

- a. **Name** Giorgio DIANA
- b. **Year of Birth** 1936
- c. **Citizenship** Italy
- d. **Company** Politecnico di Milano
- e. **Present Position** Professor of Dynamic and Vibration of Machines

f. Education and Qualifications

Mechanical engineering degree from Politecnico di Milano 1961
 Member of the Senato Accademico of Politecnico di Milano,
 Coordinator of the research in the Transport Area (structures, vehicles, logistics) of Politecnico di Milano,
 Member of Cigre (Conférence Internationale des Grandes Réseaux Electriques à Haute Tension) WG11-SC22 - Chairman of TF1,
 Member of the Technical Committee for Rotordynamics of IFToMM (International Federation of Theory of Machines and Mechanisms) - actually he is the President of this Committee,
 Member of the interim Steering Committee (together with N.Jones, A.Larsen, M.Matsumoto, C.Baker and T.Miyata) of an International Organization that focuses on Bridge Aerodynamics (honorary chair: Bob Scanlan). In particular he has the chair of the Working Group 'Benchmark Study' which will focus on comparison of different approaches in the study of the Bridge Aerodynamics (model vs model, predictions against full-scale data or full aeroelastic model data) - candidate structures are Akashi-Kaikyo, Messina, Humber, Hoga Kusten and Normandie.

g. Relevant Experience

Key Data – Professor Diana has carried out research work in the fields of fluid-elasticity, aero-elasticity (vibrations of bridges and structures), rotor-dynamics, vibration problems in mechanical engineering, railway vehicles dynamics and interaction between pantograph and catenary. On these subjects he has authored more than 150 papers presented at national and international conferences or published on specialised reviews.

Presently he guides a research team of about 20 people, professors and researchers of the Dipartimento di Meccanica of Politecnico di Milano. The team is involved in researches on fluid-elasticity and aero-elasticity, mainly for what concerns fluid-induced vibrations of structures and bridges. Large laboratory facilities are available in the Department, both for dynamic characterisation and fatigue testing of structures. Moreover, an important boundary-layer wind tunnel, which is going to be the largest in Europe, will be ready to work by the end of this year.

Expertise Relevant to Route 10 – As an expert in the field of aeroelasticity, Professor Diana has been called from the first beginning as a consultant of Stretto di Messina Society for the project of the Messina Straits Bridge. This fact gave rise to a series of studies and researches on the Super Long Bridges Aerodynamics and to the development of sophisticated computation methods and wind tunnel testing procedures which are described in a series of scientific publications partly reported in the following list of publications.

He is responsible for the Messina Straits suspension bridge design for the aeroelastic aspects and for the train runnability. He optimised the deck shape (box girder number and transparency index) and designed all the aerodynamic deck detail; e.g. the wind barriers with incorporated aerodynamic dampers.

He also made all the wind tunnel tests related to the Messina Project (on deck sectional models and on bridge full aeroelastic model), executing all the computations relevant to the bridge response to the turbulent wind and to the road and railway runnability analysis.

Professor Diana was also called by the Public Works Research Institute of the Japan Ministry of Construction for a Seminar in Tsukuba (Japan) on 'Analytical and Wind-Tunnel Simulations for the Aeroelastic Design of the Messina Straits Bridge'. He collaborated with the Honshu-Shikoku Bridge Authority for train runnability problems.

He is the chairman of the Working Group 'Benchmark Study' of an International Organization that focuses on Bridge Aerodynamics (honorary chair: Bob Scanlan): the comparison of different approaches (among those, the one developed by Professor Diana research team) in the study of the response of super long bridges to the turbulent wind (model vs model, predictions against full-scale data or full aeroelastic model data) will be the goal of this Working Group.

