INFORMAZIONI PERSONALI

Paolo Emilio Lino Maria Pennacchi

skype

Sesso | Data di nascita | Nazionalità

POSIZIONE RICOPERTA

Professore Ordinario di Meccanica Applicata alle Macchine presso il Politecnico di Milano

ESPERIENZA PROFESSIONALE

da 2010 a oggi — Professore Ordinario di Meccanica Applicata alle Macchine presso il Politecnico di Milano

da 2003 a 2010 — Professore Associato di Meccanica Applicata alle Macchine presso il Politecnico di Milano

da 1999 a 2003 — Ricercatore di Meccanica Applicata alle Macchine presso il Politecnico di Milano

- Presidente della commissione paritetica della Scuola di ingegneria Industriale e dell'Informazione dal 2013
- Vice Preside della Scuola di Ingegneria Industriale dal 2011 al 2012
- Membro della giunta del Dipartimento di Meccanica dal 2007 al 2010
- Membro del collegio di dottorato in Ingegneria Meccanica dal 2008
- Membro della giunta del Campus di Piacenza dal 2006
- Coordinatore delle tesi di laurea e laurea magistrale della scuola di Ingegneria Industriale dal 2006 al 2010
- Responsabile dei laboratori didattici e sperimentali del Campus di Piacenza dal 2003
- Membro del consiglio di corso di laurea in Ingegneria Meccanica ed Energetica dal 2003
- Segretario delle tesi di laurea e laurea magistrale in Ingegneria Meccanica e Ingegneria dei Trasporti dal 2003 al 2010

- Visiting professor presso Tongji University, Shanghai, PRC, maggio-giugno 2011
- Visiting professor presso NMAU, National Metallurgical Academy of Ukraine, Dnepropetrovsk, Ukraine, dal 2007 al 2009
- Visiting professor presso Bharat Heavy Electrical Industries, Corporate Research and Development, Advanced Technical Education Centre, Vikasnagar, Hyderbad, India, dicembre 2005
- Visiting professor presso UNICAMP-University of Campinas, Campinas, Brazil, febbraio 2005
- Visiting professor presso il Birla Science Centre, Hyderabad, India, settembre 1999

Attività o settore: Istruzione universitaria

ISTRUZIONE E FORMAZIONE

da 1994 a 1997 — Corso di dottorato di ricerca in Meccanica Applicata, IX ciclo, Politecnico di Milano — Ph.D. degree

da 1986 a 1993 — Corso di laurea (ciclo unico) in Ingegneria Gestionale, Politecnico di Milano — M.Sc. degree

COMPETENZE PERSONALI

Lingua madre: Italiano

Altre lingue

	COMPRENSIONE		PARLATO		PRODUZIONE SCRITTA
	Ascolto	Lettura	Interazione	Produzione orale	
Inglese	C2	C2	C2	C2	C2
Spagnolo	C2	C2	C2	C2	C1

Competenza digitale

AUTOVALUTAZIONE				
Elaborazione delle informazioni	Comunicazione	Creazione di Contenuti	Sicurezza	Risoluzione di problemi
Utente avanzato	Utente avanzato	Utente avanzato	Utente avanzato	Utente avanzato

- Ottima padronanza degli strumenti della suite per ufficio (elaboratore di testi, foglio elettronico, software di presentazione)
- Ottima padronanza dei programmi per la modellazione matematica Matlab, Simulink

Competenza tecniche e scientifiche

Nel corso della mia carriera sono stato titolare di corsi quali: “Meccanica applicata alle macchine”, “Fondamenti di meccanica teorica ed applicata (per ingegneria energetica)”, “Operation and control of machines for power generation” che mi hanno permesso di sviluppare notevoli competenze nei settori della produzione di energie elettrica e delle relative macchine.
In questo ambito sono stato e sono anche responsabile di progetti di ricerca relativi alla cogenerazione, al micro-Hydro, alla produzione di energia ed alla sua trasmissione, tra cui i più recenti sono:

