

A working model in the management of **MSEW projects in southern Africa**

INTRODUCTION

The use of terms like project management, construction management and other related terminology has certainly been on the rise in the construction and civil engineering industries in recent years. Post-graduate and crash courses in project management are a dime a dozen and every second person's business card sports a project management title. In an ideal world and ideal industry, this would be a good indication of how engineering projects are being managed. However, experience shows that this project management trend is not yet reflected adequately in actual projects. The *Construction Business Owner* magazine made reference to the BizMiner industry analysis report in May 2007 which reported that, of the 850 029 contractors that were operating in 2004 in the USA, only 649 602 were still operational in 2006, only two years later. The same article stated that 36.8% of construction businesses close down within one year. The USA's census data for the period 1989–2002 showed that the average failure rate of construction industry associated businesses is almost 2% higher than the average rate for all other industries. The article pinned all of this to poor project and risk management. A KPMG report in New Zealand (2010) stated, after a survey of 100 businesses across various industries, that 70% of them had suffered a complete project failure in the previous 12 months. In 2008 IBM surveyed 1 500 companies and found that only 40% of projects met schedule, budget and quality targets.

Many projects are still run in an *ad hoc* manner, with little regard for formal project management techniques. A disregard for project management as a formal discipline, which requires education and training, is still widespread. Contrary to widely accepted beliefs, lack of knowledge and skills has led and continues to lead to poor management of civil engineering and construction projects.

Sinenkosi Dlamini Pr Tech Eng
Business Development Manager
MSEW Sector
Maccaferri Southern Africa
sinenkosi.dlamini@maccaferri.co.za



This is a problem affecting small and big projects alike, but the effects of poor project management are felt harder by smaller companies. Many of these smaller companies go under because of poor management of only a few projects, and this is further exacerbated by the fact that, unless the project manager had successfully managed a project in accordance with the classic principles of project management in the past, he is unlikely to pick up errors until the wheels start coming off. This also means that employers of poor project managers never know how much they lose on every job until they employ a good manager.

MACCAFERRI PROJECT MANAGEMENT OF MSEW PROJECTS

In their involvement as suppliers of mechanically stabilised earth wall (MSEW) projects, Maccaferri Southern Africa has identified this lack of good project managers. In many cases MSEW projects are only part of a larger project – construction of a road interchange, an embankment in a building complex or an office park, etc – so they are usually small- to medium-sized projects ranging from R1million to R50 million in value. Because of the specialist nature of MSEWs, the problem is not only that of managing the execution of the project, but the consultants may also require support in the design phase. Maccaferri therefore introduced into the South African MSEW market a semi-complementary packaged solution which assists both the consultant



Completed MSEW on-ramp at the John Ross Interchange, Richards Bay



Construction of an MSEW off-ramp at the Umgeni Interchange on the N2, Durban

and the contractor to execute a successful MSEW project in all the critical aspects.

Traditionally project management consists of five main areas or process groups. These are initiating, planning and design, executing, monitoring and control, and closing. Every project is different, also depending on whether Maccaferri is approached by the tendering contractor or by the consultant, but typically Maccaferri gets involved in the planning and design stage and assists the parties involved until the closing stage.

PLANNING AND DESIGN

At this stage issues of cost, resources and risk management are of the highest concern, and, due to the specialist nature of MSEWs, the main consultants are usually not fully equipped to cost, plan for, or evaluate risks associated with a system

about which they have limited knowledge. In the planning and design stage Maccaferri carries out the preliminary wall design, generally according to the SANS 207 and the BS8006 design codes. From this (a) the structural feasibility of the MSEW solution is determined, and (b) material quantities and earthworks are generated, which makes it possible for the consultant to cost this section of the project and assign to it reasonable time frames and adequate resources. Detailed particulars are provided in the Maccaferri installation manual to facilitate construction planning.

During this process group roles and responsibilities are also decided and assigned to the stakeholders and individuals concerned. Maccaferri's involvement at this stage is of crucial importance, as part of the package that Maccaferri offers is inclusion of professional indemnity for the design of the wall. This,

