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New challenge to support Pipeline Integrity – ISO 55000 –

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Background

The Transmission System Operators (TSO) are conducting activities to work on their physical assets and benefiting from their reliability. Furthermore, in the gas industry, the low probability of failure / high consequence events are unacceptable in operations.

There are a lot of documents to help us to solve this problem: Managing System Integrity Of Gas Pipelines (The American Society of Mechanical Engineers (ASME) B 31.8S), and Gas Infrastructure Safety Management System (SMS) for gas transmission infrastructure and Pipeline Integrity Management System (PIMS) for gas transmission pipelines (British Standard European Norm (BS EN) 16348).

But these programs are often difficult to sustain in time. Furthermore, the pressure from authorities increases day by day. The problem is that we are not responding to the entire organisation. It is necessary to implement optimal Management of Physical Assets as described in Publicly Available Specification (PAS)55 2008 and The International Standards Organisation (ISO) 55000/1/2.
In this paper we will describe the way TGS will be implementing ISO 55000 Assets Management in the next year.

Aim

The goal of this paper is to clarify concepts of Analysis of Risk , PIMS , SMS, Assets Management.

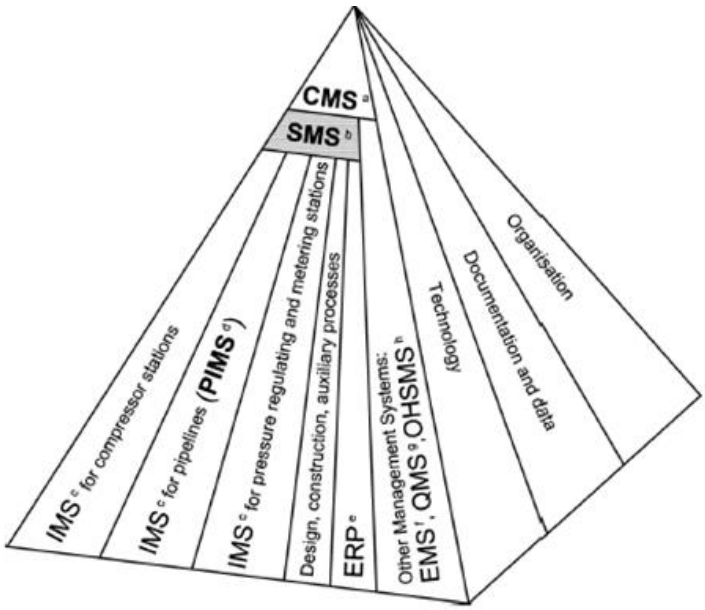
We will also describe activities that are carried out by TGS to implement ISO 55000 /1/2.

Method

When we need to control a complex system of pipelines, with cathodic protection systems, valves, installation, we have a central preoccupation: how to sustain the challenges of having to maintain and increase its reliability over time; how to reduce the risk level in low consequence areas; how to show the authorities that the pipeline system is safe.

We have some documents to help us in this activity. Some examples are:

1) Deutsches Institut für Normung European Norm **(DIN EN)16348**: This European Standard specifies requirements which enable a Transmission System Operator to develop and implement a Safety Management System (SMS) including an Integrity Management System (PIMS) specifically for pipelines.



