

Roger COJEAN

Society : ARMINES - MINES ParisTech (Centre de Géosciences)
Name : Roger COJEAN
Profession : Professor, Research Director, Expert in Engineering Geology
Date of birth : 29-04-1949
Nationality : French national

Number of years of professional experience in the field of Engineering Geology: 40

Affiliation to professional societies: Past-President of CFGI, the French National Group of IAEG (International Association of Engineering Geology and the Environment); Member of CFMS (Soil Mechanics), CFMR (Rock Mechanics), CFH (Hydrogeology), SGF (Geology)

Principal relevant work experience

R. COJEAN has a long experience in the field of engineering geology and associated scientific and technical skills such as soil mechanics, rock mechanics and hydrogeology.

At the beginning, his professional experience was oriented towards teaching and research projects in the field of engineering geology, with industry-oriented research works. Then, he developed a particular skill in the design of mining projects (open cast mining) and civil works (dams and tunnels). He has participated to several international research projects or expertises in the field of extractive industries, civil engineering works and natural hazards. He is a member of several research groups and promotes the “Design with Nature”, especially within the frame of the International Association of Engineering Geology and the Environment.

He was involved in several design projects for open-pit mines in France and abroad and several national and international expert missions in the field of extractive industries.

He participated as an expert for the mining company CVRD (*Timbopeba open pit mine*).

He was the project director in an international contract between CTGPC (China Yangtze Three Gorges Project Development Corporation) and the French Government (Fond d’Etude et d’Aide au Secteur Privé) for “*A contribution to the high rock slope design and monitoring of the permanent shiplock at the Three Gorges Dam Project (China)*”. He was also concerned by the analysis of landsliding processes in the dam reservoir 600 km in length. He was consulted for the SNWTP Chinese Project (*South North Water Transfer Project*) by the Chinese Ministry of Water Resources.

He was involved in a panel of experts for the Goro Nickel project about “*The storage of tailings from Goro-Nickel project in the Kwé Ouest valley (Province Sud - Nouvelle Calédonie, France)*” and then was appointed as an expert by the CTPBOH (French Permanent Technical Committee for Dams and Hydraulic Structures) for this project.

He was involved in several projects of civil engineering works such as the Salazie Amont Gallery (La Réunion, France) where he had to cope with the choice of the excavation technique (TBM method or traditional method) and also the choice of the type of lining of the gallery in correspondence with the geological and hydrogeological context. He has provided a technical document concerning the digging of galleries and the problems of underground waters for SNCF (the French society in charge of the safety of tunnel structures in France).

With Jean-Alain Fleurisson and Michel Deveughèle, he has written a “*Guide and Manual: Geotechnical and hydrogeological concepts and methods useful for open cast mining*” for Total mining activities.

He is the author of over 100 publications in refereed journals and has been the chair of international conferences, seminar and workshops. He has also been involved in the organisation of international events on the subjects of Engineering Geology. He is past-president of CFGI, the French National Group of IAEG (International Association of Engineering Geology and the Environment) and member of sister societies.

Roger COJEAN

64 years old, French national

Address

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Education

- 1972 **Civil engineer** (Ingénieur civil des Ponts et Chaussées). Graduate from the Ecole Nationale des Ponts et Chaussées, Paris.
- 1973 **Geologist**. Graduate from the Section d'Etudes géologiques et minières - Ecole Nationale Supérieure des Mines de Paris.
- 1975 **Doctor in Engineering Geology**. PhD from Ecole Nationale Supérieure des Mines de Paris.
- 2003 **HDR** (Entitled to supervise research works). Université Paris-Est / Marne-la-Vallée.

Professional responsibilities and present position

- 1975 **Teacher and researcher** at Engineering Geology Department of Ecole Nationale Supérieure des Mines de Paris and Ecole Nationale des Ponts et Chaussées.
- 1995 **Professor** at Ecole Nationale Supérieure des Mines de Paris
- 1995 **Professor** at Ecole Nationale des Ponts et Chaussées.
- 2006 **Research director** at Ecole Nationale Supérieure des Mines de Paris

Research interests and skill

1) Geological and engineering geological mapping. 2) Physical and mechanical properties of soils and rocks. 3) Hillslope materials and processes. 4) Modelling of deformation processes in natural slopes, large open pit mines, civil engineering works. 5) Interactions between engineering works (dams, tunnels, ...) and the soil or rock masses and the environment. 5) Engineering geology and urban planning.

