

DESIGN OF A POLYVALENT TEST-BENCH

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TRAVELEC S.A. is a SME active in the field of electric machines. Its most common activities includes :

• Maintenance and coiling of electric motors and alternators (regardless of

VIBRATION ASSESSMENT

Rotating machines \rightarrow Prone to harmonic excitation.

Aspects verified :

- Independent elements of the drive chain
- Tables and supports, separately
- Linking member between the tables
- Whole (but drastically simplified) test-bench, using a wire model

Conclusion : Rather low frequencies, necessity to perform a quick acceleration of the drive chain. Necessity to perform further and more sophisticated studies (limited by the complexity of the machine and the computational cost).

- their power)
- Sales of motors, generators, coils
- Design and manufacturing of low and medium voltage motors To support and develop these activities, the society has decided to invest into a new and polyvalent test bench and to outsource its design to the University of Liège.

PROJECT OBJECTIVES

- The designed test-bench must be able to [1] :
- Connect to electric motors and alternators of several powers (from 5kW to 40kW)
- Measure the characteristics of alternators after maintenance (tension, current, phase balancing, etc.)
- Measure the efficiency of electric motors rebuilt in the society

TECHNICAL SOLUTIONS

- Efficiency measurement thanks to a combination wattmeter-torquemeterrev counter
- Data acquisition task accomplished through the Modbus RTU protocol, supported by a RS485 bus

SAFETY AND CONTROL ASPECTS

Rotating machines can cause serious injuries if not operated safely.

- \rightarrow Need for safety systems :
- Mechanical guard surrounding the drive chain
- Emergency switches
- Safety relays

The whole safety system has been designed to be *failsafe*. It is thus impossible to operate the bench when this system is disconnected.

The bench is controlled through a push-button interface, permitting its start, stop, defect clearance and emergency stop.

RENDERINGS





- Bench controlled with a combination "softstarter-frequency converter", the latter always acting as a power sink (connected to a power resistor) • Polyvalence ensured thanks to a telescopic universal joint, an elevating table and interface plates
- Multi-diameter adaptation performed through a specially designed part
- Bench designed for efficiency and ergonomics purposes



FINANCIAL DATA

- Initial rough estimation of the budget : 15000 euros
- Precise budget : 16182,27 euros (workforce excluded, VAT excluded)
- Precise budget : 19682,27 euros (workforce estimated, VAT excluded)

REFERENCES

References

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ACKNOWLEDGEMENTS

The authors would like to thank TRAVALEC S.A., especially MM. Yannick and Maxime Reichling for their trust, confidence and advice. They thank also their professors (especially, but not exclusively, Prof. P. Duysinx, E. Béchet and O. Brüls) for their encouragements, advice and presence. M. Bernard Loly is also acknowledged for his technical expertise in the field of mechanical construction. The authors want finally to thank the different suppliers (Vermeire Belting, Aciers Crustin et Mottard, etc.) and their counselors for their availability and kind advice.