- 2016 – Terna Terna Rete Italia S.p.A.: Attività di ricerca nel settore della prevenzione ed eliminazione dei sovraccarichi di ghiaccio e neve sulle linee elettriche aeree di Terna Rete Italia S.p.A..
- 2014 – Consultancy contract, Pozzi Electra S.p.A.: “Cause di usura precoce di cuscinetti reggispinta di macchine idrauliche verticali tipo Kaplan”.
- 2014 – Consultancy contract, GE Oil & Gas - Nuovo Pignone S.r.l.: “Analisi e modellazione di steam whip in turbine a vapore”.
- 2014 – Consultancy contract, GE Oil & Gas - Nuovo Pignone S.r.l.: “Comportamento dinamico di macchinario rotante”.
- 2012 – Research contract Exergy S.p.A., “Modellazione di turbine radiali per ciclo Rankine organico (ORC)”.
- 2012 – Co-operation contract between EDF- ELECTRICITE DE FRANCE and Politecnico di Milano no. 8610-5910104425.
- 2011 – Research contract, Hydac S.A.: “Analisi del comportamento vibratorio di sistemi di raffreddamento per impianti idraulici ed eolici”.
- 2010 – Grant: “Progetto Sviluppo e realizzazione di un micro-cogeneratore a ciclo Stirling alimentato a gas naturale (MICROGEN)”, tra Regione Lombardia e Politecnico di Milano e Finlombarda SpA.
- 2010 – Experimental tests, Franco Tosi Meccanica S.p.A.: “Prove di attivazione della centrale di Narni Gr.2”.
- 2010 – Experimental tests, Franco Tosi Meccanica S.p.A.: “Prove di attivazione della centrale di Narni”.

Ho inoltre sviluppato esperienze specifiche nel settore siderurgico grazie a numerosi

progetti relativi agli impianti di produzione degli acciai e degli acciai speciali, dei quali sono stato responsabile. I più recenti sono:

- 2015 – Experimental tests, Danieli & C. Officine Meccaniche S.p.A.: "Analisi vibrazioni unità Sizing Mill – Seversky Tube Works JSCo".
- 2014 – Research contract, Danieli & C. Officine Meccaniche S.p.A.: "Verifica delle caratteristiche dinamiche di cuscinetti lubrificati".
- 2013 – Research contract, Danieli & C. Officine Meccaniche S.p.A.: "Dinamica Flessionale e Torsionale di Accoppiamenti Elastici".
- 2011 – Experimental tests, Danieli & C. Officine Meccaniche S.p.A: "Misure di vibrazione presso la Emirates Steel Factory di Abu Dhabi".
- 2010 – Experimental tests, Danieli & C. Officine Meccaniche S.p.A: "Analisi metallografica e FEM di biella di compressore".
- 2010 – Consultancy contract, Danieli & C. Officine Meccaniche S.p.A.: "Valutazione delle cause e della dinamica secondo le quali si è sviluppata la rottura della biella di primo stadio del compressore alternativo C6100B dell'impianto Emirates Steel Industry".
- 2010 – Consultancy contract, Danieli & C. Officine Meccaniche: "Valutazione della dinamica torsionale di compressori alterativi per azoto ed ossigeno dell'impianto Emirates Steel Factory".

Ho anche sviluppato esperienze specifiche nel settore delle lavorazioni meccaniche, grazie a numerosi progetti dei quali sono stato responsabile. I più recenti sono:

- 2013 – Experimental tests, Sigma Technologies S.r.l.: "Characterization of the dynamical behaviour of the colums of a machine tool made of different materials".
- 2012 – Research contract, Maina Organi di Trasmissione SpA: "Ricerca sulla vita ed il dimensionamento di giunti a denti ad alta capacità di disallineamento".
- 2011 – Consultancy contract P D Pumps - India: "Definition of tool profile for machining screw pump rotors".

Ho infine sviluppato competenze nella dinamica degli sci da discesa e nella strumentazione necessaria attraverso il contratto di cui sono stato responsabile:

- 2011 – Experimental tests, Casa Editrice Scode S.r.l.: "Misura oggettiva del comportamento dinamico di sci da discesa"

Patente di guida B

ULTERIORI INFORMAZIONI

Pubblicazioni Vedi elenco allegato

Conferenze

- Keynote speech: "Diagnostic and Identification of Faults in Rotating Machines", 4° Congreso Internacional de Ingeniería Electromecánica y de Sistemas, 14 - 18 noviembre 2005, México, D.F.
- Keynote address: "Modelling, dynamic behaviour and diagnostics of cracked rotors", Proc. of IMechE 10th International Conference on Vibrations in Rotating Machinery (VIRM10), London, UK, September 10-13, 2012.