Informatics

Computer programming: Fortran

Software skills: 1) Windows : Word, Excel, PowerPoint; 2) Geomechanics : Bishop-Carter (CGI), Degrés (CGI), Simbloc (CGI), Talren (Terrasol), Flac (Itasca), Tridéc (Itasca), Modflow

Language

French: mother tongue; **English:** written and spoken language; **Spanish:** written language.

Miscellaneous

- PhD Thesis (or equivalent) director: 40 theses. Reviewer of PhD theses and HDR theses;
- Since 1998, **co-editor of the « Bulletin of Engineering Geology and the Environment »**;
- **Member of the Editorial board of RFG** (Revue Française de Géotechnique);
- Expert for the EC-DG Research;
- From 2007 to 2011: **President of CFGI** (French Group of the IAEG: International Association of Engineering Geology and the Environment);
- 2008 : **Reviewer for the CTPBOH** (French Permanent Technical Committee for Dams and Hydraulic structures);
- Member of the International Association of Engineering Geology and the Environment, member of SGF (Société Géologique de France), member of CFMS (Comité Français de Mécanique des Sols et de la Géotechnique), member of CFMR (Comité Français de Mécanique des Roches), member of AFPS (Association Française de Génie Parasismique), member of CFH (Comité Français d'Hydrogéologie).
- **International cooperations and knowledge of various geological settings (research projects or expertise contexts. See below).**

Research and expertise works devoted to engineering geology problems, civil engineering works, extractive industries and natural hazards.

Research publications : 100 papers.

Supervised research works : 40 PhD Theses.

International projects, european research projects, national research projects (15 last years)

- CCE Contract - ORNAMENTAL ROCKS : *Improvement of productivity in quarrying dimension stones using new blasting and drilling techniques.* Contract BRE2-CT92-0315. Project coordinator : Unión Española de Explosivos, **partners : Armines-CGI, R. Cojean, scientific responsibility**, National Technical University of Athens (Grèce), Spel-ZExplosa (Portugal). Project period : **1993-1996.**
- CCE Contract – DEBRIS FLOW : *Contribution to the reduction of debris flow damage, with the analysis of triggering factors, initiation, propagation and deposition phenomena, in the alpine region.* Contract EV5V-CT94-0453. **Project coordinator : Armines-CGI, R. Cojean, scientific responsibility**, partners: ONF-RTM (France), Universität Bern (Suisse), GEO7 (Suisse), CNR-IRPI (Italie), CEMAGREF (France), Università degli studi di Trento (Italie). Project period : **1994-1996.**
- CCE Contract – LANDSLIDES : *Landslide evolution controlled by climatic factors in a seismic area. Prediction methods and warning criteria.* Contract EV5V-CT94-0451. Project coordinator : Politecnico di Bari (Italie), **partners : Armines-CGI, R. Cojean, scientific responsibility**, City University (Grande-Bretagne). Project period : **1994-1996.**
- CCE Contract – DEBRIS FLOW RISK : *Debris flow management and risk assesment in the Alpine region.* Contract ENV4-CT960253. Project coordinator : Università di Bologna (Italie), **partners : Armines-CGI, R. Cojean, scientific responsibility**, CEMAGREF (France), CNR-IRPI (Italie), FUBE (Allemagne), ONF-RTM (France), Université J. Fourier (France), Università di Firenze (Italie), Università di Padova (Italie), Università di Trento (Italie). Project period : **1996-1998.**
- CTGPC Contract (China Yangtze Three Gorges Project Development Corporation) and French Government – Fond d’Etude et d’Aide au Secteur Privé : *Contribution to the high rock slope design and monitoring of the permanent shiplock at the Three Gorges Dam Project.* **Project director: Armines-CGI, R. Cojean, scientific responsibility.** Project period : **1998-2001.**
- Fondation MAIF Contract : *Risques naturels et montagne : mouvements de terrain et risques hydrologiques associés et induits. Evaluation des méthodes et moyens de prévention et analyse des retours d’investissement. Information préventive.* **Project coordinator : Armines-CGI, R. Cojean, scientific responsibility**, partners : ONF-RTM (France), CEMAGREF (France), LCPC (France) et CETE-Lyon (France). Project period : **1998-2002.**
- CCE Contract – THARMIT : *Torrent hazard control in the European Alps. Practical tools and methodologies for hazard assesment and risk mitigation.* Contract EVG1-CT 1999-00012. Coordinateur du projet : Università di Padova (Italie), **partners : Armines-CGI, R. Cojean, scientific responsibility**, CEMAGREF (France), CNR-IRPI (Italie), FUBE (Allemagne), Università di Firenze (Italie), Università di Bologna (Italie), Università di Trento (Italie). Project period : **2000-2003.**

