Study Rail Corridor Cantabrian High Performance Cantábrico - Mediterráneo. Tranche Pamplona - Connection Y Basque. Phase 1: 5,000. Functions: Responsible design team drainage and flood studies. September - December 2015.

SACYR. Design Project Tender for Construction of a control overflows dam on the Bouhdid River for protection of Annaba City (Algeria) for flood protection. Functions: Responsible for the construction procedures. September 2015

RYADH METRO ALIANCE - ARRIYADH DEVELOPMENT AUTHORITY. Independent Checking Engineer Services for Package 3 (Lines 4, 5 and 6) of The Riyadh Metro. Functions: Expert advisor Drainage Tunnel. September 2014 - Present

QATAR RAIL COMPANY. Independent Checking Engineer Services for the design of the Light Rail Transit (LRT) System Project (stations, depots and infrastructure) in Lusail (Qatar) developed by QDVC (Qatari Diar Vinci Construction). Functions: Drainage Expert Advisor. August 2015 - Present

FUJITA. Updating Design Project Tender for Etihad Rail. Stage 2 & 3: Etihad Rail Network United Arab Emirates (Al Ain Junction - Jebel Ali Port). Exhibit C. Functions: Person in charge of teamwork road and drainage facilities. July - August 2015.

QATAR RAIL COMPANY. Detail Design Project for Metro Red Line South Elevated & At-grade, Doha (Qatar). Functions: Person in charge of teamwork of drainage platform and facilities. June 2014 - June 2015



OHL. Design Project Tender of the works for the Concession for the Public Service Exploitation for Railway Infrastructure for the section between Lucas do Rio Verde/MT - Campinorte/GO. Functions: Person in charge of teamwork of drainage platform of the line. August 2014 - June 2015

METRO VÍAS PANAMERICANAS. Feasibility study for the implementation of a Light Rail along Carrera 68 Av. in Bogotá (Colombia). Features: Design of the drainage system of rainwater and its integration into the municipal sewer system. September 2014 - March 2015

BBVA and LA CAIXA. Technical Assistance for Project Due Diligence of construction of Expansion number 1 of the Navarra Channel. Functions: Person in charge of works. January - February 2015

ADIF. Consultant specializing in Hydrology and Drainage Project in the Remodeling Project in Railway Network of Granada (Spain). Urban integration of the section of the La Chana - Station Plaza de Europa. January - February 2015

OHL-SK E%C. Design Project Tender for Construction of the new railway connection between Oslo and Sky, Follo Line Project, Contract 2 and 3. Functions: Coordinator of the design team of the drainage system of tunnel and the pumping equipments for tunnel (TBM 19 km) and emergency exits. September 2013 - November 2014

Project Engineering and Construction Contract in the form of LNG Plant Arenoso (Soledad Department, Colombia). Functions: Person in charge of climatological and hydrological studies. October - November 2014

Project Engineering and Construction Contract in the form of LNG Terminal Zeebrugge - 2nd Jetty and Fuel Gas Extension. Functions: Person in charge of disposal system hydraulic design cooling water collection system and LNG. May - September 2013

FCC Central America. Design Project for Construction of Hangar of Coopesa and auxiliary facilities at the Juan Santamaria International Airport in San José (Costa Rica). Functions: Coordinator of the design team of the drainage system of rainwater of the aircraft area, auxiliary facilities area and parking. October 2013 - April 2014

FCC. Design Project Tender for Construction of Elements of the floating gates of Öresund Immersed Tunnel (Denmark - Sweden). Functions: Person in charge of the design of the pumping equipment of ballast and bilge of flatings gates. January - March 2015

BOLIVIA YPF. Liquefied Gas Plant Station and Satellite Acquisition Tanks in Rio Grande (Bolivia). Functions: Person in charge of the design of the drainage system of rainwater. September 2013 - Decembre 2014

GRUP TCB. Project for the tendering of the works of the container terminal Quetzal. Phase I. Functions: Person in charge of the design of storm drain network, wastewater network, drinking water and fire system. July - September 2013

ENTERPRISE SUBWAY OF ARGEL. MINISTRY OF TRANSPORT OF THE REPUBLIC OF ALGERIA. Preliminary study, Basic design and Detail project of the Subway of Oran. Functions: Person in charge of the team road and drainage facilities. June 2013 - March 2014



BASQUE WATER AGENCY. Management plans in accordance with the Flood Risk European Directive 2007/60/EC on Basque Country. Functions: Definition of structural and non-structural measures. 2013 - 2014

ALQUIFE MINES. Offer for Engineering Services for the definitive feasibility study, transmission and Dominion Mining and extension released Draft Mine Reopening the Marquesado's Mines (Granada). Functions: Person in charge of the assessment of drainage system and the short detour from the Lanteira Rambla. June - July 2013

CONSORTIUM ELECTRIC TRAIN (ODEBRECHT Construction Company). Review and optimization of defense systems in the bed of the Rimac River, referred to within the partial technical file for additional works on the Rimac River (Lima - Peru). Functions: Person in charge of the work. February - May 2013