Relevant Projects

- **Messina Straits Crossing Project, Italy** - Professor Diana has been consultant for Stretto di Messina Society and he is responsible for the aeroelastic aspects of the design of the Messina Straits Suspension Bridge and for the road and railway runnability. He executed all the computations relevant to the bridge response to the turbulent wind and to the road and railway runnability analyses.
- **High Speed Railway Lines, Italy** - National Coordinator of the CNR project PFT2.
- **High Speed Railway Project, Italy** - Consultant of ABB.

Consultant of FS (Railway State Company) for the high speed track design.

Consultant of FS (Railway State Company) for the railway runnability of the high speed line main bridges: Piacenza cable stayed bridge and Sieve bridge.

- **Pantograph-catenary Interaction** - Consultant of ABB.
- **Vibration and noise induced by road and rail traffic** - Consultant of ATM (Milan Transportation Authority) both for under-ground and surface traffic.
- **Wind response of High Voltage Overhead Transmission Line Crossings** - Consultant of Utilities in several countries and Contractors: Cadafe and Edelca in Venezuela for the Orinoco and Lago de Maracaibo Crossings, ABB for the Gheshm Strait Crossing in Iran and the Yangtze River Crossing in China.
- **Millenium Wheel (British Airways London Eye)** - Consultant of Tensoteci (cable supplier) for the study of the damping system to protect the wheel cables and stays against the wind induced vibrations.
- **Current and waves action on submarine cables and offshore structures** - Consultant of Pirelli Cables and AGIP.
- **Rotordynamics and Fluid Induced Vibrations** - Consultant of ENEI (Italian Electricity Board) and other Italian societies for problems of rotodynamics and fluid induced vibrations.

h. Employment History

1980 - Present	Politecnico di Milano	Professor of Dynamic and Vibration of Machines
1996 - Present		Member of the Senato Accademico
1998 - Present		Coordinator of the research in the Transport Area
1990 - 1995		Director of the Mechanical Department
1988 - 1994		Member of the Administration Board
1974 - 1980	Politecnico di Milano	Professor of Applied Mechanics
1971 - 1974	University of Cagliari	Professor of Applied Mechanics
1963 - 1971	Politecnico di Milano	Assistant Professor of Applied Mechanics

i. Publication related to Aeroelastic Problems

R. Claren, G. Diana
 "Dynamic strain distribution on loaded stranded cables".
 IEEE Winter Power Meeting 1969, 69 TP 73

R. Claren, G. Diana, F. Giordana, E. Massa

“The vibrations of transmission line conductor bundles”.
71 TP 158 PWR - IEEE Winter Meeting, 1971

A. Carpena, G. Diana
“Behaviour to wind action of angle and T bars on H.V. Lattice structures”.
Presentato all’IEEE Summer Power Meeting 1971

G. Diana, M. Falco, M. Gasparetto
“On vibrations due to vortex shedding induced on two cylinders with one in the wake of the other”.
Meccanica, n. 3, 1976

G. Diana, M. Falco, M. Gasparetto
“On the flutter instability of a suspension bridge using the finite element method”.
77 DET 140, ASME 6th Vibration Conference, Chicago, Sept. 1977

G. Diana
“Interazione struttura - vento”.
Accademia Nazionale dei Lincei, Convegno sull’attraversamento dello Stretto di Messina e sua fattibilità, luglio 1978

R. Claren, G. Diana, G. Di Giacomo
“An approach to vortex shedding under turbulent air flow on a single vibrating cylinder”.
IEEE 1979 Summer Meeting, N.Y., July 1979.

G. Diana, F. Donazzi, M. Falco, Peng Guoxun
“Induced oscillation on a cylinder at high Reynold’s number due to vortex shedding”.
NHL Int. Symposium on Hydrodynamics in Ocean Engineering, 1981

G. Diana, M. Falco, M. Gasparetto
“The dynamic behaviour of a large span suspension bridge, Part I^a : Response to a seismic excitation”.
“Costruzioni Metalliche”, n. 1, 1982

A. Curami, G. Diana, M. Falco, A. Manenti
“ A method to define the efficiency of damping devices for single and bundled conductors of EHV and UHV lines”.