- Ville de Paris Contract : *Butte Montmartre et butte Chaumont : Suivi de déformations par interférométrie radar, analyse et modélisation des mouvements du sol*. Project coordinator : UMLV-OTIG, partners : **Armines-Centre de Géosciences, R. Cojean, scientific responsibility**. Project period : **2005-2007**.
- Fondation MAIF Contract : *Aléa et risque sécheresse : Analyse du comportement des sols argileux lors de cycles climatiques extrêmes. Application au risque sécheresse : aide au diagnostic et recommandations*. **Project coordinator : Armines-Centre de Géosciences, R. Cojean, scientific responsibility**, partners : ENPC-CERMES, UMLV-OTIG et CSTB. Project period : **2005-2008**.
- ANR Contract - *HYDROGEOBAT : Impacts géologiques et géotechniques des mouvements de nappes phréatiques sur le bâti : analyse, mesure, simulation, prévention*. **Project coordinator : Armines-Centre de Géosciences, R. Cojean, scientific responsibility**, partners : Centre de Géosciences (ex-CIG), UMLV-OTIG et Ville de Paris. Project period : **2005-2008**
- ANR-RGCU Contract - *ARGIC : Analyse du retrait-gonflement et de ses conséquences sur les constructions*. Project coordinator : BRGM, partners : **Armines-Centre de Géosciences, R. Cojean, scientific responsibility**, CDGA-Université de Bordeaux 1, LMSSMat-Ecole Centrale de Paris, CERMES-ENPC, Ecole Supérieure d'Ingénieurs de Poitiers, Fondasol, INERIS, INPL-LAEGO, INRA, INSA Lyon-URGC, LCPC, Météo-France. Project period : **2006-2009**.
- R2DS Ile-de-France Contract : *Sécheresse géotechnique et bâti. Indicateurs de sécheresse géotechnique et de sinistralité sécheresse*. **Project coordinator : Armines-Centre de Géosciences, R. Cojean, scientific responsibility**, partners : Centre de Géosciences (ex-CIG), UMLV-OTIG, ENPC-CERMES. Project period : **2006-2009**.
- Département de La Réunion Contract) : *Geological and hydrogeological context of the Salazie Amont gallery at La Réunion, France. Analysis of water inflows in the gallery*. **Project coordinator : Armines-Centre de Géosciences, R. Cojean, scientific responsibility**, partner : UMLV-OTIG. Project period : **2008-2010**.
- MEDTTL Contract – ARGIC2 : Sécheresse et constructions. Project coordinator : IFSTTAR, partners : **Armines-Centre de Géosciences, R. Cojean, scientific responsibility**, BRGM, INERIS, CSTB, CDGA-Université de Bordeaux 1, LMSSMat-Ecole Centrale de Paris, Fondasol, INERIS, INPL-LAEGO, INSA Lyon-URGC. Project period : **2010-2013**.

Some recent publications

Cojean R., Audiguier M., coordonnateurs de l'ouvrage «*Géologie de l'ingénieur / Engineering geology. Hommage à la mémoire de Marcel Arnould*», Presses des Mines, collection sciences de la Terre et de l'environnement, (2011) 386 p.