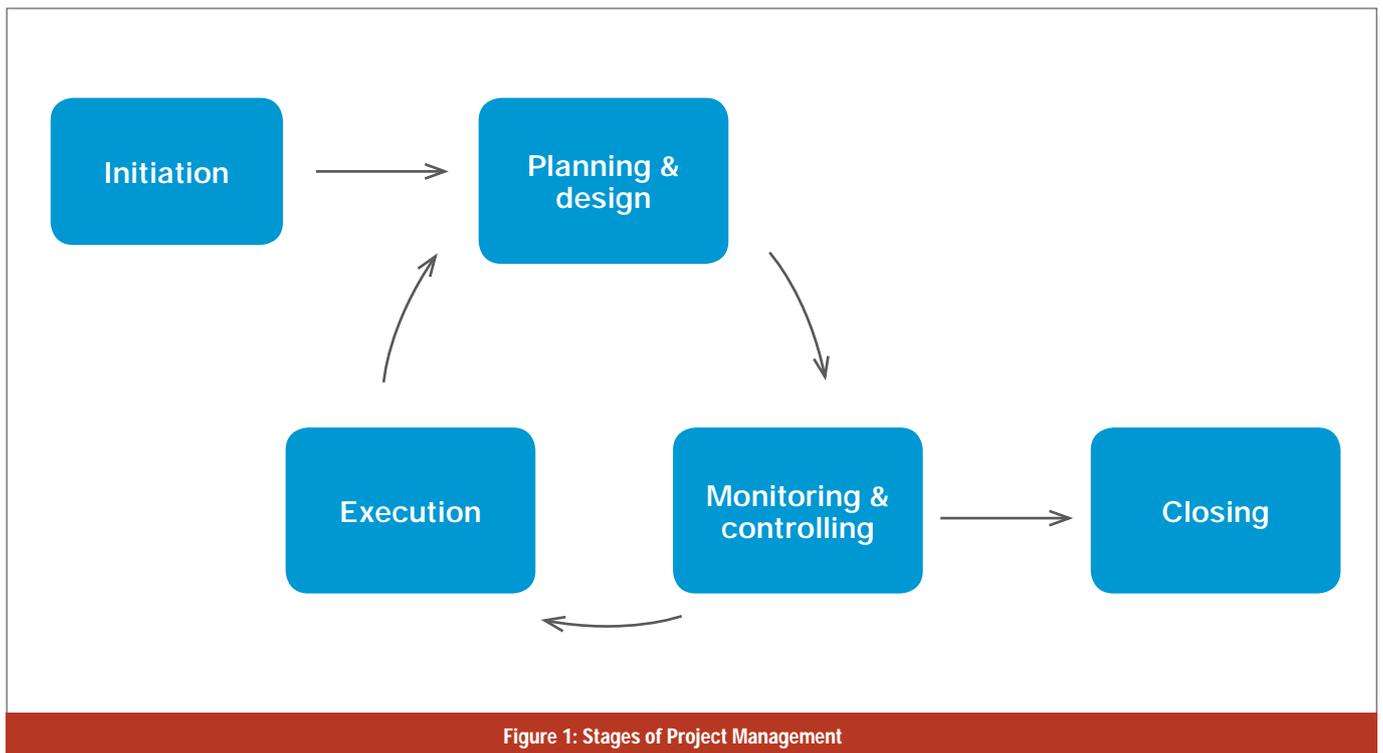


Figure 1: Stages of Project Management

Completed 25 m MSE tip wall at Optimum Colliery, Kwagga North, Mpumalanga



together with deciding on the solution, covers the crucial risk management aspect of the planning stage of project management. Finally, Maccaferri produces proposal stage drawings of the MSEW element of the project. This is an important step in the planning stage as this allows the consultant to evaluate how the MSEW structure will affect and be affected by the concurrent works, structurally and geometrically.

EXECUTION

Execution is the actual processing stage of the whole project management chain. In an MSEW project this includes the earthworks and excavations, foundations and setting out, the casting of panels, the placing of the panels and the soil reinforcement, and finally the backfilling and compacting. Typically in South Africa with such projects the supplier or the wall designer delivers the materials with the formwork for the panels at the start of the execution phase and then sends the invoice. At this stage of the project Maccaferri supplies precast panels which meet the design standards, together with all the relevant test outcomes, helping the contractor with the quality management system.

The alternative method is the provision of the moulds so that the panels can be cast *in situ* by the contractor, in which case Maccaferri provides interim training and all the necessary quality control paperwork which helps the consultant and the contractor to monitor the quality of the panels as they are being cast. Maccaferri also provides the very important panel reinforcement drawings for every single panel that goes onto the wall.

At the commencement of wall installation, Maccaferri continues to partner with both the contractor and the consultant by providing initial training to the contractor and going through typical wall installation procedures as detailed in the Maccaferri manual. A continued intermittent presence on site is maintained until completion of the project.

MONITORING AND CONTROL

The monitoring and control phase takes place simultaneously with the execution phase and the two overlap in many respects, but they are nonetheless separate and serve different purposes towards the attainment of a similar goal, that of timeous completion of a profitable project. The main aim of monitoring and control is to ensure continuous compliance with the project management plan throughout the execution of the project. The project management plan is typically a product of the Planning and Design phase. The Monitoring and Control stage is concerned with determining, among other things, (a) the *status quo* of the project, (b) the project expenditure, (c) the quality of construction and construction techniques, and (d) the documentation procedures, including quality management documents – all evaluated against the original project management plan. Depending on these results, the next step would be to determine how to adjust incorrectly standing items.

The success of this management stage lies in keeping short accounts. The seriousness of the repercussions of an error is usually dependent on when the error is discovered. Maccaferri's presence on site and its communication with other stakeholders improve the successful monitoring and controlling of MSEW projects. Solutions, and corrective and preventative actions, are then timeously provided and implemented. During this phase support is also given to the consultant and the contractor when, during the course of the project, design or drawing changes have to be made.

The construction manual also plays an important role in this process stage, as it allows the contractor to draw up useful quality management documents and check lists. Maccaferri also provides such documents to contractors who have not drawn up their own.

PROJECT CLOSURE

The project closure stage depends on proper closure of all of the preceding stages of the project. This is the most important aspect of project closure, because, if any short cuts had been taken at any stage of the management of the project, these will have an impact on the end product.

Other important aspects of this stage are the as-built drawings, design verification and the issuing of a signed stability certificate. Maccaferri has made all of these a standard part of the MSEW package.

CONCLUSION

Project management is an important discipline in engineering projects. Good designs, quality products, favourable site conditions, experienced foremen and state-of-the-art equipment do not guarantee a successful project if the project is not managed effectively. This is the case for projects of all sizes. Effective project management of sub-sections of construction (such as MSEWs) within a bigger engineering project, contribute in no small way to the successful completion of the whole project.

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