

**Curriculum Vitae
LUCIANO BARBARO****BIRTH:** 1939, Milano, Italy**NATIONALITY:** Italian**PROFESSION:** Civil Engineer, CADD specialist**EXPERIENCE:** 47 years**EDUCATION:** Diploma as assistant civil engineer: Istituto Tecnico per Geometri Carlo Cattaneo, Milan, Italy, 1959**LANGUAGES:** Italian: mother tongue, Spanish: excellent**PROFILE:**

In over 47 years of professional activity Luciano Barbaro took part to the preparation and development of many projects both specific and multipurpose, working and living in Italy and abroad. More in detail he participated to the preparation of projects for hydroelectric power plants, thermal power plants and industrial plants. During recent years, his main activity has been related to the design of earth structures such as dams and high reinforced soil structures.

He is an expert in computer aided design and computer software for graphics in two and three dimensions, such as the digital terrain modeling.

During his career Luciano Barbaro took part and has been responsible, in various degrees, of more than 200 projects.

In the field of earth structures he has been involved in the design and carried out construction and detailed design of Pappadai, main and secondary dam, of Cannamasca dam, both in Italy, of Champagne and Verrand, high reinforced soil structures both along the Aosta - Mount Blanc Motorway in Italy. For the mentioned structures a 3D CAD model has been created. He was also in charge of the three dimensional modeling of the existing earth dam of San Valentino in Italy and the subsequent construction drawing for the remedial works.

Within large project he was involved in the design of various civil works, such as the power house for the Caorso Nuclear Power Plant in Italy, the civil works of the Mers El Adjadj Thermal Power Plant in Algeria and the civil works for the Mexicali Geothermal Power Plant in Mexico. As resident chief designer he was involved in the design of the civil works of Charcani Hydroelectrical Power Plant in Perù.



PROFESSIONAL EXPERIENCE

1990 - to date SC-SEMBENELLI CONSULTING Ltd., incorporated from the private practice of PIERO SEMBENELLI CONSULTANT - MILAN, Italy, active since 1983.
(Civil Engineer CADD specialist)

He is now working on **Kerrada Dam (Algeria)**: He followed the designing steps and development of the 3 dimensional CAD model of: diversion and approach tunnels, earthfill dam, intake tower and conduits under the embankment, Foundations and construction materials investigations.

During **2006** he carried out the design at tender level of the cofferdam, approach tunnel, intake structure, power house and tail channel of the **La Colorada Hydropower Station, Venezuela**. He carried out 2 different solutions, as requested by CADAPE, the selected of one stage and the second of two stages.

During 2005 he carried out the detailed Design of **A9 Lainate – Como Motorway**. Widening from 4 to 6 lanes a section of A9 Motorway open to traffic including the construction of 4 modified interchanges, 4 main bridges, 11 flyover, 23 railway, road and pedestrian underpasses. Study and detailed design of 3 different types of flyovers.

In the same period he carried out the Tender Design and landscaping works of rehabilitation works, consisting in a new spillway grout and drains curtain, new monitoring system on concrete gravity dams, of **Val Noci Dam (Italy)** in operation since 1950.

He study an alternative solution in order to support the rock slopes along the costal road of **Rocade Mediterranée (Marocco)**.

2003 – 2004

He followed the designing steps and development of the 3 dimensional CAD model of **Borde Seco Dam, in Venezuela**, during the construction of a **40 to 50 m deep, concrete diaphragm wall**, which will improve the waterproofing of the sandstone abutments. Defining site roads, slopes, embankments, instrumentation etc.

From 2002 to 2005 he was involved in the construction design of **State Hygway SS18 (Italy)**. Viaducts foundations for 5 viaducts on 91 piers up to 60 m high in sismic region. Detailed design and assistance to jobsite during construction of a 12 m wide tunnel in poor rock. Geotechnical engineering for earth supporting structures and high cut slopes stabilization in clay.

He carried out the Preliminary, Detailed and Construction Design of **A4 Milano – Bergamo Motorway**. Widening from 6 to 8 lanes a section of A4 Motorway open to traffic including the construction drawings of all concrete structures of 2 interchanges, 2 bridges (65 and 163 m long), 1 railway flyover (90 m span), 36 flyovers, 5 pedestrian crossings, 6 underpasses, 13 emergency exits, vegetated anti-noise barriers for an overall length of 30 km, landscaping works in many areas surrounding the motorway



Kouhrang Reservoir (Iran): design of the liner for a head pond of a hydro plant at 2300 m. Study of the annular embankment and design of the steps to achieve proper drainage and anchoring of a permanent, thin, composite liner made of a PVC geomembrane coupled to a Polyester nonwoven geotextile. The side slopes are set at a 1.7 H / 1 V. The pond's bottom is sloping at 4 % toward the intake lip.