J-P. Magnan, **R. Cojean**, Y-J. Cui, P. Mestat (ed.) : SEC 2008. *Symposium international Sécheresse et Constructions*. Volume 1. 444p. Editions du LCPC. Septembre **2008**.

Cojean R. : *Natural hazards and land use planning in mountainous territories*. Proceedings VI International Conference "Innovation Technologies for Sustainable Development of Mountain Territories". Conférence invitée. Vladikavkaz, Republic of North Ossetia-Alania, Russia, May 28-30, **2007**.

Cojean R. : *La sécheresse géotechnique: une introduction*. Revue Française de Géotechnique. N° spécial « La sécheresse géotechnique », N° 120-121, 3^{ème} et 4^{ème} trimestre **2007**. pp. 7-9.

M. Audiguier, Z. Geremew, S. Laribi, **R. Cojean** : *Caractérisation au laboratoire de la sensibilité au retrait-gonflement des sols argileux*. Revue Française de Géotechnique. N° spécial « La sécheresse géotechnique », N° 120-121, 4^{ème} trimestre **2007**. pp. 69-89.

Cojean R. : *Landslides and rockslides : analysis, modelling, monitoring. Canal excavations in expansive soils*. Project SNWTP. Ministry of Water Resources. Conférences invitées. Beijing, Zhengzhou et Wuhan. Chine. 25 octobre – 2 novembre **2006**.

Pollet N., **Cojean R.**, Couture R., Schneider J.L., Strom A.L., Voisin C, Wassmer P. : *A slab-on-slab model for the Flims rockslide (Swiss Alps)*. Canadian Geotechnical Journal, **2005**. Vol. 42, pp 587-600.

R. Cojean et J-A. Fleurisson : *Géomécanique appliquée au ciel ouvert : Stabilité et dimensionnement des talus. Reconnaissances géotechniques et essais mécaniques des sols et roches*. pp 49-65. In Ciel ouvert mines et carrières 1 – Elaboration des projets. Les Techniques de l'Industrie Minérale. N° 26, Juin **2005**.

Cojean R. : Contribution au *Manuel de mécanique des roches. Tome 2 : Les Applications*. Ouvrage coordonné par P. Duffaut. Les Presses de l'Ecole des Mines. **2004**. 460 p.

Cojean R. : *Les mouvements de versants : une introduction*. Revue Française de Géotechnique. N° spécial «Mouvements de versants », N° 95-96, 2^{ème} et 3^{ème} trimestre **2001**. pp. 5-6.

Cojean R. *Engineering Geology of Construction*. Article **Cojean R.** : *Influence of geological structures in slope stability analyses for open cast mining and quarrying* Geological Society Engineering Geology Special Publication N° 10., pp.321-334, Ed. M. Eddleston, S. Walthall, J.C. Cripps, M.G. Culshaw, **1995**.

Contribution to collective books or technical publications

Fleurisson J-A et **Cojean R.** : Book chapter : *Error reduction in slope stability assessment*. 41 p. in : *Surface Mining Methods, Technology and Systems* coordinated by Jayanta Bhattacharya, Department of Mining Engineering, Indian Institute of Technology, Kharagpur, India. 2013.

J-P. Magnan, **R. Cojean**, Y-J. Cui, P. Mestat (ed.) : SEC 2008. Symposium international Sécheresse et Constructions. Volume 1. 444p. Editions du LCPC.

R. Cojean et J-A. Fleurisson : *Géomécanique appliquée au ciel ouvert : Stabilité et dimensionnement des talus. Reconnaissances géotechniques et essais mécaniques des sols et roches*. pp 49-65. In Ciel ouvert mines et carrières 1 – Elaboration des projets. Les Techniques de l'Industrie Minérale. N° 26, Juin **2005**.

Comité Français de Mécanique des Roches. *Manuel de mécanique des roches. Tome 2 : Les Applications*. Ouvrage coordonné par P. Duffaut. Participation **R. Cojean** au chapitre 28. Collection Sciences de la Terre et de l'environnement. **2004**. Les Presses de l'Ecole des Mines. 460 p.