Riconoscimenti e premi

- Best Paper Award: Bachschmid N., Pennacchi P. e Vania A.,"Rotor to stator rub causing spiral vibrations: modelling and validation on experimental data of real rotating machine", IMechE paper C623/060/2004, Proc. of 8th International Conference on Vibrations in Rotating Machinery, 7-9 September 2004, Swansea, Wales, ISSN 1356-1448, ISBN 1 86058 447 0, pp. 671-680.
- Best Paper Award: Bachschmid N., Diana G., Pennacchi P. e Vania A., "Diagnostica ed Identificazione dei Malfunzionamenti delle Macchine Rotanti", Atti della Conferenza Nazionale sulle Prove non Distruttive Monitoraggio Diagnostica, Milano, 13-15 ottobre 2005, pp. 1-10.
- Best Paper Award: Pennacchi P., Vania A. e Bachschmid N., "Robust model based identification of faults in rotor dynamics using M-estimators", Paper ID 96, Proc. of IFToMM 7th International Conference on Rotor Dynamics, Vienna, Austria, September 25-28, 2006, ISBN 3-200-00689-7, pp. 1-11
- Best Paper Award: Bachschmid N., Tanzi E. e Pennacchi P., "Turbo-generator Groups Affected by Transverse Cracks: a Sensitivity Analysis of Vibrations versus Crack Position and Depth", Proceedings of the IMechE – 9th International Conference on Vibrations in Rotating Machinery, paper C663/028/08, September 8-10, 2008, Exeter, UK, ISBN 978-1-84334-458-2, pp. 631-643.
- Best Paper Award: Chatterton S., Pennacchi P., Vania A., "Performances Degradation of Tilting-pad

Thrust Bearings due to Electrical Pitting", Proc. of 9th IFToMM International Conference on Rotor Dynamics, Milan, Italy, September 22-25, 2014, pp. 1-12.

- Award certificate of appreciation: ASME 21st Biennial Conference on Mechanical Vibrations and Noise, Las Vegas NV, USA, September 4-7, 2007.
- Award certificate of appreciation: ASME 22nd Biennial Conference on Mechanical Vibrations and Noise, August 30 - September 2, 2009, San Diego, California, USA.
- Award certificate of appreciation: ASME 23rd Biennial Conference on Mechanical Vibrations and Noise, August 28-31, 2011, Washington, DC, USA.
- Award certificate of appreciation: ASME 24th Conference on Mechanical Vibrations and Noise, August 12-15, 2012, Chicago, IL, USA.
- Sciencedirect Top 25, List of Most Downloaded Articles: Mechanical Systems and Signal Processing - January to March 2006, "Use of modal representation for the supporting structure in model-based fault identification of large rotating machinery: part 1-theoretical remarks", Mechanical Systems and Signal Processing - Volume 20, Issue 3.
- Sciencedirect Top 25, List of Most Downloaded Articles: Journal of Sound and Vibration - October to December 2006, "Thermally induced vibrations due to rub in real rotors", Journal of Sound and Vibration - Volume 299, Issue 4-5.
- Sciencedirect Top 25, List of Most Downloaded Articles: Mechanical Systems and Signal Processing - April to June 2008, "Diagnostics of a crack in a load coupling of a gas turbine using the machine model and the analysis of the shaft vibrations", Mechanical Systems and Signal Processing - Volume 22, Issue 5.
- Sciencedirect Top 25, List of Most Downloaded Articles: Mechanical Systems and Signal Processing - January to March 2011: "Diagnostics of gear faults based on EMD and automatic selection of intrinsic mode functions", Mechanical Systems and Signal Processing - Volume 25, Issue 3.
- Sciencedirect Top 25, List of Most Downloaded Articles: Mechanical Systems and Signal Processing - January to March 2013: "A new procedure for using envelope analysis for rolling element bearing diagnostics in variable operating conditions", Mechanical Systems and Signal Processing - Volume 38, Issue 1.
- Sciencedirect Top 25, List of Most Downloaded Articles: Mechanical Systems and Signal Processing - April to June 2013: "A new procedure for using envelope analysis for rolling element bearing diagnostics in variable operating conditions", Mechanical Systems and Signal Processing - Volume 38, Issue 1.
- Certificate of Excellence in Rewing: Mechanical Systems and Signal Processing, award in recognition of an outstanding contribution to the quality of the journal.

Editor di riviste scientifiche

- Editor: International Journal of Rotating Machinery.
- Editor: Mechanical Systems and Signal Processing, 2013-.