In 2002 worked on the design for waterproofing of the abutments of **Borde Seco Dam, Venezuela.**

In the 2001 he followed the designing steps and development of the 3 dimensional CAD model of **Caliraya, Filipinas.**

Between **1999** and **2001** he designed the **Brescia METROBUS**, Italy, a Light Transport System some 32 km long, which crosses the city of Brescia and extends over the nearby Val Trompia. The line is partly underground and partly on bridges. The central underground section underpasses the sensitive architectural environment of downtown Brescia. As a result of the above activities, requested under two different assignments, two tender design were produced for a 'Design and Build' type of contract.

In **1999**, he carried out the final design for the upgrading of 42 km **A4 Milan - Brescia highway** between Milano and Bergamo, in northern Italy.

In **1998** he designed the **Como Urban Tunnel** and city interchanges, length 3 Km, width from 7.4 to 18.9 m, with an excavation surface from 52 to 149 m². Design of the tunnels, of the tunnel entrances and junctions with the existing streets.

He carried out the detailed design and the construction drawings for the high cuts and embankments in expansive clays along the **Caracas-Cua new Railway Line, Venezuela**, for the cofferdams, dewatering and excavations of **Ghazi Barotha Dam and Channel in Pakistan.**

In the same year he developed the design of the review, upgrading of the bidding for BOT/EPC **Hydroelectric projects of Matiltan in Pakistan (90 MW).**

In **1997** followed the designing steps and development of the 3 dimensional CAD model of the **Protection works from rockfall along the SS11 Road at Preabocco, Verona, Italy**, and the Preliminary Design of the **Motorway Extension raccordo autostradale di Trieste, Italy.**

In the same year, he carried out the design at construction level of the cofferdam, approach tunnel, intake structure, power house and tail channel of the **Yguazu Hydropower Station, Paraguay.** An alternative design with a 3 unit consisting of a reversible pump and downstream weir and tail pond was also produced.

In the same year, he carried out the final design modification to the embankment and diversion works of **Taksebt dam** and followed the new design for grouting galleries.



From **1996** he developed the study for the execution and the final designs of the excavation for the foundations of **Verrand High Reinforced Soil Structure** and the **Exit of Courmayeur, Mont Blanc Highway**, and a reinforced soil structure of the **Termal Power Plant at Brindisi Sud in Italy**.

In the same year, he carried out the final designs of the **Ajiwa Dam Spillway in Nigeria**.

During **1995** he followed the design and the 3 D modeling of **Castellaccio Tunnel, Arezzo, Italy** and carried out the construction designs of **Waterproofing the Upstream Face of Bovilla Dam, Albania**

In **1994** he has carried out the study of construction phases and construction drawings for the concrete diaphragms supporting the excavation of a 360 m long section in swampy ground for a heavy concrete **structure connecting the Brindisi North and Brindisi South Power Plants, Italy**. The structure houses a service road, a pipeline, conveyor belts and other facilities.

In the same year, he was in charge of the geometrical modeling of the existing **San Valentino Dam in Northern Italy**. On the basis of the available technical documentation, relevant to the dam built in 1947, of the updated topographical survey and of the geotechnical, geophysical and hydrological investigations, he created the 3D model of the dam, underground structures and its foundation.

Subsequently he carried out the construction drawings of the remedial works consisting in a grout curtain 350 m long and 70 m in depth. He also followed the construction drawings of **Ertan upstream and downstream cofferdams, in the P. R. of China**. The cofferdams were 170 and 260 m long, 30 and 60 m high, for a total volume of 3 millions m³ earthfill, part of which has been dumped underwater.

From **1992 to 1993** he carried out the detailed design and the construction drawings for **Cannamasca dam in Italy**, a 427 000 m³ zoned fill earth and rock fill, including drainage and rain-waters control structures and the construction drawings for the **Verrand High Reinforced Soil Structure in Northern Italy**, located along the Aosta - Mount Blanc Highway. The embankment is 150 m. long, 37 m. high and with slope angles of 60° over the horizontal. In the same years he carried out the layout of the new tool station and service area, including buildings housing offices, equipments and stores, of the **Milano Nord barrier for the Italian A8 Motorway**.

