

THE SWISS GIOVANNI LOMBARDI IN THE HISTORY OF CIVIL ENGINEERING OF XXI CENTURY

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SUMMARY

The history of Civil Engineering in XXI century as well as the history of dams is still to be written. We could certainly begin with the eminent Swiss engineer Giovanni Lombardi (1926-2017), a genius in the field of structural engineering and tunnel construction. He built many “cathedrals of energy” around the world: dams or hydroelectric power stations, introducing innovative solutions in design and calculation. This progress was linked to economic and social pressures of the same period, including the energy (oil) crisis and the need to increase the dam’s reservoirs. His main structures are Muttsee dam (CH), Zeuzier dam (CH), Contra dam (CH), Zimapan dam (MX) and also railway and road tunnels (Gotthard, Gibraltar). This paper aims to outline the history of Giovanni Lombardi through his pioneering mind, his scientific contribution, and technical innovation in a Swiss and global context, highlighting how his engineering can be considered an art.

Keywords: *Switzerland Civil Engineering History, Giovanni Lombardi, Dams, Tunnels, Geo-engineering, Culture And Art Of Engineering, Polyvalent Engineer*

1. GIOVANNI LOMBARDI’S BACKGROUND

The particular predisposition for civil engineering (1926 – 2017) comes from the family environment. His father, a civil engineer who emigrated to France, had started his two children to the profession. There is evidence that Giovanni and his brother Giacomo (deceased in his youth) were already able to perform static calculations upon arrival at the Zurich Polytechnic. France being at war, the father sent the brothers to study in his native Switzerland. This is how Giovanni Lombardi trained at the Federal Polytechnic of Zurich, where he graduated in 1948. In the same University he obtained a doctorate degree in technical sciences in 1955 with the thesis *Thin vaulted dams* under the guidance of a young assistant of similar age, the future great bridge engineer Christian Menn (1927-2018). This thesis will mark the beginning of his brilliant and long career in the field of dams and underground works worldwide. After graduating in 1948 he began working at the studio of Henri Gicot (1897 – 1982) author of the Gotteron Bridge and in turn a pupil of H. Gruner (1873 – 1947), father of Edward Gruner who in 1948 will present a two-storey tunnel for the Gotthard railway tunnel, combined for road and railway (Fig.2). Henri Gicot is instead recognized as one of the leading dam designers in Switzerland: he collaborated in the pioneering project of the Montsalvens dam at Broc, signed the projects for the Rossens arch dam and then the first double curvature dam in Switzerland, the Les Toules on the Gran San Bernardo, and the very original Hongrin double arch dam. It is evident that this experience definitely marked the career of Lombardi, who, between 1952 and 1955, was employed in the studio of Arnold Käch (1914-1998) in Berna, a well-known designer of hydroelectric plants. In 1955, after obtaining his doctorate, he founded the Lombardi & Gellera Engineering firm in Locarno, Ticino, with Giuseppe Gellera, his college friend. The engineer Marceline Protti - Jaeger (1927), a colleague of the same age, also highlighted Lombardi’s environmental sensitivity and capacity for innovation during a seminar of Energy held in Ticino in 2018: she recalls that both of them began their career in water purification (Fig.1a, b). Exercising in a discipline at the