

Vincent Leloup

Senior Contract Advisor

with 20 years of international experience in the construction and engineering industry.

Member of the FIDIC Contracts Committee

**Founder and Director of Studies of the International Construction Contracts (I2C)
Postgraduate Diploma, Paris II Panthéon-Assas University**

FIDIC International Accredited Trainer

Accredited Adjudicator on FIDIC Contracts (French National List)

Fellow of the Chartered Institute of Arbitrators (FCIArb)

Fellow of the Dispute Board Federation (DBF, Switzerland)

Member of the Dispute Resolution Board Foundation (DRBF, USA)

Member of the Society of Construction Law (SCL, UK)

Eur Ing, MSc. Water Management, MSc. Agronomy

MSc. Construction Law & Dispute Resolution, King's College, London

Core skills

International construction contract training services : FIDIC International Accredited Trainer
Procurement strategy, project risk identification & allocation, choice of relevant forms of contract
Contract risk analysis, Contracting strategy
Contract drafting
Contract management & administration
Claim management and preparation/defence
Dispute avoidance & resolution – Mediator, Dispute Board member/Adjudicator, Expert, Arbitrator
Fluent in French and English, intermediate command of Vietnamese

Career summary

Vincent Leloup is a French **professional engineer and construction lawyer, with 20 years of experience in the building & infrastructure sectors across Europe, Africa, Asia and the Caribbean**, first in the construction industry for multinational Contractors then in the consulting engineering business prior to setting up his own practice in contract training, consulting and dispute resolution services.

He holds a significant experience at all levels of the project cycle, from master planning and feasibility stages, through to design, construction & operation. Vincent is experienced in large-scale construction project management, in particular executed along FIDIC conditions of contract (including the Construction Contract, Plant & Design Build Contract, EPC/Turnkey Contract, and subsequent releases).

He is a Member of the FIDIC Contracts Committee, a co-writer of the FIDIC 2017 Client/Consultant Model Services Agreement (5th Edition), and of the FIDIC 2017 Sub-consultancy Agreement. He is the Principal Drafter of the update of the FIDIC 1999 Green Book, which is planned to be released by end 2019.

Vincent is a FIDIC International Accredited Trainer since 2007, having delivered 150+ training courses across Europe, Africa and Asia. Also a Web Class Trainer on FIDIC Conditions of Contract for the Royal Institute of Chartered Surveyors (RICS, UK).

Accredited FIDIC Adjudicator under the French National List hosted by Syntec Ingénierie, French Member Association of FIDIC, Vincent is a Fellow of the Chartered Institute of Arbitrators (FCIArb), a Fellow of the Dispute Board Federation (DBF, Switzerland), and a Member of the Dispute Resolution Board Foundation (DRBF, USA).

Vincent is the Founder and Director of Studies of the International Construction Contracts (I2C) postgraduate diploma held by the Paris II Panthéon-Assas University, which aims at training construction professionals in the management of construction contracts in an international environment, both under common law and civil law jurisdictions. The course runs over 9 months and 158 hours of study, through 6 modules.

Vincent regularly works as advisor to Parties in construction contracts drafting, management, risk analysis, claim management and dispute resolution, who are benefiting from his experience as Contractor as well as Engineer, in preparing and defending large claims and dispute referrals, and in settling disputes.

