

J.P. Giroud

Statement of Qualifications

Dams

Dr. Giroud became first interested in dams in 1961, when he spent the summer working at a famous consulting company specialized in dams, Coyne & Bellier, in Paris, and performed calculations used in a report to the court for the catastrophic failure of Malpasset Dam, France.

Dr. Giroud designed the first earth dam for which a geotextile was used: Valcros Dam, France (1970). In this 17 m high dam, a geotextile filter was used to wrap the gravel downstream drain. A geotextile was also used in Valcros Dam under the rip-rap for the upstream slope protection. The paper presented by Dr. Giroud on Valcros Dam at the First International Conference on Geotextiles (1977) was one of the highlights of the conference: more than six years of monitoring of the successful performance of the dam had established the credibility of this new approach to the design and construction of filters for dams. More than 30 years after construction, the Valcros Dam drainage system is still performing satisfactorily, as shown by researchers who visited the dam on several occasions, took samples of the geotextile filter and adjacent soil, performed laboratory tests, and wrote papers. Valcros Dam was featured on the cover of the January 1989 issue of *Civil Engineering* (published by ASCE); the cover story consisted in part of an interview of Dr. Giroud.

During the past 31 years, Dr. Giroud has designed geotextile filters for a variety of projects such as landslide repair, tailings dams, waste disposal facilities, etc. In 1982, Dr. Giroud designed geotextile filters for Tyrone Mine tailing dam, USA (1982). In 1982, Dr. Giroud published a now-classic paper on “filter criteria for geotextiles” that establishes the principles on which geotextile filter design has been based ever since. He has taught a series of courses under a contract with the Federal Highway Administration on the design of geotextile applications, including the design of geotextile filters. Dr. Giroud’s expertise on filters is recognized worldwide. For example, he gave the keynote lecture at the international conference on filtration in 1996 (*GeoFilters 96*), and he has been invited to write the chapter on “filter criteria” in the Jubilee volume co-authored by prestigious authors for the 75th anniversary of the publication of *Erdbaumechanik* by Terzaghi. As a result of this contribution to the Terzaghi Jubilee volume, Dr. Giroud received the 2004 IGS Award.

Dr. Giroud also has extensive experience with geomembranes in dams. In 1973, he participated in the design of the first use of a geomembrane/clay composite liner in a dam, Coiroux Dam, in France. In addition, Dr. Giroud has pioneered several geomembrane

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application techniques: first use of a geotextile associated with a geomembrane (1971), first double geomembrane liner with granular drainage layer (1974), and first entirely geosynthetic double liner using a geonet between two geomembranes (1981). These techniques have been used extensively in waste containment facilities and liquid reservoirs and are increasingly used in dams.

Dr. Giroud's experience with large dams and reservoirs using geomembranes also includes his intensive participation in the design of major structures such as La Muela Pump Storage Station (Spain) in 1983, Kuriyama Dam and Reservoir (Japan) in 1985, and Djebel Zioua Reservoir (Algeria) in 1986. In the last project, Dr. Giroud co-authored with J.L. Sherard a comprehensive report evaluating all solutions, including several solutions incorporating geotextiles and geomembranes. (This was J.L. Sherard's last report.) Dr. Giroud also reviewed the design of Helmlo Tailings Dam (Canada) in 1984, and the design of Codole Dam (France), which was at the time of its construction (1983) the second highest dam in the world lined with a geomembrane, and is still one of the highest. In 1990, Dr. Giroud reviewed the design of the heightening of Middle Creek Dam (Montana). Recently (2002), Dr. Giroud provided technical assistance for the conceptual design of the remediation of cracked earth dams in Arizona. In particular, Dr. Giroud conducted a detailed theoretical analysis of the behavior of a geomembrane liner resting on an embankment where cracking develops.

Dr. Giroud has also extensive field experience and, at the request of the geosynthetic manufacturer, has witnessed the installation of geotextiles and/or geomembranes used in large dams such as Frauenau Dam (Germany), l'Ospedale Dam (France), Kilburn Dam (South Africa), Hans Strijdom Dam (South Africa), and Codole Dam (France).

Dr. Giroud has investigated numerous failures of geosynthetics. In 1980, he performed a forensic analysis of a geomembrane failure at Avoriaz dam and reservoir, France, and provided expert testimony for the subsequent litigation. In 1990, he provided an analysis of construction problems at a flood retention dam with a geomembrane core, Signal Buttes Dam in Arizona.

In 1989, Dr. Giroud reviewed for the U.S. Bureau of Reclamation, a report titled "Geotextiles in Embankment Dams". In 1990, he prepared for the U.S. Bureau of Reclamation a two-volume report titled "Geomembranes in Embankment Dams"; this report presents the state of the art on the subject. Dr. Giroud also published several papers on geosynthetics in dams. In particular, Dr. Giroud published a series of two papers titled "Geosynthetics in Dams: Two Decades of Experience", as cover stories for Geotechnical Fabrics Report, in 1992. Also, Dr. Giroud was the lead author of a paper on dam rehabilitation (1993) published in an ASCE volume on Geotechnical Practice in Dam Rehabilitation.