Modular structure of EN 16348

CMS: Continuous Monitoring System

SMS: Safety Management System

IMS: Integrity Management System

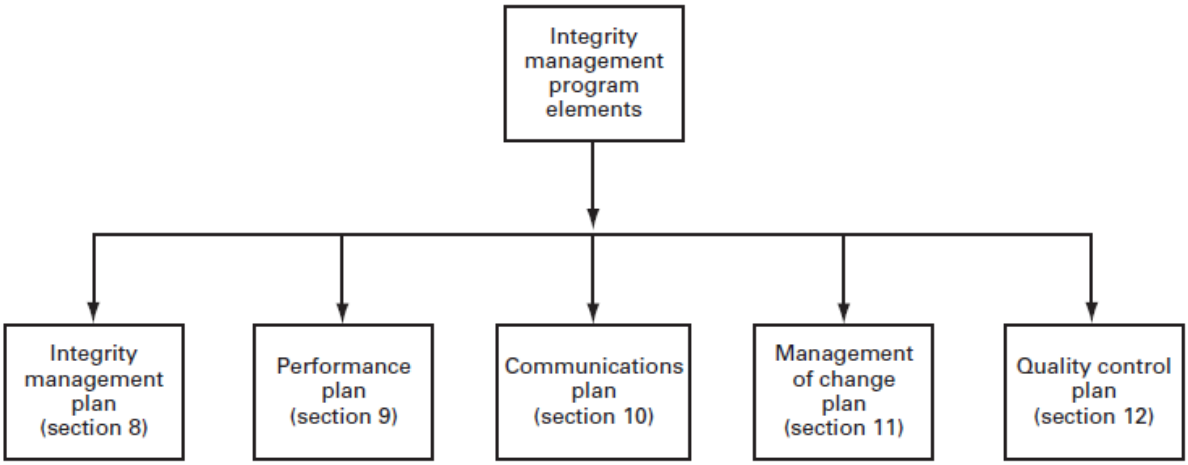
ERP: Enterprise Resource Planning

EMS: Environmental Management System

QMS: Quality Management System

OHSMS: Occupational Health and Safety Management System

2) **Pipeline Integrity Management System (PIMS):** is the collection of arrangements that collectively ensure the integrity of the pipeline. This assemblage of arrangements forms barriers layers of defense to accident. One is ASME B31.8s. because it is a management system approach for mitigating risks. This code is specially designed to provide the TSOs with the information necessary to develop and implement an effective integrity management program utilising proven industry practices and processes. The processes and approaches within this Code are applicable to the entire pipeline system.



PIMS and ASME B31.8s include in their conception the need for risk analysis, in order to prioritise tasks, and check risk reduction. The risk analysis is only one element in this process

But in fact, for many companies, the application of these methodologies does not meet the requirements of the company because of:.

- No link between Maintenance Management and Strategic Plan
- Inefficiency in Operation due to elements not taken into account during design
- Unexpected costs / lost opportunity
- Lack of documentation on the management
- Bad communications between areas (design, construction, operation)

The answer to this problem is a system of Assets Management like the ones described in **PAS55 2008** and **ISO 55000/1/2**. Both define what a physical assets management system must include to ensure sustainability and optimum asset performance.

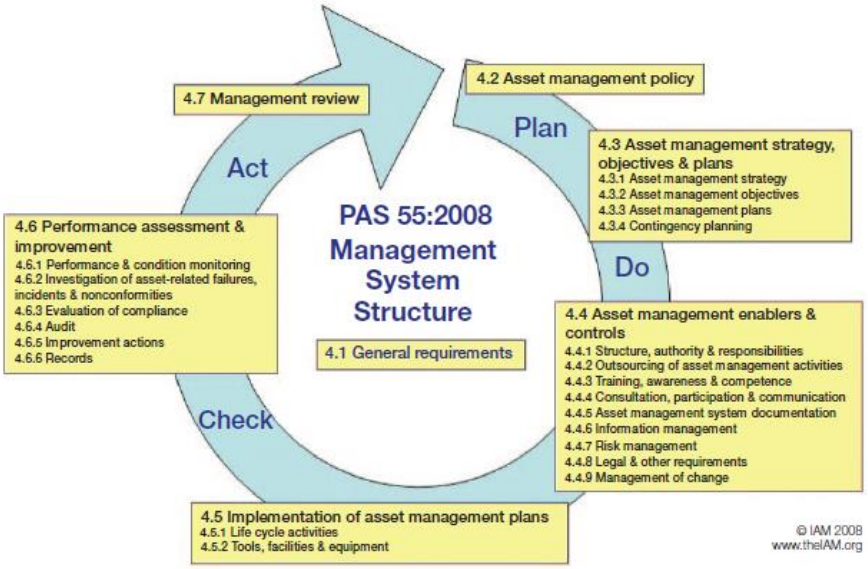
The Deming cycle, plan-do-check-act (PDCA), ensures quality in the physical asset management (PAM) environment. PAS 55 is based on the PDCA framework, with a primary focus on the management of physical assets and asset systems.