Recent project history

DISPUTE RELATED APPOINTMENTS

- 2019 – now: Chairman of a 3-member Dispute Board on a wastewater infrastructure project in Georgia, carried out under the FIDIC MDB 2010 Harmonized Edition of the Conditions of Contract for Construction
- 2019 - now: Sole Dispute Adjudication Board Member on an hospital rehabilitation & extension project in Haiti, carried out under FIDIC Conditions of Contract for Plant & Design-Build, aka the Yellow Book 1999 Edition – 42 M€ capital value
- 2019 – now: Member of a 3-Member Dispute Board on an irrigation development project, for the construction of a dam in Kenya, carried out under the FIDIC MDB 2010 Harmonized Edition of the Conditions of Contract for Construction, 83 M€ value
- 2018 – 2019: Expert witness (analysis of risk allocation in a construction contract, compared to international practices) on an ICC arbitration for a mining project in Western Africa
- 2018: Analysis of readiness of a Contractor's claim for referral to arbitration on a water supply project in Africa
- 2018 – now: Member of a 3-Member Dispute Board on a navigation dam rehabilitation design-build contract in France, 227 M€ capital value
- 2018 – now: Member of a 3-Member Dispute Board on a navigation dam rehabilitation interface contract (interface in between design-build and O&M contracts) in France, 227 M€ capital value
- 2018 – now: Member of a 3-Member Dispute Board on a project for the construction of main sewers in Eastern Africa, 35 M€ capital value, carried out under the FIDIC Conditions of Contract for Construction, aka the Red Book 1999 Edition
- 2018 - Expert witness (*interpretation of FIDIC Contract terms*) on an ICC arbitration for a port project in the Middle East, FIDIC Silver Book 1999 Ed. 70 M€ dispute.
- 2017 - now - Member of a 3-Member Dispute Board on a water transmission main construction project in Eastern Africa, 74 M€ capital value, carried out under the FIDIC MDB 2010 Harmonized Edition of the Conditions of Contract for Construction, aka the Pink Book
- 2017 - Sole Dispute Board Member on a road & bridge construction project in Armenia, carried out under the FIDIC MDB 2010 Harmonized Edition of the Conditions of Contract

for Construction, aka the Pink Book.

- 2016 - Sole Dispute Adjudication Board Member on an airport rehabilitation & extension project in Western Africa, carried out under FIDIC Conditions of Contract for Construction, aka the Red Book 1999 Edition
- 2015 – Member of a 3-Member Dispute Board (ICC Rules) for a port construction project run under FIDIC Silver Book Conditions of Contract, 650 M€ capital value / 50 M€ dispute

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BIDDING DOCUMENTS FOR DBO CONTRACT – SOLID WASTE (2019)

Critical review of bidding documents prepared for DBO contracts (10- year-operation) for municipal solid waste treatment facilities in the governorates of Gabès, Bizerte and Sousse in Tunisia.

FRENCH DEVELOPMENT AGENCY (AFD) STANDARD BIDDING DOCUMENTS (2018-2019)

Review of the AFD Standard Bidding Documents (SBD) for Design-Build-Operate (DBO) contracts in the water sector based on the FIDIC 2008 Gold Book.
Review of the AFD SBD for Design-Build Contracts based on the FIDIC 2017 Yellow Book.

UNITED NATIONS OFFICE IN GENEVA – CONTRACT DRAFTING FOR THE REHABILITATION OF THE *PALAIS DES NATIONS* (2018-2019)

Drafting of the Contract for the rehabilitation of the United Nations *Palais des Nations* in Geneva. Contract based on the FIDIC Red Book 1999 Edition, as amended by UNOPS, and with further amendments so as to meet the project objectives defined by the Strategic Heritage Plan (SHP) team. Capital value of the Works: 250 MCHF.

HOSPITAL PROJECT – HAITI – CONTRACTUAL AUDIT (2017)

Contractual audit of the Haiti State Hospital rehabilitation & extension project, carried out under FIDIC Yellow Book (Plant & Design-Build) 1999 form of Contract. Identification and opinion on matters in dispute in between the Parties, and assistance in the dispute resolution process.

ASIAN DEVELOPMENT BANK – BIDDING DOCUMENTS FOR DESIGN- BUILD-OPERATE PROJECTS (2017-2018)

Advice to relevant ADB staff on Executing Agencies' procurement submissions under DBO water and wastewater projects, based on the ADB Standard Bidding Documents (SBD) for DBO Contracts for water and wastewater greenfield infrastructure (using the FIDIC Gold Book 2008 as standard form of contract). Review of procurement plans, bidding documents, bid evaluation reports and advice on contract administration queries for projects in Bangladesh, India, Myanmar and Fiji. Customized training on related issues.

MIXED PV-THERMAL POWER PLANT – MAURITANIA (2017)

Advisory services as to poor performance of a consulting engineering firm acting as Engineer for a mixed PV-thermal power plant project, including power transmission lines. Assessment of the contractual rights & remedies of the Client, and recommendations as to the way forward.

SEAWATER TRANSFER & DESALINATION PROJECT – JORDAN & ISRAEL (2017)

Due Diligence services on a BOT Contract under the Red Sea – Dead Sea project (Phase I) – Estimated value: 1.1 bn USD / Main features : supply of 65 MCD/year of desalinated potable water, and of 235 MCD/year of mixed (brine + seawater) water to the Dead Sea from the Red Sea. Review & comments on draft BOT Contract.