Appartenenza a gruppi / associazioni

- Chairman of IFToMM (International Federation for the Promotion of Mechanism and Machine Science) Technical Committee of Rotor Dynamics, 2011- .
- President of AIT (Associazione Italiana di Tribologia), 2014- .
- General Conference Chairman of IFToMM - 9th International Conference on Rotor Dynamics, 22-25 September 2014, Milan, Italy.
- Member of ASME (American Society of Mechanical Engineers).

ALLEGATI

- Elenco pubblicazioni

Milano, 27/04/2016

ELENCO PUBBLICAZIONI SUDDIVISE PER CATEGORIA DEL PROF. ING. PAOLO PENNACCHI

LIBRI

C1.b1) Mimmi G., Pennacchi P.,
"**Appunti di Meccanica Applicata alle Macchine**", Collana Scientifica, Edizioni CUSL, Milano, 1998, pp. 1-312.

C1.b2) Pennacchi P., Frosini L.,
"**Temi d'esame svolti di Meccanica Applicata alle Macchine**", Collana Scientifica, Edizioni CUSL, Milano, 2002, ISBN 88-8132-179-3, pp. 1-164.

C1.b3) Bachschmid N., Pennacchi P., Tanzi E.,
"**Cracked Rotors, A Survey on Static and Dynamic Behaviour Including Modelling and Diagnosis**", Springer, Berlin – Heidelberg, 2010, DOI 10.1007/978-3-642-01485-7, ISBN 978-3-642-01484-0 (Print), 978-3-642-01485-7 (Online), pp. 1-401.

CURA DI LIBRI

1) Bachschmid N., Pennacchi P.
"**Modelling of rotating machinery in power plants. Monitoring and diagnostics.**", Proceedings of the *Workshop Modelling of rotating machinery in power plants. Monitoring and diagnostics*, May 27, 2005, Milan, ISBN 88-901916-0-0, pp. 1-74.

2) Bachschmid N., Pennacchi P.
"**Advances in vibration control and diagnostics**", 2006, Polimetrica International Publisher, Monza, Italy, ISBN 88-7699-036-4, pp. 1-258.

3) Pennacchi P.
"**Proceedings of the 9th IFToMM International Conference on Rotor Dynamics**", *Mechanisms and Machine Science*, Vol. **21**, 2015, Springer, ISBN 978-3-319-06590-8, pp. 1-2214.

CONTRIBUTI SU LIBRI

1) Braghin F., Pennacchi P., Pennastrì E., Sabbioni E.,
"**Biomeccanica**", Proceedings of the *Workshop Modelling of rotating machinery in power plants. Monitoring and diagnostics*, May 27, 2005, Milan, ISBN 88-901916-0-0, pp. 1-74.

2) Pennacchi P., Vania A., Bachschmid N.,
"**Fault Identification in Industrial Rotating Machinery: Theory and Applications**", *IUTAM Symposium on Emerging trends in Rotor Dynamics*, K. Gupta ed., 2011, Springer, Dordrecht, ISBN 978-94-007-0019-2, DOI: 10.1007/978-94-007-0020-8, pp. 455-467.

3) Bachschmid N., Pennacchi P., Tanzi E.,
"**Cracked rotating shafts: typical behaviors, modeling and diagnosis**", *IUTAM Symposium on Emerging trends in Rotor Dynamics*, K. Gupta ed., 2011, Springer, Dordrecht, ISBN 978-94-007-0019-2, DOI: 10.1007/978-94-007-0020-8, pp. 441-454.

4) Pennacchi P., Ricci R., Chatterton S., Borghesani P.,
"**Effectiveness of MED for Fault Diagnosis in Roller Bearings**", *Vibration Problems ICOVP 2011*, J. Náprstek et al. ed., 2011, Springer, Dordrecht, ISBN 978-94-007-2068-8, DOI: 10.1007/978-94-007-2069-5, pp. 637-642.

5) Pennacchi P., Borghesani P., Ricci R., Chatterton S.
"**Bearing Fault Diagnostics Using the Spectral Pattern Recognition**", *Vibration Problems ICOVP 2011*, J. Náprstek et al. ed., 2011, Springer, Dordrecht, ISBN 978-94-007-2068-8, DOI: 10.1007/978-94-007-2069-5, pp. 643-648.