ADIF. Technical Assistance to the works of the Platform of Northern - Northwest Corridor High Speed. High Speed Line Madrid-Galicia. Section: Tunnel Canda-Vilavella. Functions: Expert advisor drainage tunnel. April 201

FCC. Design Project Tender for Construction of Airport Road Interchange and Airport Region Network (Abu Dhabi). Features: Expert advisor Hydrology and Drainage. Person in charge of workgroup. March - April 2013

FCC. Design Project Tender for Construction of Highway E12 E12/E11 Extension and Interchange (Abu Dhabi). Features: Expert advisor Hydrology and Drainage. Person in charge of workgroup. January - February 2013

FEDERAL DIVISION ELECTRICITY OF MEXICO. Offer for the Project in the form of Project EPC contract Chicoasén CH II (Mexico). Features Coordinator for Civil Works. November - December 2012

BCHIDRO. Offer for the Project in the form of EPC contract Campbell River Hydroelectric Project (Canada). Features Coordinator for Civil Works. November 2012

ENDESA. Offers for Engineering Services for the Development of Basic Engineering Design and Drafting Project Grant of CHB Reversible Cancelitas (La Palma), Jabalcón (Granada) and Montnegre (Zaragoza). Features: Head of Offers. October - November 2012

ADIF. Draft Platform Mediterranean Corridor High Speed. Section: Los Mayorales - Almería. Features: Hydraulic Study Andarax River - Justification of the proposed viaduct. July - September 2012

COMEXHIDRO. Offer for the Project in the form of EPC contract Tecate Hydroelectric Project (Mexico). Functions: Coordinator for Civil Works. March - July 2011

FUJITA. Design Project Tender for Etihad Rail. Stage 2 & 3: Etihad Rail Network United Arab Emirates. Functions: Person in charge of teamwork road and drainage facilities. June - September 2012

FCC - ALPINE. Design Project Tender for Doha Subway. B&D Packages 2 & 4 Red Line South/Green Line. Functions: Definition of pumping stations. July - September 2012

COOPESANTOS. R.L. Offer for the Project in the form of EPC contract Hydroelectric Project San Joaquin - Los Santos (Costa Rica). Functions: Coordinator for Civil Works. May - July 2011



DIVERSIFICACION AND ENERGY SAVING INSTITUTE (IDAE). Adaptation of the Emergency Plan for Flood Risk Failure or Broken Dam Virgen de la Viñas (Aranda de Duero, Burgos). Functions: Person in charge of Manager works. April - March 2013

GUADIANA RIVER BASIN CONFEDERATION. Preliminary Flood Risk Assessment in the Guadiana River Basin. Functions: Project Director. September 2011 - February 2012

ENDESA. Offer for Engineering Services for the Preparation of Construction Project Hydroelectric Pumping reversible Soria - Chira (Gran Canaria), including works of Surveying and Geotechnical. Functions: Director of the Offer. April - May 2011

Project Engineering and Construction Contract in the form of Dunkerque LNG Terminal EPC Page Project-LNG Plant-Process Facilities. Functions: Person in charge of disposal system hydraulic design cooling water collection system and LNG. March 2011 - July 2013

ADIF. Support Project Management New Railway Complex Atocha Station and Action arising in the Chamartin Station. Features: Expert advisor Drainage. Person in charge of team. December 2010 - December 2011

JOINT VENTURE FCC-ODEBRECHT. Engineering Project Design, Construction of Civil Works, Auxiliary Line and Station Facilities, Supply and Installation of Rail Integrated System including rolling stock, and Commissioning of the System for Line No.1 of the Panama Subway. Functions: Definition of pumping stations. January 2011 - August 2012

ACS - COBRA. Project Castor underground gas storage/Castor Underground Gas Storage Development Project. Functions: Person in charge of Study flooding. January 2010 - July 2010

STATE DEPARTAMENT OF ROAD OF SPAIN. Layout and construction Duero Highway A-11 Project. Section: North Zamora Ronda - Ricobayo. Features: Expert advisor Hydrology and Drainage. Person in charge of workgroup. September 2009 - July 2010

DEPARTMENT OF INFRASTRUCTURE. MINISTRY OF DEVELOPMENT. Support Contract Management of Construction Projects platform. High Speed Line Sevilla - Huelva. Supervision of basic and constructive platform projects. Features: Expert advisor Hydrology and Drainage. November 2009 - June 2010

ANDALUCIAN WATER AGENCY. Hydraulic Study for Flood Prevention and Management of Guadalhorce River Basin (Málaga). Functions: Person in charge of workgroup. 2008

ADIF. Consultant specializing in Hydrology and Drainage Project in the new Platform high-speed rail Levante. Madrid - Castilla La Mancha - Valencian Community-Region of Murcia. Section: Valencia - Puzol. Functions: Expert advisor Hydrology and Drainage. March 2009 - July 2009

BBVA BANK - SANTANDER BANK. Technical Advisory Services and Requests / Actions for the improvement works of the integral water cycle Sevilla to undertake Huesna by Waters. Functions: Person in charge of Manager works. March 2009 - August 2013.