WATER SUPPLY & WASTEWATER PROJECTS – SRI LANKA CONTRACT AUDIT (2016/2017)

Works Contracts audit on two water supply & wastewater projects financed by the Asian Development Bank, run under FIDIC Conditions of Contract, suffering from delays & other implementation difficulties. Identification of the contractual causes of disputes, review of priority issues and recommendations for issues & dispute resolution.

UNITED NATIONS OFFICE IN GENEVA -- CONTRACT REVIEW & COMPLETION FOR THE CONSTRUCTION OF A NEW BUILDING (2016-2017)

Review and completion of the Conditions of Contract to build a New Permanent Building (NPB) within the compound of the UN Office in Geneva. Contract based on the FIDIC Red Book 1999 Edition, as amended by UNOPS, and with further amendments so as to meet the project objectives defined by the Strategic Heritage Plan (SHP) team.
Capital value of the Works: 100 MCHF

PORT CONSTRUCTION – CARIBBEAN (2017)

Expert opinion on the interpretation of Contract terms for the construction of a container terminal carried out under the FIDIC Conditions of Contract for Construction, aka the Red Book, 1999 Ed.

ASIAN DEVELOPMENT BANK – STANDARD BIDDING DOCUMENT FOR DESIGN-BUILD-OPERATE PROJECTS (2016-2017)

Drafting of the Standard Bidding Documents (SBD), and User's Guide, for Design-Build-Operate (DBO) contracts financed by the Asian Development Bank in the water sector. The SBD are based on the FIDIC Conditions of Contract for Design, Build and Operate Projects, the FIDIC Gold Book, 2008 Edition.

DESIGN, SUPPLY & INSTALLATION OF PORT CELL & LIFT LOBBY DOORS FOR A POWER STATION – FRANCE (2016)

Contract Management advisor to the Subcontractor of a 30M€ subcontract, based on the FIDIC 2009 (Test Edition) Subcontract form of Contract, for the design, supply & installation of lift & lobby doors in a nuclear power station.

FRENCH DEVELOPMENT AGENCY (2015-2016)

Translation of the FIDIC MDB Harmonized 2010 Edition (the Pink Book) into French.

DESIGN, SUPPLY & INSTALLATION OF LIFTS & CRANES FOR A POWER STATION – FRANCE (2015-NOW)

Contract Management advisor to the Contractor of a 30 M€ contract, based on the FIDIC Yellow Book, 1999 Edition, for the design, supply & installation of lifts and cranes in a nuclear power station.

DESIGN, SUPPLY & INSTALLATION OF MEDICAL GAS SYSTEMS IN 9 HOSPITALS – GHANA (2015)

Advisor to the Contractor of a Design, supply & installation contract of medical gas systems in 9 hospitals, based on the FIDIC Yellow Book, 1999 Edition. Assistance for the contract negotiation and formation.

220KV OVERHEAD TRANSMISSION LINE (OHTL) CONSTRUCTION – MOZAMBIQUE (2015)

Advisor to a Contractor involved in the construction of a 42 km long OHTL in for a private coal mine operator. 23 MUSD project run under a bespoke form of contract integrating some FIDIC standard Clauses. Identification of contract risks and remedies, definition of a contract management strategy and action plan.

PORT CONCESSION – CARIBBEAN (2014-2015)

Lender Technical Advisory Due Diligence services for the concession of a large Caribbean container terminal (2.8 M TEU). Review of & opinion on the project procurement strategy, the conditions developed for supply and construction contracts, the construction risks identification & allocation, and the insurance policies. All in conjunction with Lenders' Legal Due Diligence advisors, and with Concessionaire's Legal advisors.

220KV OVERHEAD TRANSMISSION LINE (OHTL) CONSTRUCTION – RWANDA (2015)

Advisor to a Contractor involved in the construction of a 100km long OHTL in between Kigali and the border with Uganda. 25 MUSD project financed by the African Development Bank and run under a MDB Plant Design, Supply and Installation form of Contract. Identification of contract risks and remedies, definition of a contract management strategy and action plan.