From **1990 to 1991** he made the construction drawings for **Champagne High Reinforced Soil Structure in Italy**, 400 m long and 27 m high, located on the Aosta - Mount Blanc motorway and for **Val Ferrua embankment in Italy**, a structure 600 m long, located on the Torino-Savona motorway and the detailed drawings for **Pappadai dam in Southern Italy**, a 700000 m³ homogeneous calcarenite fill with a bituminous impervious liner (27 600 m²), including 4 secondary earth dams waterproofed with a PVC liner on the upstream slope, bottom outlet tunnel, gate shaft and the appurtenant works.

He made the final and detailed drawings for the **refurbishment, with a PVC liner, of Zollezzi concrete arch dam in Italy**.



1984 - 1990 ELC - ELECTROCONSULT, MILAN, Italy
(Civil Engineer CADD Specialist)

From **1988 to 1990**, for the feasibility study of the 2 x 20 MW **Latera Geothermal Power Plant in Italy** he carried out the three-dimensional CAD modeling of the **power house** and appurtenant works. Subsequently he made the layout and the construction design of the **6 km. long inlet steam pipes** and of the **12 km long outlet pipes**.

In the same years, for the feasibility study of the **Cayor Water Supply in Senegal** consisting in **600 km of pipelines**, he designed the intake work, pumping stations, profiling of the pipeline and treatment plant.

In **1987**, he prepared all construction drawings and the three dimensional CAD model of the grouting and drainage curtains for **Gezende dam in Turkey**, 100 m high with double curvature.

In **1984 - 1986**, he carried out the construction designs of the **line and stations for a 10 km section of the Milano-Lecco railway in Italy** including the infrastructures for the Airuno town.

1980 - 1983 ELC - ELECTROCONSULT, MILAN, Italy
(Resident Chief Design)

He carried out the construction drawings of the intake, tunnels (10 km), penstock (820 m of drop), underground powerhouse and buildings **at the job site** of the 3 x 50 MW **hydroelectric power plant Charcani in Perù**.

1967 - 1980, ELC - ELECTROCONSULT, MILAN, Italy
(Civil Engineer)

From **1976 to 1980**, he carried out the contract and detailed design of concrete and steel structures of the 1 x 50 MW **Thermal Power Plant of Cebu in Philippines**, coal fired and of the **Mers El Adjadj 3 x 175 MW Thermal Power Plant in Algeria**.

From **1974 to 1975**, he carried out contract design of civil works of the 1 x 150 MW **Bataan Thermal Power Plant in Philippines** and of the n. 10 **Las Minas Thermal Power Plant (1 x 150 MW) in Panama**. He carried out the detailed design of road works and of the **main sheds dockyard for the Thay Navy in Bangkok, Thailand**.

From **1972 to 1974** he was involved in the design and carried out the detailed design of the **power house** for the 1 x 860 MW **Caorso Nuclear Power Plant in Italy** and he carried out the contract drawings of the n. 4 **Las Minas Thermal Power Plant (1 x 40 MW), in Panama**.

From **1970 to 1971** he carried out the contract design and detailed drawings for the **powerhouse** structures of the 2 x 37.5 MW **Geothermal Power Plant Mexicali in Mexico**.

From **1967 to 1969** he carried out the detailed design of **all civil works** for the 1 x 125 MW **Bocamina Thermal Power Plant in Chile**, a coal fired plant.

1963 - 1966 Prof. LOCATELLI - Ing. DE BERNARDINIS - MILAN, Italy



(Assistant Civil Engineer)

He was involved in the design of reinforced concrete and steel structures and inspected the jobsites during construction of **large concrete structures in Milan, Italy** such as an **underground three-storey car park** (total area: 80,000 m²), of the **skyscraper for the Council Technical Bureau** (95 m high), of the **Turati skyscraper** (80 m high), of the **Siemens plant** and of a curved multi-spans **flyover**.

1959 - 1962 IMPRESA GUFFANTI, MILAN, Italy
(Assistant Civil Engineer and cost estimate)

He took part in the contract design of the **Termini - Cinecittà section of the Rome Subway in Italy**.

He took part in the preparation of the construction drawings and inspected the jobsite during the construction of a **section of the Milan subway underpassing** the foundation of the historical **Sforzesco Castle** and of the **Montecatini Plant in Bolzano in Italy**.