R. Cojean : *Conception des talus de carrières et mines à ciel ouvert : approche géologique et géomécanique*. Revue Les Techniques de l'Industrie Minérale. N° 10, juin **2001**, pp 51-60 et 135-138. Responsable (co-rédacteur) du numéro spécial « *Mouvements de versants* » de la Revue Française de Géotechnique, **2001**.

R. Cojean, M. Deveughèle, M. Audiguier, J.A. Fleurisson : *Géologie de l'ingénieur, géotechnique et tunnels. Tome 1 : Géologie et géomécanique : concepts de base. 90p. Tome 2 : Géologie de l'ingénieur et tunnels. 80p.* Contrat Bouygues-TP, **Novembre 2001**.

Antoine P, **Cojean R.**, Durville J.L., Landry J., Leroi E., Marie R., Potherat P., Toulemont M., Villain J. (2000). *Guide technique pour la caractérisation et la cartographie de l'aléa dû aux mouvements de terrain.* 72p. Guide réalisé à la demande du Ministère de l'Aménagement du Territoire et de l'Environnement. Publication LCPC. Collection Environnement. 2000.

Mémento des Mines et carrières, Nouvelle série, numéro 4. Article **Cojean R.** (1998). *Stabilité des talus de carrière et mines à ciel ouvert. Principes de dimensionnement.*, pp 212-233. Publication de la Société de l'Industrie Minière. 1998.

Geological Society Engineering Geology Special Publication N° 10. *Engineering Geology of Construction.* Article **Cojean R.** (1995). *Influence of geological structures in slope stability analyses for open cast mining and quarrying*, pp.321-334, Ed. M. Eddleston, S. Walthall, J.C. Cripps, M.G. Culshaw, 1995.

Invited papers, general reports of congresses, internet publications

Cojean R. (2007): *Natural hazards and land use planning in mountainous territories.* Proceedings VI International Conference "Innovation Technologies for Sustainable Development of Mountain Territories". *Invited paper.* Vladikavkaz, Republic of North Ossetia-Alania, Russia, May 28-30, **2007**.

Cojean R. (2006). *Landslides and rockslides : analysis, modelling, monitoring. Canal excavations in expansive soils.* Projet SNWTP. Ministry of Water Resources. *Invited papers.* Beijing, Zhengzhou et Wuhan. Chine. 25 octobre – 2 November **2006**.

Cojean R. (2003). *Risques naturels et montagne : Mouvements de terrain et risques hydrologiques associés et induits. Evaluation des méthodes et moyens de prévention et analyse des retours d'investissement.* *Information préventive.* 43p., site Fondation MAIF. June **2003**.

Cojean R. (2000). *Conception des talus de carrières et mines à ciel ouvert : approche géologique et géomécanique, modélisation et instrumentation.* *Invited paper.* Congrès de la Société de l'Industrie Minière, 14-17 November **2000**, Paris.

Cojean R.(2000). *Triggering factors of debris flows : significant questioning for debris flow hazard analyses.* Congrès EGS 2000 (European Geophysical Society), 25-29 April **2000**, Nice, France. *Invited paper* for the session « Rainfall triggered landslides and debris flows ».

Cojean R. (1997). *Risques naturels et anthropogéniques : risques sismiques et volcaniques, phénomènes de subsidence et de tassement, risques hydrologiques.* *General report* for theme 2 of the International Symposium of Engineering Geology, Athens, Greece, 23-27 June **1997**.

Cojean R. (1995). *Contribution to the reduction of debris flow damage, with the analysis of triggering factors, initiation, propagation and deposition phenomena in the alpine region* *Invited paper* to the Hydrogeological Hazards in the European Union Conference, Bruxelles, 30-31 January **1995**.

Cojean R. (1994). *Roles of water as a triggering factor for landslides and debris flows.* *Invited paper* to the International Workshop on Floods and Inundations related to Large Earth Movements, Trento, Italy, October 4-7, **1994**, pp.A-13-1, A-13-19.