HIGHWAY CONSTRUCTION PROJECT – ARMENIA (2015)

Works & Services Contracts audit on a 250 MUSD highway construction project financed by the Asian Development Bank, run under the FIDIC MDB Harmonized Edition (2010) of the Conditions of Contract for Construction, suffering from delays & other implementation difficulties. Identification of the contractual causes of disputes, review of priority issues and recommendations for issues & dispute resolution.

MIXED USE DEVELOPMENT PROJECT - FRANCE (2014-PRESENT)

Nominated as Arbitrator for construction disputes matters on the JV Agreement in between 2 investors forming a Special Project Vehicle acting as Employer of a mixed use development project called “Zac Bordeaux Saint Jean Belcier” (740,000 m² - office building, residential buildings, 4 & 3 star hotels, shopping mall, car park) in South-West France.

FRENCH DEVELOPMENT AGENCY (2014-2015)

Assistance for the drafting of Standard Bidding Documents (SBD) for Large Works with high environmental & social impact. Harmonizing the various parts of the SBD, and in particular with the Conditions of Contract based on the FIDIC MDB 2010 Edition (Pink Book).

PORT CONSTRUCTION – MOROCCO (2013-2015)

Advising the Employer and the Engineer as to Contractor’s Claims on a 5-year contract based on amended FIDIC 1999 Silver Book Conditions of Contract, 1999 Edition. Issuing opinion papers and preparing claim defense strategy. Assistance in dispute adjudication processes.

REAL ESTATE PROJECT / DUE DILIGENCE – NORTH AFRICA (2014)

Contract & Procurement due diligence services for a mixed use real estate development project in Northern Africa – GFA 400,000 m², capital value 450 MUSD. 54 construction contracts and consultancy agreements reviewed at 30% project progress stage. Objective: assess current & projected financial liabilities incurred by the Employer under the project.

NUCLEAR POWER PROJECT – EUROPE (2014)

Training & advisory services to 2 Contractors tendering on a large-scale nuclear power project, run along NEC3 Conditions of Contract. Contract risk analysis and mitigation plan development.

NUCLEAR POWER PROJECT – EUROPE (2011-PRESENT)

Training & advisory services to the Employer and the Engineer of a large-scale international nuclear power project, run along amended FIDIC 1999 Red and Yellow Book Conditions of Contract.

FACTORIES CONSTRUCTION – INTERNATIONAL TYRE MANUFACTURER (2013-2014)

Drafting a Model Contract for the construction of factories worldwide (America, Asia, Europe) for an international tyre manufacturer, based on FIDIC 1999 Yellow Book Conditions of Contract.

PORT REHABILITATION – INTERNATIONAL FREIGHT & LOGISTICS COMPANY (2012-PRESENT)

Advisory services as to dispute resolution for a port rehabilitation contract management in Sierra Leone Training & advisory services for an international freight & logistics company operating ports worldwide as concessionaire. Training on FIDIC Conditions of Contract. Drafting a FIDIC 2006 White Book based services contract for port rehabilitation design services in India. Drafting of 2 Model Contracts based on the FIDIC 1999 Red Book and Green Book Conditions of Contract.

WATER SUPPLY & WASTEWATER INFRASTRUCTURE PROJECT – MINISTRY OF FINANCE, REPUBLIC OF CROATIA (2010-2012)

Advisory services towards the Ministry of Finance (CFCA) as to the management of several water supply & wastewater infrastructure construction contracts run under FIDIC 1999 Red & Yellow Books Conditions of Contract, in the frame of Contractors' claims & dispute referrals.

WASTEWATER TREATMENT PLANT CONSTRUCTION – PALESTINE (2012)

Advisory services towards the Engineer as to an Adjudicator's decision on a Dispute. World Bank standard form of contract for Design, Supply & installation of Plant & Equipment.

ROAD CONSTRUCTION PROJECT – MOZAMBIQUE (2012)

Advisory services towards the Engineer as to a dispute on defects notification period extension, non-remedied defective works and call upon the Performance Security. FIDIC MDB 2005 Harmonized Edition contract.

CONTRACTS TRAINING COURSES (2007-PRESENT)

Delivered 150+ training courses to Employers, Engineers, Contractors, Lawyers, Insurers and Lenders in Europe, Asia and Africa. FIDIC International Accredited Trainer since 2007.

Member of the FIDIC Trainer Accreditation Assessment Panel from 2011 to 2016.

