

NSE-PHC General Meeting and Technical Evening

Challenges To Controlling Major Projects.

By

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INTRODUCTION

Project: A sequence of unique, complex and connected activities that have one goal or purpose and that must be completed by a specific time, within budget and according to specification.

A project comprises a number of activities that must be completed in some specified order, or sequence,

Projects are dynamic systems that must be kept in equilibrium, not an easy task but must be done. See diagram below.

Scope Triangle



Introduction - cont'd

The geographic area inside the triangle represents the scope and quality of the project. Lines representing time, cost, and resources availability bound scope and quality. Time line being the window of time within which to complete the project; cost line is the budget available to complete project, resource line are the consumable used on the project – people, equipment availability and facilities usually controlled by the project management team.

At the planning stage when all the resources have been identified, including time and cost fixed to deliver the scope and quality, the system is in equilibrium. However, this will not last too long as CHANGE is waiting around the corner during execution. Something is sure to change. For example the client calls with an additional requirement for a feature not in the original plan or market opportunities have changed and it is necessary to reschedule the deliverables to an earlier date, or a key team member leaves the company and is difficult to replace. Any one of these changes throws system out of balance.

Introduction - cont'd

On major project, the critical goals for the project management are **ultimate cost and completion date** (Reilly 2010) while not losing focus on quality. In other to achieve these goals, many factors go into successfully planning and executing a major project. Two primary factors considered are:

- (1) How well the major project is managed and
- (2) Ensuring that the major project can be kept under **control during planning and execution.**

Definitions

Project Management: According to PM body of knowledge, **project management** is the application of knowledge, skills, tools, and techniques to project activities to meet project requirement. It is a process (or set of processes) used to guide and focus work towards achievement of goals that have been set for the project.

Control is therefore a critical element on which the success or failure in **project management** rests in the execution of a major project.

Introduction - cont'd

CONTROL: According to Black's Law dictionary, it is "to regulate or govern the planning and execute of a major project (Garnar, 1999).

In more common usage, control means to:

- (1) Exercise restraint or direction over; dominate, regulate or command.
- (2) To hold in check; curb.

But with the major project, control primarily refers to hold in check, in order to prevent such things as cost overruns and schedule delays or to maintain minimum required quality.

Why is this distinction important? It is simply because whereas one can **MANAGE** a project well using all the best available tools and process and yet would still not be able to exercise control over the project during planning and execution, which almost always results in the project failing to meet its scope, cost, schedule and quality goals.

Introduction - cont'd

Attribute of major project.

- Cost above N1 billion – N200 billion
- Multiple year execution schedules
- Multinational involvement of designer, engineers, contractors, equipment suppliers and specialty material vendors.
- Specialty trade workforce in large numbers
- Consortium, financing and/or ownership
- Technical complexity.
- Political ramifications and risks.
- Social ramifications and risks.





CHALLENGE 1 – SAFETY FIRST [HEALTH, SAFETY, SECURITY AND ENVIRONMENT (HSSE)]

It is mandatory that every participatory stakeholder executing project must ensure that everybody goes home safely every day.