ANDALUSIAN WATER AGENCY. Hydraulic Study for Flood Prevention in the basins of Western Almeria (Almería). Functions: Persons in charge of workgroup. 2006 - 2007.

ADIF. Support Projects Management Platform Contract. High Speed Line Vitoria-Bilbao-San Sebastián. Supervision of basic and constructive platform projects. Functions: Expert advisor Hydrology and Drainage. 2006 - 2010.

BBVA, ICO, NAVARRA BANK, IBERCAJA and LA CAIXA. Technical Assistance for Project Due Diligence of construction, commissioning and operation of the Navarra Channel. Functions: Person in charge of works. Includes the study of production estimate of two hydroelectric plants (CH and CH Dam Toe Shot Channel 29 MW and 20 MW respectively). Planned Investment: 26,00 M€.

ADIF. Consultant specializing in Hydrology and Drainage in the Contract to Support Projects Management Platform High Speed Line Valladolid - Burgos. Supervision of basic and constructive platform projects. Functions: Expert advisor Hydrology and Drainage. 2008 - 2009.

ADIF. Draft Platform (Basic and Constructive) Tranche Vera - Los Gallardos of Mediterranean Corridor High Speed. Functions: Person in charge of Hydraulic equipment. January 2008 - November 2008.

AYALA WATER BOARD. Emergency plan and operating rules Artziniega Dam. Functions: Person in charge of the works. January 2008 - November 2008.

AENA. Construction project storm pond for rainwater network of Extension Airport Santiago de Compostela. Functions: Person in charge of works. July - August 2008.

OHL. Construction project Modernization Modernization Line. Line Annaba - Ramdane Djamel. Functions: Person in charge of Design System drain line. March 2007 - June 2008.

ACUAMED (Waters of the Mediterranean Basin). Consulting and Assistance Coordination and Verification News Construction Projects related to urgent actions included in Law 11/2005. Functions: Person in charge of works. 2007 - 2008.

ALAVA PROVINCIAL COUNCIL. Basic project to expand the station potable water from the reservoir Arceniega (Álava). Functions: Person in charge of Manager works. March - July 2007.

ENAGAS. Project evacuation system drain line water to the sea from vaporizers for enhancing the capacity to issue the ENAGAS regasification plant in Barcelona. Functions: Person in charge of works. March 2006 - July 2007.

JOIN VENTURE FCC CONSTRUCTION, AQUALIA, WATER MANAGEMENT, S.A., HARINSA ENVIRONMENTAL SA, SARALEGUI AND AZPIROZ CONSTRUCTIONS, SL, and RURAL BANK OF NAVARRA. Demand Study for the Proposed Tender Construction and operation of infrastructure interest of the irrigation area of the Canal de Navarra, 1st Phase, by concession of public works. Functions: Person in charge of Manager works. May 2006 - July 2007.

ACCIONA. Hydrologic and Hydraulic Study Wadi Corvera and Cypress for Project Bidding through concession agreement, the Airport of the Region of Murcia. Functions: Person in charge of the work. Date: April - June 2006.



ACCIONA. EDAR Project Tender for the Project by the concession agreement, the Airport of the Region of Murcia. Functions: Person in charge of the works. April - June 2006.

ACUAMED (Waters of the Mediterranean Basin). Consulting and Assistance Coordination and Verification of Construction Projects related to emergency actions approved by Royal Decree-Law 2 /2004. Functions: Person in charge of Manager works. 2006 - 2007.

PLANT SOCIETY REGASIFICATION SAGUNTO. Draft making systems and pouring seawater for Sagunto regasification plant. Functions: Person in charge of for the work. April 2005 - February 2006.

GE PLASTICS OF SPAIN, S. COM. BY A. Construction and Engineering Project detail effluent line at Industrial Complex Ge Plastics in La Aljorra (Cartagena) Tue. Functions: Person in charge of Manager works. January 2006 - January 2007.

GE PLASTICS OF SPAIN, S. COM. BY A. Environmental Impact Study of the effluent line of GE Plastics Industrial Complex in La Aljorra (Cartagena) Functions: Person in charge of Manager works. March 2005 - October 2006

TRASAGUA (Transfer Infrastructures, Inc.). Construction Project of the hydraulic infrastructure of the transfers authorized by Art. 13 of Law 10/2001 of 5 July (P.H.N.). South Branch: Siphon Hondon de las Nieves to hydroelectric development of the place. Functions: Person in charge of Manager works. October 2003 - March 2004.

NATIONAL OFFICE L' ELECTRICITÉ. Offer Detail Studies of Hydroelectric Tilougguit (20 Mw) (Morocco). Investment: 10.00 M€. Functions: Person in charge of for the work. November 2011.

HYDRAULIC SANTILLANA, Inc. (CANAL ISABEL II). Construction of small hydro projects Pedrezuela (1100 kw) of Manzanares (600 kw) and Valmayor (710 kw). Functions: Person in charge of the works.