6) Pennacchi P.,
"**Introduction of advanced technologies for steam turbine bearings**", *Advances in steam turbines for modern power plants*, T. Tanuma ed.

LAVORI SU RIVISTE INTERNAZIONALI

C3a.1) Mimmi G., Pennacchi P.,
"**Determination of Tool Profile for the Milling of Three Screw Pump Rotor**", *Meccanica, International Journal of the Italian Association of Theoretical and Applied Mechanics*, Vol. **32**, n. 4, 1997, CODEN MECCB9 ISSN 0025-6455, pp. 363-376.

C3a.2) Mimmi G., Pennacchi P.,
"**Deviations Induced by Tool Sharpening in the Profile of Three Screw Pump Rotors**", *Meccanica, International Journal of the Italian Association of Theoretical and Applied Mechanics*, Vol. **32**, n. 6, 1997, CODEN MECCB9 ISSN 0025-6455 pp. 567-576.

C3a.3) Mimmi G., Pennacchi P.,
"**Rotor Design and Optimization in Internal Lobe Pumps**", *Applied Mechanics Reviews*, Vol.**50**, n.11, part 2, November 1997, ISSN 0003-6900, pp. S133-S141.

C3a.4) Mimmi G., Pennacchi P.,
"**Internal Lobe Pump Design**", *Transactions of the Canadian Society of Mechanical Engineering (CSME)*, Vol. **21**, n. 2, 1997, ISSN 0315-8977, pp. 109-122.

C3a.5) Mimmi G., Pennacchi P.,
"**Involute Gear Pumps versus Lobe Pumps: a Comparison**", *ASME Journal of Mechanical Design,* Vol. **119**, No. 4, December 1997, ISSN 1050-0472, pp. 458-465.

C3a.6) Mimmi G., Pennacchi P.,
"**Computation of Pressure Loads in Three Screw Pump Rotors**", *ASME Journal of Mechanical Design,* Vol. **120**, No. 4, December 1998, ISSN 1050-0472, pp. 581-588.

C3a.7) Mimmi G., Pennacchi P.,
"**Dynamic Effects of Pressure Loads in Three Screw Pump Rotors**", *ASME Journal of Mechanical Design,* Vol. **120**, No. 4, December 1998, ISSN 1050-0472, pp. 589-592.

C3a.8) Mimmi G., Pennacchi P.,
"**Analytical Model of a Particular Type of Positive Displacement Blower**", *IMechE Proc. Instn. Mech. Engrs.-Journal of Mechanical Engineering Science - part C,* Vol. **213**, No C5, 1999, ISSN 0954-4062, pp. 517-526.

C3a.9) Mimmi G., Pennacchi P.,
"**Dynamic Loads in the Three-Lobe Supercharger**", *ASME Journal of Mechanical Design* Vol. **121**, No. 4., December 1999, ISSN 1050-0472, pp. 602-605.

C3a.10) Mimmi G., Pennacchi P.,
"**Non Undercutting Conditions in Internal Gears**", *Mechanism and Machine Theory*, Vol. **35**, No 4, Apr-2000, ISSN 0094-114X, pp. 477-490.

C3a.11) Mimmi G., Pennacchi P.,
"**Preshaping Motion Input for a Rotating Flexible Link**", *International Journal of Solids and Structures*, Vol. **38**, Issue 10-13, Jan-2001, ISSN 0020-7683, pp. 2009-2023.

C3a.12) Bachschmid N., Pennacchi P., Tanzi E., Vania A.,
"**Accuracy of Modelling and Identification of Malfunctions in Rotor Systems: Experimental Results**", *Journal of the Brazilian Society of Mechanical Sciences*, Vol. XXII, No. 3, 2000, ISSN 0100-7386, pp. 423-442.

C3a.13) Mimmi G., Pennacchi P.,
"**Diaphragm Design Improvement for a Metering Pump**", *Engineering Failure Analysis* Vol. 8, No 1, Feb-2001, ISSN 1350-6307, pp 1-13.

C3a.14) Mimmi G., Pennacchi P.,
"**Compression Load Dynamics in a Special Helical Blower: a Modeling Improvement** ", *ASME Journal of Mechanical Design* Vol. **123**, No. 3, September 2001, ISSN 1050-0472, pp 402-407.

C3a.15) Mimmi G., Pennacchi P., 6
"**A Special Type of Crank Mechanism with Variable Stroke**", *ASME Journal of Mechanical Design* Vol. **123**, No. 3, September 2001, ISSN 1050-0472, pp 468-472.

