DESIGN AND FIELD TUNING OF AN UPSTREAM CONTROLLED CANAL NETWORK SCADA

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ABSTRACT

This paper presents the design, implementation and field tuning of a SCADA of an irrigation canal network upstream controlled with AMIL gates and equipped with other Neyrpic devices. Besides the hydraulic system, the paper also presents the supervisory and control system and its remote terminal units. The developed and field-tuned manual and automatic controllers are also presented. The manual controllers – direct and gate position controllers and gate flow controllers – are defined for the main canal intakes in order to permit achievement of predefined flow values or daily flow schedules, and are also defined for a few gate-controlled canal orifices used to discharge the overflow to the drainage system. The automatic controllers – water depth controllers for a few gate-controlled canal orifices – are defined in order to automatically prevent canal overtopping.

The SCADA system also monitors the outflows at the main canals – the most important canal top side weirs, canal terminal weirs and automatic Neyrpic siphons. The flow equations used in the computing of flow in real time inside the developed controllers and the monitoring units were field tuned using collected data readings from a monostatic Doppler current meter. The tuning parameters are also defined and presented. Copyright © 2008 John Wiley & Sons, Ltd.

KEY WORDS: irrigation canal; irrigation canal modernization; local upstream control; real-time supervisory control; SCADA; flow equations

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RéSUMÉ


Le système de télégestion pilote également les débits de sortie des canaux principaux – les déversoirs des canaux les plus importants, les déversoirs de fin de canaux, et les siphons automatiques Neyrpic. Les équations utilisées pour calculer les débits en temps réel dans les contrôleurs ou dans les unités de surveillance ont été calées sur le terrain à l’aide d’un moulinet monostatique Doppler. Les paramètres correspondants sont aussi précisés et présentés. Copyright © 2008 John Wiley & Sons, Ltd.

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1Développement et calage sur le terrain d’un système de télégestion d’un réseau de canaux à commande par l’amont.