Cojean R. (1992). *Influence of geological structures in slope stability analyses for open cast mining and quarrying*. **Invited paper** to the 28th Annual Conference of the Engineering Group of Geological Society, Manchester, 6-10 September **1992**.

Cojean R. (1992). *Slope stability research in France - Large landslides and rockslides in France and Europe - Nuclear waste disposal research in France*. **Invited papers** to the Institute of Geology at Beijing, July **1992**.

Main expertise work reports

Cojean R. : Guide méthodologique « Actions de l'eau sur les ouvrages souterrains ». Final report. 209p. SNCF Contract. **Juillet 2010**.

Cojean R. : Expertise report on the geological and hydrogeological context of water inflows in the Salazie Amont gallery (La Réunion, France). 185p. **March 2010**.

Cojean R., Durville J-L, Gauchez J., Pothérat P. : Expertise report on landslides and natural dams resulting from the 12-05-2008 earthquake in Sichuan (China). 85p. **December 2009**.

Cojean R. : Expertise report on the Project Goro Nickel - Kwé Ouest Phase 2, for the CTPBOH – Comité Technique Permanent des Barrages et Ouvrages Hydrauliques. 51p. **October 2008**.

Cojean R. : Expertise report related to a Monitoring manual: Stability of tailing dams. Comurhex Contract. **February 2008**.

Deffontaines B., **Cojean R.**, Fruneau B., Magalhaes S., Zokimila P. : Etude des faibles déformations topographiques des buttes Montmartre et Chaumont à partir des nouvelles méthodes interférométriques radar (Dinsar et SPN) et identification de l'origine des mouvements topographiques. 76p. + Annexes. Ville de Paris Contract. **February 2008**.

Cojean R. : Expertise report : Stability of tailing dams. B1 - B6 dams.-. Comurhex Contract. 33p + Annexes. **December 2007**.

Cojean R. : Geotechnical survey of the quarries of Sainte-Colombe-sur-Guette (Aude). IMERYYS Minéraux France SA Contract, 38p. **September 2007**.

Ledoux E, **Cojean R.** et Schmitt J-M : Expertise report on : the storage of tailings from Goro-Nickel project in the Kwé Ouest valley. Province Sud - Nouvelle Calédonie Contract. 145p + Annexes. **August 2007**.

Cojean R. : Expertise report on the geological, geotechnical and hydrogeological context of the quarry of Lepuix-Gy (Territoire de Belfort). 22p. Société des Carrières de l'Est Contract. **January 2007**.

Cojean R. : Expertise devoted to the canal earthworks within the frame of the SNWTP Chinese Project (South North Water Transfer Project). Ministry of Water Resources. China. **November 2006**.

Cojean R., Ledoux E. : Expertise report related to the landslide at Corcelles-Ferrières, Waste disposal center, Société Nicollin Contract. **September 2006**.

Cojean R. : Expertise report on the geological and geotechnical context of the water storage basin at the site of EDF – Les Renardières (Seine-et-Marne). EDF - R&D Les Renardières Contract. **May 2005** and **July 2005**.

Cojean R. : Geotechnical survey of the quarries of Sainte-Colombe-sur-Guette (Aude). IMERYYS Minéraux France SA Contract, 32p., **May 2005**.

Cojean R. : Expertise report on the cessation of mine workings in La Grand-Combe Ouest (Gard) concession. CdF – Direction des Sites Arrêtés et de l’Environnement Contract. **March 2005.**

Cojean R. : Expertise report on the cessation of mine workings in Decazeville-Firmi (Aveyron) concession. CdF – Direction des Sites Arrêtés et de l’Environnement Contract. **September 2004.**

Cojean R. : Geotechnical survey of the quarry of Saint-Jean-de-la-Poterie (35). Charier CM Contract. **July 2004.**

Ledoux E., **Cojean R.** : Expertise report related to the Waste disposal center of St Jean-aux-Amognes (Nièvre). 34 p. Nevers Préfecture. **June 2004.**