TRASAGUA (Transfer Infrastructures, Inc.). Draft Project Construction Transfers Authorized by Article 13 of Law 10/2001 of 5 July (PHN). Section 10. Santa Magdalena de Pulpis - E.B. Caves Vinromá (Castellón). Functions: Person in charge of Manager works. July 2003 - March 2004.

MBIA Branch Spain and WATER BASIN SOUTH CONFEDERATION. Study of technical and economic viability of the Infrastructure Works Connection Dam and Negratín - Almanzora Reservoir. Functions: Person in charge of Manager works. September - November 2003.

DIVERSIFICACION AND ENERGY SAVING INSTITUTE (IDAE). Project implementation and commissioning of Hydro Electric Central Porma and Ferreras. 20 Mw - 18 M€. Functions: Person in charge of the Design and Construction Civil Works. 2001 - 2004.

DIVERSIFICACION AND ENERGY SAVING INSTITUTE (IDAE). Emergency Plan for the Flood Risk Failure or Broken Dam Virgin Vines (Aranda de Duero, Burgos). Functions: Person in charge of Manager works. April 2002 - July 2005.

DIRECTORATE GENERAL OF RAILROADS. Project Background Study of High Speed Railway Line Madrid - Extremadura. Tranche Madrid - Cáceres. Functions: Person in charge of Hydrology and Drainage Works. 2003.



DIRECTORATE GENERAL OF RAILROADS. New Gate Station Sol-Gran Vía System Design Drainage filtration. Functions: Person in charge of Manager works. January 2001 - January 2003.

DIVERSIFICATION AND ENERGY SAVING INSTITUTE (IDAE). Offer for the Procurement of Works Engineering Project for Implementation of Hydroelectric Berberin in Calasparra (Murcia). Functions: Person in charge of works. May 2002.

GIF. Project to build new railway platform access Levante high-speed stretch Enova - Puebla long. Functions: Person in charge of Hydrology and Drainage Works. 2002.

GIF. Project to build new railway platform access Levante high-speed long stretch Puebla - Alzira. Functions: Person in charge of Hydrology and Drainage Works. 2002.

ITER (International Thermonuclear Experimental Reactor). Vandellós Joint Assessment of Specific Sites for Fusion Technology Ibérica, AIE (Grouped International Entrepreneurs, SA and Sener Ingeniería y Sistemas, SA) Functions: Person in charge of work takes water for cooling. 2002.

FERROVIAL. Barajas Plan. Tender Project Runway 18L/36R Flight, Flight Track 15L/33R and associated taxiways. Functions: Person in charge of Hydrology and Drainage works. 2002.

EIFFAGE - ACS GROUP. Project Tender for the South High Speed Line-Mediterranean Europe. International Figueras - Perpignan section. Functions: Person in charge of Hydrology and Drainage works. 2002.

COBRE LAS CRUCES, SA. Basic Project Forwarding Arroyos Molinos and Garnacha, Basics Reservoir Project Supply Regulatory Project Las Cruces and Basic Water Supply Project Process to Las Cruces. Person in charge of hydrologic works and hydraulic studies. 2001.

DIRECTORATE GENERAL OF RAILROADS. Informative Study Project L.A.V. Madrid - Castilla La Mancha - Comunidad Valenciana - Region of Murcia. Tranche Valencia - Castellón. Functions: Person in charge of Hydrology and Drainage works. 2001 - 2002.

DIRECTORATE GENERAL OF RAILROADS. Informative Study Rail Access Project AV Cartagena and Railway Network Management of the City of Murcia Functions: Person in charge of Hydrology and Drainage works. 2001 - 2002.

WATER WORKS DIRECTORATE GENERAL OF THE MINISTRY OF ENVIRONMENT. Previous Studies and Environmental Impact Assessment for the Proposed Dam on the River Turia Villamarchante. 2001.

DIRECTORATE GENERAL OF RAILROADS. Informative Study Rail Project Fitness between Bobadilla and Granada. Functions: Person in charge of Hydrology and Drainage Works. 2001 - 2002.

DIRECTORATE GENERAL OF RAILROADS. Basic Line Project Sevilla - Cádiz. Tranche Airport Jerez de la Frontera - Cádiz. Duplication of Way Functions: Person in charge of Hydrology and Drainage Works. 2000 - 2001.

DIRECTORATE GENERAL OF RAILROADS. Project L.A.V. between Córdoba and Málaga. Section 92- A- Highway Guadalhorce river. Platform. Functions: Person in charge of Hydrology and Drainage Works. 2000 - 2001.



GIF. Project Control and works in LAV Platform Madrid- Zaragoza -Barcelona - French border. Section Lleida- Martorell. Functions: Person in charge of Hydrology and Drainage Works. 2000 - 2001.

1997-2000. APOYO TÉCNICO Y ESTUDIOS, S.L.

JOINT VENTURE ISOLUX WAT-SERAGUA-CGS. Project Tender for the Contest Works Sanitation and Treatment of Urban Wastewater in the region of the Vegas Bajas.