- **Plan** Establish the asset management strategy, objective and plans needed to deliver results in alignment with the organization's asset management policy and strategic plan.
- **Do** Establish the enablers for implementing asset management and other essential requirements, such as regulatory requirements; and implement the asset management plan(s).
- **Check** Monitor and measure results against asset management policy, strategy objectives, regulatory and other requirements; and record and report the results.
- **Act** Take actions to make sure that asset management objectives are achieved, and to continuously improve the asset management system and asset management performance.

PAS 55 has three key elements: it places the responsibility for asset management firmly in the hands of executive management; it is broad in reach, driving a cross-functional approach; and it addresses the key issues of risk, whole-life costing, and knowledge management, together with sustainability and accountability.

The PAS 55 asset management standard gives guidance and best practices on asset management and is typically relevant for all asset-intensive industries.
PAS 55 defines asset management as "systematic and coordinated activities and practices through which an organization optimally and sustainably manages its assets and asset systems, their associated performance, risks
and expenditures over their lifecycles for the purpose of achieving its organizational strategic plan."

This PAS gives guidance and a 28-point requirements checklist of good practices in physical asset management;



PAS55 states that a balance among the following drivers is necessary:

ISO 55000 is an overview of what an asset management system consists of and of the terminology that is used throughout the ISO 5500X suite of standards. The basic principles of asset management are mentioned, and the benefits that such a system offers the different management levels of an organisation are briefly outlined.

ISO 55001 specifies the minimum requirements to establish, implement, maintain, and improve an asset management system. These requirements are to enable parties, internal and external, to be able to measure an organisation's ability to meet legal, regulatory, and contractual requirements as well as the organisation's own requirements.

The last standard of the suite, ISO 55002, offers guidance on how to apply an asset management system in accordance with the requirements of ISO 55001. The standard informs the reader of how to implement and maintain an asset management system at all management levels of an organisation by providing guidance of what should be done. It also gives insight into the planning, operation, and support activities that go with such a system.

The entire ISO 5500X suite of standards is based on the general PDCA framework. ISO 55000 is not divided into the same subsections as ISO 55001 and ISO 55002, because it only explains the concepts and terminology of asset management systems. ISO 55001 and ISO 55002 are divided into seven main elements: (1) organisational context, (2) leadership, (3) planning, (4) support, (5) operation, (6) performance evaluation, and (7) improvement . These sections can be grouped to fit into the PDCA framework.

RESULTS

Why is it necessary to adhere to and apply PA555/ISO 55000?

Because this will enable us to:

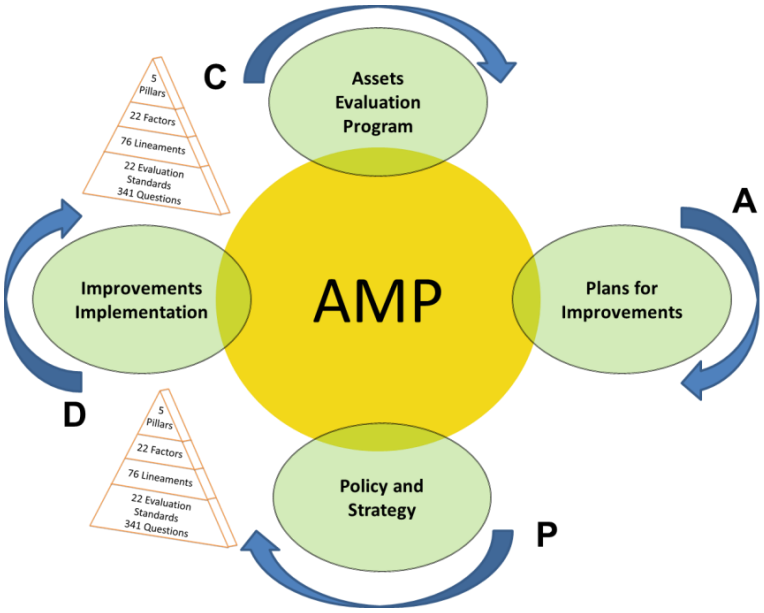
- Attain our aims and obtain results which are sustainable for a long time..
- Manage the assets involved along their life cycle
- Implement processes of permanent improvement
- Fulfill the requirements of cost-benefit decision making of all the levels of the organisation.
- Align the asset management strategy and approach with the overall business strategy
- ·Improve the integration between asset management and financial management processes
- ·Maximise return on assets
- ·Maximise asset uptime
- ·Foster an organisational culture focused on quality, safety, and continuous improvement