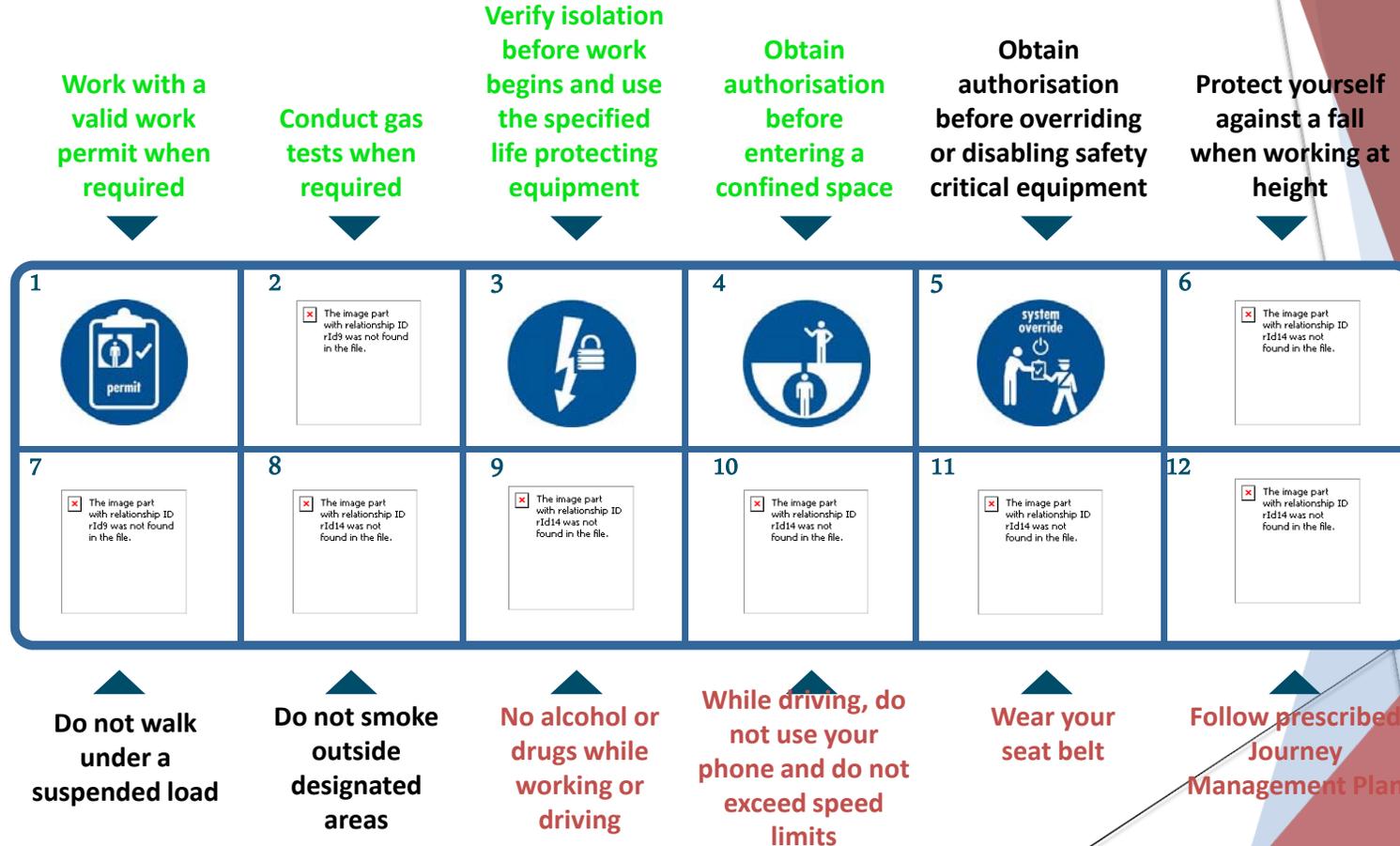
The Rule that Saves Lives

Life-Saving Rules

You and I go home safely every day



Life-Saving Rules – what are they?



Note: Commuting, alcohol in social settings and smoking in office environments are out of scope