C3a.16) Bachschmid N., Pennacchi P., Tanzi E., Vania A.,
"**Identification of Transverse Crack Position and Depth in Rotor Systems**", *Meccanica, International Journal of the Italian Association of Theoretical and Applied Mechanics*, Vol. **35**, n. 6, 2000, CODEN MECCB9 ISSN 0025-6455, pp. 563-582.

C3a.17) Bachschmid N., Pennacchi P., Audebert S.,
"**Algunos Resultatados en la Identificación Basada en Modelos de Fisuras Transversales en Sistemas de Rotores**", *Información Tecnológica,* Vol. **12**, n.5, 2001, ISSN 0716-8756, pp. 25-32.

C3a.18) Pennacchi P., Mimmi G., Frosini L.,
"**Reduction of Quasi-impulsive Forces and Noise Emission in Three-screw Pump Rotors**", *International Journal of Fluid Power,* **2** (2001), No. 3, ISSN 1439-9776, pp.23-31.

C3a.19) Bachschmid N., Pennacchi P., Vania A.,
"**Identification of Multiple Faults in Rotor Systems**", *Journal of Sound and Vibration*, Vol. **254**, No. 2, 2002, ISSN 0022-460X, pp. 327-366.

C3a.20) Bachschmid N., Pennacchi P.,
"**Multiple Fault Identification Method in the Frequency Domain for Rotor Systems**", *Shock and Vibration*, Vol. **9**, No. 4-5, 2002, ISSN 1070-9622, pp.203-215.

C3a.21) Bachschmid N., Tanzi E., Pennacchi P., Audebert S.,
"**Transverse crack modeling and validation in rotor systems including thermal effects**", *International Journal of Rotating Machinery*, Vol. **9**, No. 2, 2003, ISSN 1023-621X, pp.113-126. Anche *International Journal of Rotating Machinery*, Vol. **10**, No. 4, 2004, ISSN 1023-621X, pp.253-263.

C3a.22) Bachschmid N., Pennacchi P., Vania A., Zanetta G.A., Gregori L.,
"**Identification of Rub and Unbalance in a 320MW Turbogenerator**", *International Journal of Rotating Machinery*, Vol. **9**, No. 2, 2003, ISSN 1023-621X, pp.97-112. Anche *International Journal of Rotating Machinery*, Vol. **10**, No. 4, 2004, ISSN 1023-621X, pp.265-281.

C3a.23) Pennacchi P., Vania A.,
"**Identification of a Generator Fault by Model-Based Diagnostic Techniques**", *International Journal of Rotating Machinery*, Vol. **10**, No. 4, 2004, ISSN 1023-621X, pp.293-300.

C3a.24) Vania A., Pennacchi P.,
"**Experimental and Theoretical Application of Fault Identification Measures of Accuracy in Rotating Machine Diagnostics**", *Mechanical Systems and Signal Processing*, Vol. **18**, No. 2, 2004, ISSN 0888-3270, pp.329-352.

C3a.25) Pennacchi P., Vania A.,
"**Accuracy in the Identification of a Generator Thermal Bow**", *Journal of Sound and Vibration*, Vol. **274**, No. 1-2, 2004, ISSN 0022-460X, pp.273-295.

C3a.26) Bachschmid N., Pennacchi P.,
"**Accuracy of Fault Detection in Real Rotating Machinery Using Model Based Diagnostic Techniques**", *JSME International Journal Series C*, Vol. **46**, No. 3, 2003, ISSN 1344-7653, pp. 1026-1034.

C3a.27) Bachschmid N., Pennacchi P., Tanzi E., Verrier P., Hasnaoui F., Aabadi K.,
"**Crack Detectability in Vertical Axis Cooling Pumps During Operation**", *International Journal of Rotating Machinery*, Vol. **10**, No. 2, 2004, ISSN 1023-621X, pp.121-133.

C3a.28) Mimmi G., Pennacchi P., Frosini L.,
"**Biomechanical analysis of pedalling for rehabilitation purposes: experimental results on two pathological subjects and comparison with non-pathological findings**", *Computer Methods in Biomechanics and Biomedical Engineering*, Vol. **7**, no. 6, 2004, ISSN 1025-5842, pp. 339-345.