JOINT VENTURE ISOLUX WAT-SERAGUA-CGS. Project Tender for the Contest Works Sanitation and Treatment of Urban Wastewater in the region of the South Countryside (Llerana and Others).

JOINT VENTURE ISOLUX WAT-SERAGUA-CGS. Project Tender for the Contest Works Sanitation and Treatment of Urban Wastewater in areas of influence Guadajira River.

JOINT VENTURE FCC CONSTRUCTION-IBERDROLA. Project Tender for Competition Modified Reservoir Casares de Arbás (León) Project.

ALDESA CONSTRUCTIONS, SA Project Tender for Design and Construction Competition Regulatory Siphon Odiel (Huelva).

ISOLUX WAT, CEPRASTUR, Economic Interest Group (Cantabrian and Hydroelectric CADASA). Tender Project Competition for Design and Implementation of Hydroelectric Dam Rioseco Reservoir (Asturias).

DIRECTORATE GENERAL OF HIGHWAYS IN ANDALUCIA ORIENTAL. Settlement Project Highway Puerto Lumbreras - Adra. CN- 332, from Almeria to Valencia Cabo de Gata and Cartagena, mile markers 7 to 45. Section: Airport - Venta del Pobre.

FCC CONTRUCTION, SA Project Tender for the Contest Works Project and Conduction Breakdown of Wastewater in the Southern Zone of the Menor Sea.

FCC, ACS, Inc., Dragados y Construcciones, SA, NECSO, SA, OHL, SA and AGROMAN, Inc. Tender Project Competition for Design and Construction of the WWTP System Alzira. TT.MM. and other Alzira (Valencia).

FCC, ACS, Inc., Dragados y Construcciones, SA, NECSO, SA, OHL, SA and AGROMAN, Inc. Tender Project Competition for Design and Construction for Network Emissaries for sanitation Doñana. TT.MM. Field of Escacena, Chucena, Paterna del Campo and Manzanilla (Huelva).

FCC, ACS, Inc., Dragados y Construcciones, SA, NECSO, SA, OHL, SA and AGROMAN, Inc. Project Tender for Design and Construction Competition for New Water Tank Cadasa treated.

SERRAGUA, S.A. (Concession Supply and Sanitation of Alcalá de Henares) Construction Project for the Installation of Valves to close polygons cutting and Repair Leaks in central Alcalá de Henares (Madrid).

FCC CONSTRUCTION, SA, ACS, SA, DRAGADOS AND CONTRUCTIONS, SA, NECSO, Inc. and AGROMAN, Inc. Project Tender for Design and Construction Competition to drive for reuse of Purified Water. The Palmas Norte.



MINISTRY OF ENVIRONMENT AND REGIONAL DEVELOPMENT OF MADRID. Construction Project Collector Road Torrelaguna in T. M. San Sebastián de los Reyes.

SERAGUA, S.A. (Concession Supply and Sanitation of the City of Badajoz). Improvement Project Water supply to Badajoz and surrounding villages for the company.

TPA, Inc. (Environmental Technical Production, SA) Elimination Project volatile around the service station Rios Rosas.

FCC CONSTRUCTIONS, SA, FERROVIAL, ACS, SA, DRAGADOS AND CONSTRUCTIONS, SA, NECSO, Inc. and AGROMAN, Inc. Project Tender for Design and Construction Competition for collectors of Benidorm and Villajoyosa (Alicante) for businesses.

FCC, S.A. Project Tender for Supply Drive Competition to Don Benito - Guarenya and complimentary Valtorres and other.

ISOLUX WATT, Inc. Project Tender for Design and Construction Competition Integral Sanitation and Wastewater Treatment in the environment of the Natural Monfragüe.

FCC CONSTRUCTIONS, SA, FERROVIAL, SA, ACS, SA, DRAGADOS Y CONSTRUCTIONS, SA, NECSO, Inc. and AGROMAN, Inc. Project Tender for Works Competition General Interest Sector 4 left bank of the Canal Júcar - Turia in TM Picassent (Valencia).

GUADIANA RIVER BASIN CONFEDERATION. Construction Project in Flood Control and Calamón and Rivillas Rivers in T. M. Badajoz.

FCC, S.A. Hydraulic Study for the Project Bidding Contest and Enforcement of Hydraulic Works Management entity Bolarque River Tagus and Talavera. Tranche Talavera de la Reina (Toledo).

FCC CONSTRUCTIONS, SA, FERROVIAL, ACS, SA, DRAGADOS AND CONSTRUCTIONS, SA, NECSO, Inc. and AGROMAN, Inc. Project Tender for Design and Construction Competition New WWTP Odón (Madrid) and New WWTP Boadilla del Monte (Madrid).

SERAGUA, S.A. (Concession Supply and Sanitation of the City of Oviedo). Construction Project for the Improvement of the Supply System to Oviedo from the Aramo.

ACS, SA, DRAGDOS Y CONSTRUCCIÓN, SA and AGROMAN, Inc. Tender Project Competition for Design and Construction of the Comprehensive Drainage Outfall Bay of Santander.

FCC, Inc. Channeling Study of 2-3, 3-4 and 4-5 to drain Alto Canal Spillway of Arroyos Payuelos.