In 1983, Dr. Giroud was general reporter at the Symposium on Waterproofing for Reservoirs, Dams and Canals, Paris, France. In August 1989, Dr. Giroud was guest speaker at the session on Filters in Dams at the 12th International Conference on Soil Mechanics and Foundation Engineering (Rio de Janeiro, Brazil), and he presented a one-day course on geosynthetics in dams to the Dam Safety Section of the State of Montana Department of Natural Resources and Conservation (1989). In April 1991, he presented a state-of-the-art lecture on geosynthetics in dams to the U.S. Committee on Large Dams (USCOLD), in White Plains, New York; and in October 1991 he presented a similar lecture at the annual conference of the Association of State Dam Safety Officials (ASDSO) in San Diego, California. Dr. Giroud taught a 2-day course on geosynthetics in dams for the ASDSO in Scottsdale, Arizona (May 1991) and Atlanta, Georgia (September 1995). In April 1992, Dr. Giroud was the keynote speaker at the Southeastern Dam Safety Conference in Atlanta, Georgia; the subject of his lecture was “The Safe Use of Geotextile Filters and Other Geosynthetics in Dams”. In April 1993, Dr. Giroud was invited speaker at the ASCE Specialty Conference on Geotechnical Practice in Dam Rehabilitation, held in Raleigh, North Carolina. Also in 1993, Dr. Giroud presented a one-day course on geosynthetics in dams to the U.S. Bureau of Reclamation. In February 1999, Dr. Giroud presented a lecture on geomembranes in dams at the annual meeting of the Minnesota Section of the American Society of Civil Engineers (ASCE).

Selected References of Publications Related to Dams

- Giroud, J.P., Gourc, J.P., Bally, P., et Delmas, P., 1977, “Comportement d’un textile non-tisse dans un barrage en terre”, *Proceedings of the International Conference on the Use of Fabrics in Geotechnics*, Volume II, Paris, Avril 1977, pp. 213-218. (in French)
- Giroud, J.P., Gourc, J.P., Bally, P., et Delmas, P., 1984, “Behavior of a Nonwoven Geotextile in an Earth Dam” (English translation of the above) in *Geotextiles and Geomembranes, Definitions, Properties and Design*, by Giroud, J.P., IFAI, 325 p.
- Giroud, J.P., Gourc, J.P., Bally, P., et Delmas, P., 1977, “Commentaires sur le comportement d’un textile non-tisse dans un barrage en terre”, *Proceedings of the International Conference on the Use of Fabrics in Geotechnics*, Volume III, Paris, Avril 1977, pp. 68-71. (in French)
- Giroud, J.P., Gourc, J.P., et Bally, P., 1977, “Premiere utilisation d’un textile non tisse dans un barrage en terre en France”, *Conference Europeenne de la CIID*, Theme 3, Rome, Mai 1977. (in French)
- Giroud, J.P., 1985, “Geomembrane-Lined Dams in Europe”, *Proceedings of the Geotechnical Fabrics Conference ‘85*, IFAI, Cincinnati, OH, June 1985, pp. 66-69.
- Giroud, J.P., 1987, “A comment by the President of the IGS”, *Water Power & Dam Construction*, Vol. 39, No. 3, March 1987, p. 15.
- Giroud, J.P., 1989, “Are geosynthetics durable enough to be used in dams?”, *Water Power and Dam Construction*, Vol. 41, No. 2, February 1989, pp. 12-13.

- Giroud, J.P., 1990, "Discussion of 'Engineering Geosynthetics in Design and Construction of Jibiya Dam' by Sembenelli, P.", *Proceedings of the Fourth International Conference on Geotextiles, Geomembranes and Related Products*, Vol. 3, The Hague, The Netherlands, May 1990, p. 1083.
- Giroud, J.P., 1990, "Discussion of 'Results of Seventeen Years of Using Geomembranes in Dams and Basins' by Alonso, E., Degoutte, G., and Girard, H.", *Proceedings of the Fourth International Conference on Geotextiles, Geomembranes and Related Products*, Vol. 3, The Hague, The Netherlands, May 1990, p. 1084.
- Giroud, J.P., 1990, "Functions and Applications of Geosynthetics in Dams", *Water Power and Dam Construction*, Vol. 42, No. 6, June 1990, pp. 16-23.
- Giroud, J.P., 1991, "Geosynthetics in Dams", *IGS News*, Vol. 7, No. 3, November 1991, pp. 12-13
- Giroud, J.P., 1991, "*Embankment Dams - Geomembranes*", U.S. Bureau of Reclamation Design Standards, No. 13, Chapter 20, 302 p.
- Giroud, J.P., 1992, "Geosynthetics in Dams: Two Decades of Experience", *Geotechnical Fabrics Report*, IFAI, Jul-Aug 1992, pp. 6-9, and September-October 1992, pp. 22-28.
- Giroud, J.P. and Gross, B.A., 1993, "Geotextile Filters for Downstream Drain and Upstream Slope", *Geosynthetics Case Histories*, Raymond, G.P. and Giroud, J.P., Eds., ISSMFE, pp. 2-3.
- Giroud, J.P., 1993, "Geosynthetics in Dams", *Geosynthetics World*, Vol. 3, No. 1, March-April 1993, pp. 26-28.
- Giroud, J.P. and Bonaparte, R., 1993, "Geosynthetics in Dam Rehabilitation", *Geotechnical Practice in Dam Rehabilitation*, Anderson, L.A., Editor, ASCE Geotechnical Special Publication 35, Proceedings of a Conference held in Raleigh, N.C., USA., April 1993, pp. 1043-1074.
- Giroud, J.P., 1996, "Granular Filters and Geotextile Filters", *Proceedings of GeoFilters '96*, Lafleur, J. and Rollin, A.L., Editors, Montréal, Canada, May 1996, pp. 565 - 680.
- Giroud, J.P., 2003, "Filter Criteria", pp. 221-259, in *Jubilee Volume, 75th Anniversary of K. Terzaghi's "Erdbaumechanik" ("Soil Mechanics")*, H. Brandl, Editor, Reports of the Institute for Soil Mechanics and Geotechnical Engineering, Technical University of Vienna, Austria, 378 p.

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