F. Brancaleoni, F. Cheli, G. Diana
“The railway runnability of long span suspension bridges”.
IABSE Congress, Helsinki, June 1998

F. Brancaleoni, F. Cheli, G. Diana
“Structural aspects of long span suspension bridges behaviour in construction”.
IABSE Congress, Helsinki, June 1998

F. Cheli, G. Diana, A. Manenti, P. Nicolini, F. Tavano
“Oscillation of bundle conductors in overhead lines due to turbulent wind”.
IEEE P.E.S., 1990 Winter Meeting, Atlanta (Georgia), February 4-8/1989

G. Diana, M. Falco, R.T. Severn, M.L. Stockwell
“Wind effects on a long span suspension bridge”.
Structures Congress ’91, Indianapolis (Indiana), May 1991

F. Cheli, G. Diana, F. Fossati, A. Manenti
“Aeolian vibrations of overhead transmission lines computation in turbulence conditions”.
First Int. Symposium on Computational Wind Engineering, Tokyo, August 1992

J.M.W. Brownjohn, A. Collina, G. Diana, A. Zasso
“Suspension bridge parameter identification in full scale test”.
8th Int. Conf. on Wind Engineering ICWE, London, Canada, June 1991, (lavoro presentato anche al Seminario
“Identificazione strutturale: Metodi dinamici e diagnostica”, ISMES, Bergamo, ottobre 1992)

A.Damsgaard, G. Diana, G.L. Larose, M. Falco

“Wind tunnel investigations of the tower for the Stretto di Messina Bridge”.
IN VENTO 92, Capri, 25-27 ottobre 1992

G. Diana

“Aeroelastic study for long span suspension bridges: the Messina Crossing”.
ASCE Structures Congress XI, Irvine (California), April 1993

S. Bruni, F. Cheli, A. Collina, G. Diana

“Interaction between railroad superstructure and railway vehicles”.
13th IAVSD Symposium on Dynamics of Vehicles, Chengdu, Sichuan (China), August 23-27, 1993

S. Bruni, A. Cigada, A. Collina, G. Diana

“Turbulence effect on flutter velocity of long span suspended bridges”.
Journal of Wind Engineering and Industrial Aerodynamic, 48, 1993

S. Bruni, F. Cheli, A. Collina, G. Diana, G.L. Larose

“Comparison between wind tunnel test on a full aeroelastic model of the proposed Messina Bridge and numerical results (part II^a)”.
IAPSOWE III Symposium, Hong Kong, December 13-15, 1993

M. Boccione, G. Diana, A. Manenti, A. Zasso

“Passive control system for reducing hangers wind induced vibrations design criteria and application to Messina Straits Bridge”.
IABSE/FIP Int. Conference, Deauville (France), October 1994

F. Cheli, G. Diana, F. Resta

“Time domain aeroelastic force identification on bridge decks”.
9ICWE, New Delhi, India, 09/13 January 1995

S. Bruni, F. Cheli, A. Collina, G. Diana

“Super long suspension bridges: railway runnability”.
15th IABSE Congress Proceedings, Copenhagen, Denmark, 1996

S. Bruni, F. Cheli, A. Collina, G. Diana, A. Zasso

“Aerodynamic design of very long-span suspension bridge”.
IABSE Symposium on Long-Span and High-rise Structures, Kobe (Japan), 2-4 settembre 1998, pagg. 13

S. Bruni, F. Cheli, A. Collina, G. Diana, F. Natoni, G. Traini

“Noise and vibration induced by train: the case of the Messina bridge”.
IABSE Symposium on Long-Span and High-rise Structures, Kobe (Japan), 2-4 settembre 1998, pagg. 6

F. Cheli, A. Cigada, G. Diana, M. Falco

“Experience gained in the Messina bridge aeroelastic project”.
ISBAP 98 Proceedings International Seminar on Long Span suspension bridge aerodynamic perspective 98, Kobe (Japan), 1-3 marzo 1998, pagg. 19