Exemples of Clients for FIDIC training sessions :

- International institutions: United Nations, Asian Development Bank, African Development Bank, French Development Agency, French Ministry of Foreign Affairs, Millenium Challenge Corporation (USA), RVO (Netherlands)
- Employers: EDF EN, Michelin, Bolloré, Hanoi Metro Railway Board (Vietnam), ITER Organization, CERN, Fusion 4 Energy, Quadran, Commonwealth War Graves Commission
- Professional bodies: Syntec Ingénierie (France), Royal Institution of Chartered Surveyors (RICS, UK), OICM (Mali), OICE (Italy), ICEG (Ukraine), VECAS (Vietnam)
- Consulting Engineers : Tractebel, Egis, Engage, Setec, Seureca, Momentum, Aéroports de Paris Ingénierie
- Contractors : General Electric, Colas, Colas Rail, Razel, Sogea Satom, Soletanche Freyssinet, Areva, STX, ONDEO IS, Vinci Energies, Groupe Fives, Groupe Réel, Leon Grosse

Conferences & seminars

SPEAKER AT THE FOLLOWING INTERNATIONAL CONFERENCES

- DRBF European Regional Conference in Brussels - November 2011
- FIDIC International Contract Users' Conference in London - December 2012
- DRBF Annual International Conference in Paris - May 2013.
- FIDIC – ICC Conference in Paris – June 2013
- FIDIC International Contract Users' Conference in London - December 2013
- FIDIC Middle East Contract Users' Conference in Abu Dhabi – February 2014
- FIDIC Asia Pacific Contract Users' Conference in Shenzhen – July 2014
- FIDIC International Contract Users' Conference in London – December 2014
- FIDIC International Contract Users' Conference in London – December 2015
- FIDIC International Contract Users' Conference in London – December 2016
- FIDIC International Contract Users' Conference in London – December 2017
- DRBF Conference in Paris - March 2018
- FIDIC Asia Pacific Contract Users' Conference in Singapore – July 2018
- FIDIC International Contract Users' Conference in London – December 2018
- International Construction Contracts Conference – Prague – May 2019
- DRBF Conference – Berlin – May 2019

Career history

INTERNATIONAL DIRECTOR, SCE, 2004-2013

International Director for SCE, French consulting engineering firm specialized in Environment Management and Land planning. Primary responsibility focused on international strategy definition, business development, and project supervision in the Water & Environment fields in North Africa, Middle East, Eastern Europe, China and India.

Main project history

- **Vietnam - Project preparation for Ho Chi Minh City Environmental Sanitation project phase II (HCMCES II) – 450 MUSD - WB financing - Project Director (2009-2013)**
Improvement of Ho Chi Minh City sewerage capacities through the construction of a 1.3 M PE Wastewater Treatment Plant and a 8-km long DN3000 sewage interceptor. Use of the 2008 FIDIC Design-Build-Operate Contract as contracting scheme. Feasibility Study, EIA, RAP/SA, Financial & Economic Analysis, Institutional Analysis.
- **Vietnam - Integrated Water Resources Management (IWRM) of the Dong Nai River basin – Project Director (2009-2013)**
Basin due diligence & diagnostic assessment, simulation of development scenarios, preparation of the River Basin Management Plan
- **Algeria – Rehabilitation & Extension of Jijel and Guelma water supply & sewerage systems – Project Director (2007-2013)**
Diagnostic assessment, Master Planning, Feasibility Studies, Design and Tender documentation preparation on behalf of Algerienne des Eaux (ADE) and Office National de l'Assainissement (ONA).
- **China - Reconstruction and expansion project of Water Supply System of Anqing City – 40 M€ - KfW financing – Project Director (2010-2012)**
Improvement of the WTPs and water supply network in Anqing. Assistance with project implementation
- **Croatia - Consultancy & Technical Assistance for the ISPA Measure – Karlovac Water and Wastewater programme – Project Director (2008-2011)**
Assistance in design review, tendering and contracting for water supply & sewerage networks construction and rehabilitation (17 M€ value- 1999 Red FIDIC Book Conditions of Contract), WWTP construction (100,000 PE – 14 M€ -1999 Yellow FIDIC Book Conditions of Contract), equipment supply. Institutional strengthening & capacity building regarding ISPA project management, GIS, networks modelling, UFW remediation and Financial & Operational Performance Improvement Programme (FOPIP) implementation
- **Bulgaria - Technical Assistance for Water supply & Sewerage Projects preparation in 7 Bulgarian towns – Project Director (2007-2009)**
Diagnostic assessment of the infrastructure, development of models, preparation of Master Plans and Long-Term Investment Programmes for each town, Financial & Operational Assessment of Municipalities and Regional Water Companies. EC financing

