

# THE MEASURABLE NEWS

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## THEME OF THIS ISSUE:

### International Earned Value Management

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## Application of EVM to the EURO 2004 Programme

by

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*It was not just national football teams that were working toward the European championships in 2004. Portugal, which hosted Euro2004, had to have 10 stadiums match fit and up to UEFA standard. Earned value management was applied to help ensure everything was ready for kick-off.*

By the time that the European championships reached the crucial final leg in 2004, Portugal created not one but 10 stadiums and the necessary infrastructure to meet the exacting specifications of UEFA and FIFA. Of the 10 stadiums, seven were completely rebuilt and three were improved. Each stadium constituted an independent and complex project and the overall schedule was two years - with no slip-page.

Scope was an important aspect. The stadiums are not designed

purely to host football matches. They are also expected to become important local centres for other sporting and social activities during and after the tournament. As a consequence, their general scope includes running tracks, swimming pools and units for other sporting activities; health and shopping centres, commercial and entertainment areas; conference rooms and auditoriums and cinemas.

These projects were subject to important constraints. All stadiums had to conform to the most recent

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norms and requirements imposed by both UEFA and FIFA. In addition to top quality pitches, each had to be able to cope with a minimum crowd of 30,000 and the accompanying public facilities. There had to be excellent changing room accommodations for referees and players, and it had to meet the needs of the world's press and media. Medical and dope-testing control rooms were required, along with the safety, surveillance and security measures essential at today's top level football matches.

Each stadium had a different specification to bring it up to scratch. Some needed renovation and adaptation, like one of the oldest urban stadiums, the Coimbra which was expanded from its former 14,000 capacity. Of the new stadiums, two were built in Lisbon; The Sport Lisboa e Benfica stadium, with a 65,000 spectator capacity and the Jose Alvalade stadium which replaced an existing, but aging, facility.

The time period for the construction was the same for all projects, and they were implemented and

managed in parallel.

Earned Value Management (EVM) was used to help create these stadiums for the third largest worldwide sporting event with an overall budget of 460 million euros.

The EURO 2004 programme owed much to the experience of Expo 98, the last World Fair of the last millennium, held in Lisbon in 1998. It, too, was complex, with a work breakdown structure (WBS) of 12 major programmes, each with 75 individual projects, and an unmoveable final schedule. Each project was classified on the basis of its relative importance to the overall mission and each contained thousands of standard activities defined by the project manager. At sub-contractor level, the WBS led to thousands more tasks and actions. As with Euro 2004, there was international participation, resulting in a mandatory and rigorous risk management process and an effective cost and schedule control system.



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The Euro 2004 stadium programme had three main objectives: (1) to monitor and evaluate the programme, (2) to monitor the building of all the support facilities, and (3) to monitor the building and improvement required to all national and local infrastructure

The same control techniques were implemented in all projects to increase the probability of producing performance metrics that could be immediately compared. Because the control system was common, the metrics collected (and their underlying assumptions) were the same for all projects, enabling a valid, easier and more economic comparative analysis. This allowed management to gain an important understanding about the overall programme performance. On the basis of objective data, pressure could then be exerted with the appropriate contractors, so that they would all reach similar levels of performance.

EVM metrics such as the Actual Cost (AC), Planned Value (PV) and Earned Value (EV) were collected and performance indices were calculated. In addition, other metrics were produced to better understand the causes of deviations and to help in devising effective re-planning decisions. These included:

- Staff productivity per type of work;
- Monthly invoiced costs and determination of trend analysis;
- Physical progress accomplished per type of work.

The implementation of EVM at Euro2004 was based on the following key requirements that were established at the beginning of the programme:

- The evaluation of the physical work accomplished (i.e., the Earned Value), which required the establishment of measures for work units and the estimation of their unitary cost, for each type of work;

- The value of the physical work accomplished calculated as the number of work units accomplished times the unitary cost;
- The estimation of the labour work accomplished based on the estimated time to complete the task, and not on the basis of the budget remaining;
- Detailed progress information collected on time and with accuracy.

In addition to meeting these requirements, the following guidelines were adopted as the basis for the establishment of a coherent and useful EVM-based control methodology:

- All techniques were implemented from the very beginning in all projects;
- Information gathering was integrated within the management and quality assurance and control activities;
- The specific interests of all parties involved were addressed, so that information gathering was not seen just as 'additional effort'. Agreement with all parties was achieved on what information they needed to provide, and to demonstrate the type of feedback they would receive;
- Easy-to-use templates were developed and provided, common to all projects, which allowed for a more accurate and consistent data collection process;
- Data collected was stored in and processed from a central database system;
- Numerical analytical data on progress and performance was complemented with graphical representations and images/ photos of the work underway in the field;

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- Indices were produced that allowed management to validate the data collected (i.e., 'data-quality control' indices);
- Comparative analyses of performance were produced across all projects that allowed management to put pressure on the appropriate sub contractors;
- All EVM metrics and indices were represented in graphics and on a timely basis;
- Information and data provided by the QA/QC team was processed, and used in the review meetings with stakeholders, thereby emphasizing its usefulness;
- Results and impacts of EVM-based corrective actions were tracked and analyzed, thereby demonstrating to all parties the usefulness of the method.

The information system used at Euro2004 to support this approach was improved from the initial version used in Expo98. However, EVM alone - while a powerful tool - is not sufficient. There are limitations and, as Expo 98 demonstrated, such a large programme also requires a significant amount of human resources, a powerful information system and a great deal of commitment by all involved.

The Euro 2004 tournament was a success both in respect to the construction projects and to the event itself. During the preparation for the tournament, Earned Value Management played an important role by providing confidence to key stakeholders and by keeping the project management team informed of the areas needing more attention. Metrics and productivity patterns provided important benchmarks to exert pressure on the various suppliers involved. The success of the event was recognized internationally and one can confidently say that the Portuguese definitely won this major event, except for what EVM could produce no

forecast: the final! (ed. note: For the record, after beating Spain, England, and Holland to reach the final, host Portugal fell to Greece in the final 0-1, the only goal coming in the 57th minute in what BBC Sports called one of the biggest shocks in football history.)

## About the Authors

**António Laranjo** was the Tournament Director of Euro2004, responsible for the definition and implementation of the programme-wide control system (including the EVM method), in particular regarding the stadium projects. He was previously program manager of Expo98 where he first launched this programme management approach in Portugal. He is Adjunct Professor at the Instituto Superior de Engenharia de Lisboa and is currently undertaking a PhD on Project Finance Initiatives (PFI).

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