C3a.29) Bachschmid N., Pennacchi P., Vania A.,
"Diagnostic Significance of Orbit Shape Analysis and its Application to Improve Machine Faults Detection", *Journal of the Brazilian Society of Mechanical Sciences and Engineering*, Vol. **XXVI**, No. 2, 2004, ISSN 1678-5878, pp. 200-208.

C3a.30) Pennacchi P.,
"Robustness of Command Input Preshaping Technique Applied to Residual Vibration Reduction", *Shock and Vibration*, Vol. **11**, No. 3-4, 2004, ISSN 1070-9622, pp. 377-382.

C3a.31) Pennacchi P., Vania A.,
"**Analysis of the Shaft Thermal Bow Induced by Rotor-to-Stator Rubs**", *IASME Transactions*, Vol. 1, No. 1, 2004, ISSN 1790-031X, pp.193-198.

C3a.32) Pennacchi P., Vania A.,
"Diagnosis and model based identification of a coupling misalignment", *Shock and Vibration*, Vol. **12**, No. 4, 2005, ISSN 1070-9622, pp. 293-308.

C3a.33) Pennacchi P., Bachschmid N., Vania A., Zanetta G.A., Gregori L.,
"**Use of Modal Representation for the Supporting Structure in Model Based Fault Identification of Large Rotating Machinery: Part 1 – Theoretical Remarks**", *Mechanical Systems and Signal Processing*, Vol. **20**, No. 3, 2006, ISSN 0888-3270, pp. 662-681.

C3a.34) Pennacchi P., Bachschmid N., Vania A., Zanetta G.A., Gregori L.,
"**Use of Modal Representation for the Supporting Structure in Model Based Fault Identification of Large Rotating Machinery: Part 2 – Application to a Real Machine**", *Mechanical Systems and Signal Processing*, Vol. **20**, No. 3, 2006, ISSN 0888-3270, pp. 682-701.

C3a.35) Bachschmid N., Pennacchi P., Vania A.,
"**Thermally Induced Vibrations due to Rub in Real Rotors**", *Journal of Sound and Vibration*, Vol. 299, No. 4-5, 6 FEB 2007, ISSN 0022-460X, pp. 683-719.

C3a.36) Pennacchi P., Vania A., Bachschmid N.,
"**Bivariate Analysis of Complex Vibration Data: an Application to Condition Monitoring of Rotating Machinery**", *Mechanical Systems and Signal Processing*, Vol. **20**, No. 8, 2006, ISSN 0888-3270, pp. 2340-2374.

C3a.37) Pennacchi P., Vania A.,
"**Reply to comment from B. Larsson about paper "Accuracy in the identification of generator thermal bow", JSV (2004) 274(1), 273-295. By P. Pennacchi and A. Vania**", *Journal of Sound and Vibration*, Vol. **282**, No. 3-5, 2005, ISSN 0022-460X, pp. 1322-1324.

C3a.38) Pennacchi P., Bachschmid N., Vania A.,
"**A model based identification method of transverse cracks in rotating shafts suitable for industrial machines**", *Mechanical Systems and Signal Processing*, Vol. **20**, No. 8, 2006, ISSN 0888-3270, pp. 2112-2147.

C3a.39) Bachschmid N., Pennacchi P.,
"**Faults Identification and Corrective Actions in Rotating Machinery at Rated Speed**", *Shock and Vibration*, Vol. **13**, No. 4-5, 2006, ISSN 1070-9622, pp. 485-503.

C3a.40) Pennacchi P., Frosini L.,
"**Dynamical Behaviour of a Three-Phase Generator Due to Unbalanced Magnetic Pull**", *IEE Proc. Electric Power Applications*, Vol. **152**, No. 6, 2005, ISSN 1350-2352, pp. 1389-1400.

C3a.41) Maccagni A., Roccato R., Pennacchi P., Pizzigoni B.,
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LAVORI PRESENTATI A CONGRESSI NAZIONALI

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Publication date: 2001-08-23
Inventor(s): MIMMI GIOVANNI [IT]; PENNACCHI PAOLO [IT]
Applicant(s): UNIV PAVIA [IT]; MIMMI GIOVANNI [IT]; PENNACCHI PAOLO [IT]
Classification:
- international: F04C18/56; F04C18/48; (IPC1-7): F04C18/56
- European: F04C18/56; F04C18/56B
Application number: WO2001EP01681 20010215
Priority number(s): IT2000MI00257 20000215

Milano, 27 aprile 2016

In fede,