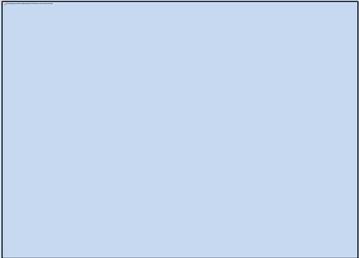
MAJOR PROJECT FATAL INCIDENTS

Three Project-related Fatal Incidents This year



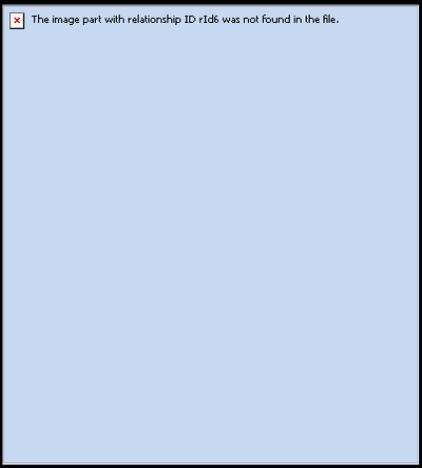
PTP
Malaysia
May 2013

GUMUSUT-KAKAP – May 2013



PTP
Germany
Jul 2013

RHEINPOWER – July 2013



UAU
Canada
Jul 2013

DEEP BASIN – July 2013

INCIDENT No.1 : RheinPower Fatality

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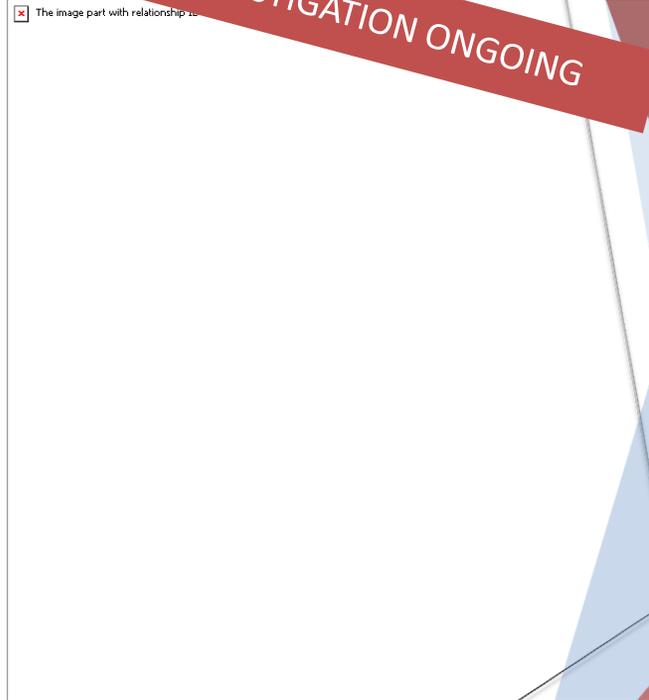
INVESTIGATION ONGOING

- ▶ Fatality resulted from a 170m (560ft) fall from a stack while carrying out project modifications to increase flue gas velocity.
- ▶ Activities involved fixing boards to the top of the chimney. The scaffold is approx. 1 m (3ft) from the top.

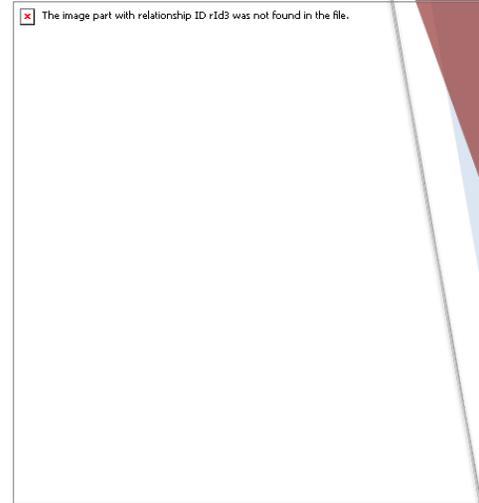
INCIDENT No.2: Deep Basin Fatality

- ▶ Fatality resulted from Injured Person (IP) being struck by a pipe during tie-in work at the Cecilia Gas Plant.
- ▶ The IP was inside a trench preparing for a pipe to be welded when a separate section of pipe fell into the trench and struck him

INVESTIGATION ONGOING



INCIDENT No.3: Gumusut-Kakap Fatality



- ▶ Floating Production System (FPS) had left construction yard
- ▶ Commissioning and Start-Up team performing checks on FPS
- ▶ Fatality resulted from the Water-Tight Door opening with great force, striking the Injured Person and throwing him backward, resulting in his head hitting the door stopper.



CHALLENGE 2 - THE RICOCHET EFFECT

This is a kind of 'ripple effect' that is common in major project. The effect results from, say, delay in delivery of needed materials impacts on string of schedule activities along the same line necessary to complete a specific element of the full scope of work. However, the "Ricochet effect" happens where changes introduced to an element of work activities causes some unexpected and unintended effect on some other elements of work that is not in the same sequence of event in the major project. While ripple effect are generally isolated to a particular string of logically related activities within a scope, ricochet effect bounces through non logical linked activities strings in unexpected and unpredictable ways which results in unintended consequences for those other activities and often the project as a whole - impacting on cost/schedule.



CHALLENGE 3: CONTROLLING NON PARTICIPATING STAKEHOLDER

Satisfying the communication needs of your team members and **participating stakeholders** and non-participating stakeholders, opens opportunity for managing a successful major project.

- **Participatory stakeholder**:- Those directly involved in the planning and execution of the project which include the owner (public entities, such as departments etc) consultants, engineers, construction, subcontractor, vendors, suppliers and
- **Non-Participatory Stakeholder**:- Those affected by the project, who have influence but who have no direct involvement in/or control over the planning management or execution of the project, including outside investor, regulatory agencies, labour unions, local government department, the media, special interest groups and the general public.