Cojean R. : Geotechnical survey of the quarries of la Vallée Heureuse (Pas-de-Calais). SMA-BTP Contract. **April 2004.**

Cojean R. : Geotechnical survey of the quarries of BGP – Granite rose de la Clarté (Côtes d’Armor). SMA-BTP Contract. **February 2004.**

Cojean R. : Expertise report on the rock slope excavations of Briaires, LGV-Est-européenne (Bar-Le-Duc, Meuse). SNCF Contract. **October 2003.**

Cojean R. : Expertise report concerning the subsidence risk assessment at Vimy (Pas-de-Calais). Dillon Consulting Contract. **July 2003.**

Fleurisson J-A., **Cojean R.** : Western Area Audit Report. ECC-IMERYYS Tableware Contract. **March 2003.**

Cojean R. : Geotechnical survey of the quarry of Holcim (Lumbres, 62). Sobesol Contract. **July 2002.**

Cojean R., Vouille G. : Expertise report on A89 - Section 2.3 - Saint-Astier highway. Geotechnical survey of the Cimchaux underground quarry. SETEC-TPI Contract. **May 2002.**

Cojean R. : Rock slope design of the quarry of Origny (Lumbres, Nord). Ciments Holcim Contract. **July 2002.**

Cojean R., Vouille G. : Expertise report on A89 - Section 2.3 - Saint-Astier highway. Geotechnical survey of the Dordognaise underground quarry. SETEC-TPI Contract. **April 2001.**

Arnould M., **Cojean R.** Report on the analysis of slope stability problems in the reservoir of the Three-Gorges dam (China). 50p. **November 2001.** Convention MEFI. Secrétariat d’Etat à l’Industrie. DGEMP-DIMAH.

Panet M., Rat M., **Cojean R.** : Expertise report on the rock slope excavation of the LGV Méditerranée. SNCF Contract. **1995 et 1996.**

Cojean R. : Report on the slope stability analysis of the Timbopeba South wall (Brazil). CVRD (Companhia Vale do Rio Doce) Contract. **June 1993.**

List of geological terrains concerned by expertise works :

BRASIL: CVRD - Companhia Vale do Rio Doce
Minas Gerais province: mining province.

CHINA: *Water Resources Ministry, CTGPC (China Yangtse Three Gorges Project Development Corporation), CWRC (China Water resources Corporation).*

Liaoning province, Hubeï province, Sichuan province: antecambrian granitic bedrocks: deep excavations for civil engineering projects; Carboniferous coal measures: coal mines; Triassic and Jurassic strata : landslides; Quaternary deposits: loesses and canal excavations.

FRANCE : *AREVA, Carrières de l'Est- Groupe COLAS, Comurhex, Charbonnages de France, Charrier CM, Ciments Holcim, -ECC-IMERYYS Tableware, EDF-R&D, IMERYYS Minéraux, Province Sud - Nouvelle Calédonie, SETEC-TPI, SITA FD, SNCF, SMA-BTP, SOBESOL, Société Nicollin, Ville de Paris – IGC.*

Any geological context:

- Ancient bedrocks (Bretagne, Vendée, Limousin, Vosges): opencast mines and quarries, projects of underground waste storage.
- Sedimentary basins (geological strata of Carboniferous, Permian, Cretaceous and Tertiary age): opencast mines and quarries, LGV lines, underground works, landslides.
- Pyrenean and alpine range : landslides, debris flows, opencast mines.
- La Réunion: Piton des Neiges volcano.
- Nouvelle Calédonie: peridotites, laterites.

IRAN : *NICICO (National Iranian Copper Industries Co.)*

Province of Kerman: porphyry copper deposits

MOROCCO: *OCP (Office Chérifien des Phosphates)*

Region of Ben Guérir and Khouribga: Sedimentary phosphate deposits

UNITED KINGDOM: *ECC-IMERYYS Tableware*

Cornwall: kaolin deposits

THAILAND: *EGAT (Electricity Thailand)*

Tertiary sedimentary basin: lignite deposits

TUNISIA: *CPG (Compagnie des Phosphates de Gafsa)*

Region of Gafsa: Sedimentary phosphate deposits