MINISTRY OF ENVIRONMENT AND REGIONAL DEVELOPMENT OF MADRID. Construction Project in Valcanejeros Collector T. M. San Sebastian de los Reyes.

GUADIANA RIVER BASIN CONFEDERATION. Study of Damage caused by flooding in Rivillas and Calamón Rivers in Badajoz. Study Solutions.



DIRECTORATE GENERAL OF LOCAL ADMINISTRATION DEPARTMENT OF ENVIRONMENT COMMUNITY OF MADRID. Remodeling Project of the Place de la Concorde. La Cabrera (Madrid).

DIRECTORATE GENERAL OF LOCAL ADMINISTRATION DEPARTMENT OF ENVIRONMENT COMMUNITY OF MADRID. Street Paving Project at the Urban Helmet Villaconejos (Madrid).

CANAL ISABEL II. Artery Project Axis N- III. Tranche Rivas- Arganda and Velilla de San Antonio - Loeches and Torres de la Alameda.

CANAL ISABEL II. Draft South Artery Foundation Supply Madrid.

GUADIANA RIVER BASIN CONFEDERATION. Feasibility Study of Irrigation Monterrubio (Badajoz). Comparative Study of Solutions.

FCC. Inc. Project Tender for Execution of Works Competition Purification and Reuse of Lanzarote Island.

GUADIANA RIVER BASIN CONFEDERATION. Technical Assistance for the Study of existing and potential Guadiana Basin Hydroelectric.

OCP, S.A. Project Tender for Execution of Works Competition Interceptors Under Collectors Nalón River Course.

FCC, S.A. Project Tender for Execution of Works Competition of WWTPs Miajadas and Jerez de los Caballeros (Cáceres).

GUADIANA RIVER BASIN CONFEDERATION. Operational Standards and Security Diagnosis Dam Alange (Badajoz).

DIRECTORATE GENERAL OF LOCAL ADMINISTRATION DEPARTMENT OF ENVIRONMENT COMMUNITY OF MADRID. Street Paving Project at the Urban Helmet Villarejo of Salvanés (Madrid).

FCC, S.A. Modified Project Collector Connection Interceptor Industrial Discharges to the left bank of the river Segre (Lleida).

1995-1997: OFICINA TÉCNICA DE CONTROL DE OBRAS. S.A. (OFITECO, S.A.)

GUADIANA RIVER BASIN CONFEDERATION Project S.A.I.H. (Automatic Hydrological Information System) Guadiana Basin.

DUERO RIVER BASIN CONFEDERATION. Operational Standards Compuerto, Camporredondo and Cuerda del Pozo Dams.

TAJO RIVER BASIN CONFEDERATION. Delimitation of the study prior D.P.H. corresponding to the 2nd phase of the project Linde.

1994-1995: ESTUDIOS Y PROYECTOS, NIP, S.A.

JOINT VENTURE ELEC NOR, Inc. - PACSA. Project Tender for the contest and, construction of the WWTP La Línea de la Concepción (Cádiz)

ELEC NOR, Inc. Construction Project Hydroelectric Nacaome (Honduras)

MINISTRY OF PUBLIC WORKS BOARD OF ANDALUCIA. Construction Project of E.D.A.R. Paterna de Rivera (Cádiz) and E.D.A.R. El Algar (Cadiz)



Ref. 0202333

ALAVA PROVINCIAL COUNCIL (SPAIN). Draft Concession Agreement for the Integral Development of the Source of the Araia (Alava)

BASQUE ENERGY (E.V.E.). Assisting the Project Manager for Power Minicentral Oate (Vizcaya)

1991-1992. ELSAMEX, S.A.

MINISTRY OF PUBLIC WORKS BOARD CASTILLA LA MANCHA (SPAIN). Improvement Project and Conditioning Yebra - Fuentenovilla (Guadalajara) Road

MINISTRY OF PUBLIC WORKS BOARD CASTILLA LA MANCHA (SPAIN). Improvement Project and Conditioning Mondejar Road - Almoguera (Guadalajara)

COURSES:

- ✓ HYDROLOGY SEMINAR, Department of Hydraulics and Fluid Mechanics of the ETS of Civil Engineering of the Polytechnic University of Madrid
- ✓ II PREVENTION COURSE IN CIVIL ENGINEERING, organized by the association EPIC (Applied Studies in Civil Engineering) of the ETS of Civil Engineers and delivered by the Technical Security Service Company BUILDINGS LAIN, SA
- ✓ COURSE ON OPERATING AND MAINTENANCE OF WASTEWATER TREATMENT PLANTS, organized by the Polytechnic University of Madrid and taught by the Department of Sanitary Engineering of the ETS of Civil Engineering of the Technical University of Madrid, under the direction of D. MUÑOZ AURELIO HERNANDEZ
- ✓ I COURSE OF CALCULATION AND DESIGN OF STRUCTURES IN COMPUTER, organized by the General Foundation of the Polytechnic University of Madrid and taught by the Department of Civil Engineering EUITOP Madrid Polytechnic University of Madrid
- ✓ I COURSE OF CALCULATION AND DESIGN OF STRUCTURES BY COMPUTER, organized by the General Foundation of the Polytechnic University of Madrid and taught by the Department of Civil Engineering EUITOP Madrid Polytechnic University of Madrid
- ✓ II SPECIAL MEETING OF THE PROGRAM ON WATER DESALTING, organized by the Department of Conferences and Training Group Recoletos
- ✓ II SPECIAL MEETING OF THE PROGRAM ON WATER DESALTING" organized by the Department of Conferences and Training Group Recoletos
- ✓ NATIONAL CONGRESS OF THE ENVIRONMENT, December 2008
- ✓ SPECIAL MEETING OF THE NATIONAL WATER QUALITY, organized by the Conference Expansion
- ✓ TECHNICAL DAY ON VALVES AND SOLUTIONS FOR THE SECTOR OF THE HIDROELÉCTRICAS DAMS AND CENTRALS, organized by ACUSTER, S.L. April 2009
- ✓ TECHNICAL DAY ON MANUAL OF DESIGN, CONSTRUCTION AND OPERATION OF RESERVOIRS, organized by the CEDEX with the collaboration of ATEBA. May 2009
- ✓ CONFERENCE ON MATHEMATICAL MODELS FOR ENGINEERING HYDRAULIC, organized by the CEDEX with the collaboration of PTLHE and AIHR. June 2009
- ✓ TECHNICAL DAYS ON ADVANCED STUDIES IN HYDRAULICS AND HYDROLOGY, organized by SENER. June 2009



Ref. 0202333

- ✓ NEW WATER INFRASTRUCTURE PROJECTS, conference organized by INTERECONOMÍA - ACCIONA AGUA - DEGREMONT. September 2009
- ✓ TECHNICAL DAYS ON WATER ENGINEERING, organized by the CEDEX. October 2009
- ✓ PRESENTATION DAY OF THE SPANISH ASSOCIATION OF SUSTAINABLE REUSE OF AGUEA (ASERSA), organized by ASERSA. November 2019
- ✓ TECHNICAL DAY ON INNOVATION AND WATER ENGINEERING. NEW TECHNOLOGY AND OPPORTUNITIES, organized by INTIC. April 2010
- ✓ TECHNICAL DAY ON THE NEW EUROPEAN FLOOD DIRECTIVE, organized by the Ministry of Agriculture, Fisheries, Food and Environment. June 2010
- ✓ PRESENTATION DAY ON TECHNICAL SAFETY RULES FOR DAMS AND PACKAGINGS, organized by SPANCLOD. November 2011
- ✓ PRESENTATION DAY ON THE STRATEGIC AGENCY OF THE RESEARCH OF THE SPANISH TECHNOLOGICAL PLATFORM OF WATER, organized by TECNIBERIA. June 2016.
- ✓ COURSE ON BIM SENER - BIM TRAINING PLATFORM, organized by SENER BIM OFFICE. August 2018.
- ✓ TECHNICAL DAY ON STAINLESS STEEL IN WATER INDUSTRY, organized by OUTOKUMPU. September 2018.
- ✓ TRAINING COURSE ON CIVIL PROJECT MANAGEMENT, organized by SENER. February 2019.
- ✓ COURSE ON LEADERSHIP AND TEAM MANAGEMENT, organized by The Coaching Lab and SENER. April 2019.
- ✓ COURSE OF TUNNELING MACHINES, organized by SENER. December 2019.

MEMBERSHIPS OF PROFESSIONAL SOCIETIES:

Since 1992: Member of the Spanish Civil Engineers College Association (C.I.C.C.P.)



Pere Busquet, P.E.

Traction Power System



Years of Experience
29 years

Education

MSc Electrical Engineering,
Universidad de Cataluña. 1989

Professional Certifications

PE California E 21516
Spain Association of Industrial
Engineers # 8301

Employment History

SENER Ingeniería y Sistemas, S.A.

2001–Present
Project manager and senior
electrical engineer *for the
Transport Energy Section*

EISSA (Energética de Instalaciones Sanitarias, S.A.)

1999–2001
Electrical Engineer

Garona Verda

1998–1999
Director for a combined heat
and power (CHP) power plant.

IDOM

1996–1998
Electrical Engineer

CYMI, S.A. (former CAE)

1995–1996
1991–1994
Electrical Engineer

GIROA

1994–1995
Electrical Engineer

EXPERIENCE SUMMARY

Pere has 29 years of experience in systems engineering (final design, specifications, civil works management assistance and systems commissioning) specifically in the rail system environment (medium voltage power supply systems, low voltage power distribution systems, traction substations, high voltage supply), substations, and electrical centrals (400/220/110/25 kV distribution substations, and hydraulic centrals.) He has proven experience in developing emergency and backup power supply strategies, design of substations and switchgear, earthing systems, protection systems against stray current, as well as cathodic protection.

