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35-Year Structural Monitoring of a Prestressed-Concrete Pressurized Wind Tunnel

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In this paper, we present a unique SHM feedback based on 35-year monitoring data of a prestressed concrete pressurized wind tunnel. 276 double coil vibrating wire extensometers have been embedded in the concrete structure during construction. Long term strain measurement performed during 35 years show elastic behavior during daily pressurizing tests and long-term shrinkage due to concrete creep and prestressing cable relaxation. In addition some microcracks have been detected with the vibrating wire extensometers. Such microcracks have no structural effects whereas they affect concrete wall permeability therefore wind tunnel serviceability. Such a monitoring system may be integrated in a service life management plan as it represents a durable and economic tool for conditional maintenance (repair of prestress losses, microcrack repair). The presented durable SHM system will help to ensure that the wind tunnel will continue to meet its design requirements throughout its operational life.

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Ключевые слова:

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Instrumentation of the Wind Tunnel

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Conclusion and perspectives