CHALLENGE 3: CONTROLLING NON PARTICIPATING STAKEHOLDER- Cont'd

With the non-participatory stakeholders, you are advised to watch what you say, because these set of stakeholder judge the success of a major project on a straight pass-fail basis. You either met its critical expectation or did not. Three main primary expectation of non-participatory stakeholder relative to a major project are:

- (1) The ultimate cost of the project.
- (2) The ultimate time to complete and
- (3) Whether the completed project fulfills its intended purpose, all as promised by those promoting and directly participating in the execution of the project.

Make promises that in realistic and with sound basis as non-participatory stakeholder will not react well to receiving a constant stream of news that project-cost has increased and time to completion adjusted out for progressively late dates.



CHALLENGES 4: CONTROLLING COST CREEP

Creeps here refer to minute changes in the project due to the obscure, and for a while unnoticeable, actions of team members, many of which go undetected until a problem raises its ugly head. Creeps have cost implication and does appear in form of:

Scope Creep – change in project that was not in the original plan. Changes can occur for several reason that have nothing to do with the ability or foresight of the client, project manager or the project team member. Market conditions are dynamic. Scope creep is necessarily anyone's fault. It is just a reality that has to be dealt with. It doesn't matter how good and thorough a job you and the client did in planning the project, scope creep is still going to happen.

Deal with it.

CHALLENGES 4: CONTROLLING COST CREEP-Cont'd

Based on experience with major project, cost issues, the following steps are considered worthy to be taken in order to check cost overrun during execution.

- (1) Turn cost trending and forecasting from a special event into a routine, continuous project control function that examines cost at a detailed level.
- (2) Ensure that adequate well-trained and experienced staff are included in the cost control group, dedicated to continuous trending and forecasting of major project costs.
- (3) Make sure that cost effect analysis and forecasting become elements of every significant decision made during the entire life cycle of the project. The first question that should be asked when faced with any issue or situation or change should be, “what effect will this have on the total project cost?”

CHALLENGES 4: CONTROLLING COST CREEP-Cont'd

Treat contingency differently. We should desist from perceiving it as being a first come first-used bag of money. Rather should be jealously guarded and spent in a miserly fashion and only grudgingly as final result. Contingency set in a budget is meant to last the entire duration of the project yet it is gulped before the project is anywhere near completion.

- (5) Base change control on 'no' being the first response. In essence, too much time is spent in describing the change and not nearly enough in justifying the change. It is better to assume that there is a real danger of any change initiating a **ricochet effect** within the major project, then one can understand that every change needs to be examined not only in terms of its cost and its possible ripple effect; it also needs to be of such value to the major project that it is worth taking the risk of initiating a ricochet effect within the project.



CHALLENGE 5: CONTROLLING SCHEDULE CREEP

A **schedule** defines the activity to be accomplished and start and finished dates for particular activity including planning, design and construction.

Critical Paths Method (CPM) **schedule** are used for planning and monitoring project. The CPM schedule is broken down into smaller work component and have three major components, namely: Activities, duration and logic. A combination of these components result in a network consisting of nodes and arrows. Later framed into project completion date and available float for each activity.

The CMP schedule today are computer based.

CHALLENGE 5: CONTROLLING SCHEDULE CREEP-Cont'd

BENEFIT OF USING CPM

On a major project, time means money and this is evidence when one thinks of the daily, monthly and annual spend rate on major projects. Keeping a full labour force in the field for an additional month to overcome **schedule delays** may cost more than most typical construction projects expend on executing the entire project from start to finish.

Therefore, one way to manage time effectively and efficiently is through a thorough understanding of CPM scheduling and its use as a management tool.

CHALLENGE 5: CONTROLLING SCHEDULE CREEP – Cont'd

The CPM schedule

- (1) Identifies the activities that must be completed as part of a project, thus laying out how a project is to be executed as well as how it might be resourced.
- (2) Determine what work activities must be done.
- (3) Determine what work activities can be performed in parallel.
- (4) Determine the shortest time in which to complete a project.
- (5) Determine total resources that are needed to execute projects, and can generate profiles of how much staff will be required and when; amongst others.