The development and implementation of a suitable assets management system is essential for the effective reliability of our assets.

PAS 55 / ISO 55000 is designed to help organizations display full asset management competence by meeting a particular set of requirements. Requirements address "good practices" rather than "best practices" in each area.

TGS is carrying out a process to implement **ISO 55000 / 1 /2** in the next year.

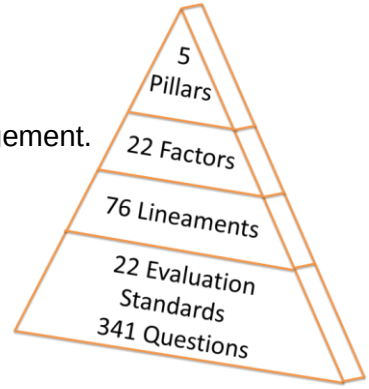
During 2013 TGS worked on design and development of Assets Managing Program (AMP) based on PAS 55. This program is structured on PDCA cycle. It is shown in the following figure:



In this way, improvements are continuously made by evaluations which verify the effectiveness of the assets policy.

We defined the following structure:

Pillars: they are the main factors of analysis by assets management.



They are:

- People
- Equipment
- Operations and Maintenance
- Project Design and Implementation

- Policy and Aims

Factors: Specific aspects of a Pillar to be evaluated. For example: Factors of Equipment are:

- Pipelines
- Rotating Equipment
- Equipment under pressure and fire
- Tanks
- Equipment under pressure without fire
- Control and Protection System
- Electrical System
- Big engines and vehicles

Lineaments: Requirements that each evaluated factor should comply with in order to attain the best standard expected by the organization

Evaluation Standard: It is a question whose answer will make it possible to evaluate each aspect of assets.

During 2014 and 2015 we will work on the implementation of Assets Management Program in TGS. This will include the following steps:

- ✓ **Information** about this plan to the employees. We believe this point is essential for the plant to be successful.
- ✓ **Training.** It includes the selection of the people to do the audit activity.
- ✓ **Evaluation**. Making questionnaires about Evaluation Standard for different assets.
- ✓ **Improvements**: Implementation of necessary measures detected in previous steps

Conclusions

- ❖ There are different concepts such us PIMS, IMS, SMS, Analysis of Risk that need to be clarified, because each of them has advantages and disadvantages.
- ❖ Our industry needs to improve the reliability of our assets.
- ❖ ISO 55000 Assets Management is a good way to reach this goal.
- ❖ TGS describes a methodology to attain this certification.

References

- Managing System Integrity Of Gas Pipelines (The American Society of Mechanical Engineers (ASME) B 31.8S)
- Gas Infrastructure Safety Management System (SMS) for gas transmission infrastructure and Pipeline Integrity Management System (PIMS) for gas transmission pipelines (British Standard European Norm (BS EN) 16348)
- Publicly Available Specification (PAS)55 2008
- The International Standards Organisation (ISO) 55000/1/2
- ISO 55000 Assets Management