Pere is a highly skilled professional with proven capabilities when managing complex projects and multiple concurrent assignments related to electrical engineering installations in stations, tunnels, and depots. He has successfully worked for the Spanish Railway Infrastructure Authority (ADIF), Catalanian Railway Authority as well as for the Ministry of Civil Works, for projects of transport infrastructure and specially railways. Pere has deep knowledge of coordinating electrical systems with other systems in stations, tunnels, and depots.

RELEVANT EXPERIENCE

Rail Conventional Network upgrading Program in Spain for-ADIF (Interurban and Long Distance lines). Sr. Electrical Senior Engineer.

(2018 – In progress). Pere is participating of the detailed projects of five Traction Power Substations for the interurban lines in Catalonia: SET Flaçà, SET Port Bou, SET Figueres, SET La Garriga and SET Riudecanyes. TPSs are power rated at 2x3300 MVA, nominal voltage 3.000 Vdc.

Capacity study of an existing 45 kV overhead line for supplying the new TPSs; definition of the HV single line diagram and the Traction General Diagram. Functional Design of TPSs. Client: ADIF

HS2. High Speed Two: High Speed Train Birmingham – London. Washwood Heath Depot. Electrical Senior Engineer. (2018). Pere has elaborated of the Basis of Design for the Earthing and Bonding and Lightning Protection Systems for the Depot Area and every technical building.

California High-Speed Rail Project. Section Palmdale to Burbank, Electrical Engineer

(2015-2017) Pere designed the electrical installations (2x25 kV, traction substations, paralleling substations and switching substations) for each proposed route. SENER is in charge of environmental and engineering services during preliminary design phase. Client: California High-Speed Rail Authority (CHSRA)

LUSAIL LRT – ICE Services, Lusail/QATAR, Authorized Reviewer

(2014-In progress) Pere served as the authorized reviewer of energy as well as earthing and bonding documents. SENER is currently working as Independent Checking Engineer (ICE) for LUSAIL LRT, lines green, red, yellow, and purple. Client: ALSTOM.





Barcelona Metro Line 9, Barcelona/Spain, Sr. Systems Engineer

(2003–2017) Pere has served as senior systems engineer working on the following Line 9 contracts:

- Responsible for the preparation of specifications of the bids for the D/B of the Platform Screen Door (PSD) system for the new line
- Senior systems engineer for earthing and bonding systems. Responsible for the management of the on-board systems. Implementation and coordination of the design and the manual of grounding and protective connection of all electrical systems - HV (220 kV), MV (30 kV), traction current, and LV (400 V)
- Coordinated the technical evaluation of the proposals for traction substations, 220/30 kV receptors substations and energy distribution systems
- Preparation of technical specifications for the design of: ATC, signaling and command center, telecommunication systems, and energy systems
- Preliminary functional study of Line 9 electrification systems
- Technical assistance for the access and connection to the transmission electrical grid (220 kV) with system operator (REE) and energetic transmission company (REE).

Client: Infraestructures.cat (former GISA) – Catalanian Infrastructures.

Mexico City – Toluca Commuter Rail, Sr. Electrical Engineer

(2014) Pere served as senior electrical engineer responsible for resolution of interfaces with CFE (electrical supplier) for the necessary connections at 23 kV (stations, tunnel, and technical buildings) and 230 kV (traction substations and detail design of needed electrical connections). Client: SCT – Secretaria de Comunicaciones y Transporte (Government Authority for Transport and Communications)

The Toluca – México City intercity train connects the metropolitan area of Toluca with Mexico City.

International HSR Connection Spain - France, Section Figueres-Perpignan, Spain-France, Sr. Electrical Engineer

(2014-211) As senior electrical engineer, Pere contributed to the successful design of the electrical and systems infrastructures according to client requirements and technical specifications. He also provided technical assistance during the previous concession bid project for the high-speed line. He provided supervision in all the phases of the project from design to commissioning and completion of the line. Client: TP Ferro (Concessionaire) / EIFFAGE-ACS (Contractor)

Maryland Metro Purple Line, Maryland/USA (2014–2015)

Client: Archer Western (Walsh Group) /VINCI/ Alstom

SENER prepared the bid design for Maryland Purple Line Partners EPC Contractors as lead designer and engineer of record for alignment, geotechnical, structures, stations, architectural, civil, MEP, systems, and proposal documentation preparation. Pere served as senior systems engineer preparing the review of the technical documentation regarding traction, as well as earthing and bonding systems.

Guadalajara LRT Line 3, Guadalajara/Mexico, Systems Engineer

(2012-2013) Pere served as systems engineer responsible for energy systems. Client: SCT – Secretaria de Comunicaciones y Transporte (Government Authority for Transport and Communications). SENER carried out the preliminary and final design of systems in the new Guadalajara LRT line 3, including energy system design.

Abu Dhabi LRT/Tram Study, Abu Dhabi/UAE, Sr. Systems Engineer

(2014) Pere served as senior systems engineer. He prepared the review of technical design requirements to be applied in energy systems for the tramway lines: LRT1, LRT2, and LRT3 in Abu Dhabi. Client: Abu Dhabi Department of Transport