- **Armenia - Municipal Water & Wastewater project - Project Director (2007-2008)**
Preparation of Feasibility Studies & Detailed Engineering Design for water supply infrastructure improvement project for 12 cities & settlements - Goris, Eghegnadzor, Echmiadzin, Ararat, Vedi, Masis, Stepanavan, Tashir, Talin, Alaverdi, Artik, Noyemberyan
- **China - Second Yunnan Urban Environment Project – 250 MUSD (World Bank financing) - Deputy Project Director (2006-2007)**
Project preparation for water supply, sewerage (including 9 WWTP of total 122,000 m³/day capacity), river protection and waste subprojects
- **China - Chongqing small cities infrastructure improvement project – 190 MUSD (World Bank financing) – Deputy Project Director (2005-2008)**
Design Review & Advisory Services for water supply, sewerage, flood protection and road projects. Assistance for review of Preliminary & Detailed Design, Tender Documents for FIDIC Works Contracts
- **Romania – Technical Assistance for water supply & wastewater project – 42 M€ - EC ISPA financing - Project Director (2004-2007)**
Preparation of ISPA application, design and tender documentation for the rehabilitation and extension of the water supply and sewerage systems in Drobeta Turnu Severin. Conceptual (DWTP – 50,000 m³/d & WWTP – 125,000 PE) and detailed (water supply & sewerage networks – 90 km) design works, Tender documentation preparation for 3 works contract under FIDIC Conditions 1999 (Red Book for networks, Yellow Book for plants), 1 Service Contract under PRAG conditions, and 1 Supply Contract. Procurement Support during tendering & evaluation process.
- **China - Second Shandong Urban Environment Project – 250 MUSD (World Bank financing) (2005-2006)**
Project preparation for water supply, sewerage (including 2 WWTP of total 170,000 m³/day capacity), river protection and waste subprojects (total investment: 250MUSD).
- **Serbia - Technical assistance for the improvement of Belgrade Water Supply system (2004-2006)**
Setting-up asset register of the water supply network within the first pressure zone (half of Belgrade, 1300km of networks, 22 water facilities. Design & calibration of new hydraulic model (with Infoworks), detailed diagnostic assessment of a network pilot area.

DEPUTY PROJECT DIRECTOR, SAUR INTERNATIONAL (BOUYGUES GROUP AT THE TIME), 1999-2004

Deputy Director of the « Halong City Water Supply Project » - 20 MUSD water supply infrastructure construction & rehabilitation project (WB financing) in Halong, Vietnam.

In charge of

- FIDIC Contract Administration (1999-2004): Claim file preparation (6 MUSD). Supervised a team of lawyers, quantity surveyors and professional engineers. Held negotiations with Client and the Engineer. Dispute amicably settled.
- Pipeline rehabilitation works supervision (2000-2002), including trenchless techniques such as slip-lining.

OPERATION ENGINEER, SAUR, FRANCE, 1998-1999

Posted at Anjou Maine Agency, France, covering water supply & sewerage services over 4 counties (“départements” in French). Performance monitoring, asset management – asset inventory, diagnosis and renewal plans. Tendering for water supply & sewerage services on industrial sites.

RESEARCH ENGINEER, ESSEX & SUFFOLK WATER (SUEZ GROUP AT THE TIME), ENGLAND, 1998

Seawater desalination project – Feasibility Study for the implementation of alternative water production through seawater desalination by reverse-osmosis in Essex county, England, at a nuclear power plant site.

WATER PLANNING ENGINEER FOR RENAULT (CAR MANUFACTURER), FRANCE, 1997

Preparation of the Water Supply Master Plan for Maubeuge factory, France.

PROJECT ENGINEER FOR COMPAGNIE GENERALE DES EAUX (VEOLIA GROUP), FRANCE, 1996

Water supply services for Paris suburbs, supplying 4 Million inhabitants. Preparation of annual pipeline rehabilitation scheme, based on the development of specific database integrating main feeders (pipelines with DN>400) data