CHALLENGE 5: CONTROLLING SCHEDULE CREEP – Cont'd

SCHEDULE CONTROL ISSUES

- (1) The process of scheduling is an interactive process which by necessity involves input by participatory stakeholders, some of whom may not have been identified at the time when the project was approved and the initial schedule for completion of the project released. In view of this situation, project management is forced into the position of trying to forecast a completion date without having the details that would confirmed the reasonableness of the completion date set and **communicated to the non-participatory stakeholder.**
- (2) Optimistic bias built into the schedule in the form of the critical path, which assumes no float in that critical path schedule is another control issue.

CHALLENGE 5: CONTROLLING SCHEDULE CREEP – Cont'd

- (3) Schedule is much more sensitive to both ripple effects and ricochet effects than cost, and that makes identification, trending and forecasting more complicated because those effects may pass through hundreds of different and even seemingly unrelated activities on a given project.
- (4) Schedules have become so sophisticated with their computer software that there is a tendency to try to outwit the other stakeholders in order to portray certain areas of work as critical and other areas of work as not critical to serve their own purpose. Schedule manipulation should be carefully monitored and can come in form of
- Inclusion of imposed date constraint on activities.
 - Shortening of future duration - Contractor use it when they are responsible for a delay and want to give the impression that they are still on schedule.
 - Revision of logic- May result from changes in the work or attempt on project work-around to recover delays. Sometimes revision of logic manipulation is intended to show a different critical path/or give the false impression that the project is still on schedule.



CHALLENGE 6: CONTROLLING INFORMATION OVERLOAD

Ironically, so much information is generated on a daily basis in major project management and control by the participatory stakeholders such that the volume of information produced now becomes a barrier to effective or efficient cost and schedule control. Take for instance a typical Energy plant projects may have the following attribute:

- Regulatory oversight, approval authority, reporting demand from multiple governmentally empowered agencies (ie environmental and permitting bodies).
- Multiple investment stakeholders, each with application and reporting requirement.
- Multiple general & special engineering consultants each generating huge volumes of technical documentation.
- Multiple equipment supplier & material supplier again producing volume of technical documents.
- Multiple general & special contractors producing schedules, progress reports, earned value report, normal administration document.
- The project management team which is not only receiving, reviewing and responding to the document generated by other participatory stakeholder but also producing its own reports, communication and analysis.

CHALLENGE 6: CONTROLLING INFORMATION OVERLOAD-Cont'd

Despite the volume of document produced it is still the responsibility of the project management to sort out those document that will enable it to exercise full control over **cost and schedule** that are one of the main goals of successful project management.

Regrettably, the most important point of control and the one least given attention is '**document control**'. The aim of a sound document control process is to get the right information to the right person(s) at the time when it is most needed and most useful. It is common to underestimate the volume of documents that quickly and completely inundate the project team. These documentation grew over time because of technological advances. Computerized processes and increased demand for information relative to every element of the major project.

CHALLENGE 6: CONTROLLING INFORMATION OVERLOAD-Cont'd

To effectively manage and control document/information, the project management will have to:

- (1) Engage adequate and well trained staff, no less important in a project than a cost engineer or a schedule engineer.
- (2) Professionally organized document control procedure, tailored to the major profit structure and organization.
- (3) Set a computerized tracking system for document which not only controls distribution but also maintains the 'record copy' for each document through the system.
- (4) A 'trip wire' function that alert the document control manger when required document have not been received as expected.
- (5) A centralized computer document storage and retrieval system-live link, to ensure project document do not get missing in the piles.





LESSONS LEARNED

- The two most critical control issues on a major project are cost and schedule.
- Measuring cost and schedule performance depends on the expectations set for both cost and schedule at the beginning of the project.
- Non-participatory stakeholders to a major project do not hear the concept of cost or schedule **estimate**; they interpret it as real cost and time. **Beware!**
- Changes and effect do not just ripple through linked work activities only, they also ricochet through non-linked work activities because of complexity in the major projects.
- Critical factor to exercising control is engagement of sufficiently experienced and qualified cost and schedule staff.
- Use correct tools to assist in controlling cost and schedule. Tool is tool, people must absorb the information and ultimately make decision based on the information.
- Document management must not be ignored as it is key to any proactive control process; to defend against dispute, claims and litigations on a project.

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PEDESTRAIN SAFETY

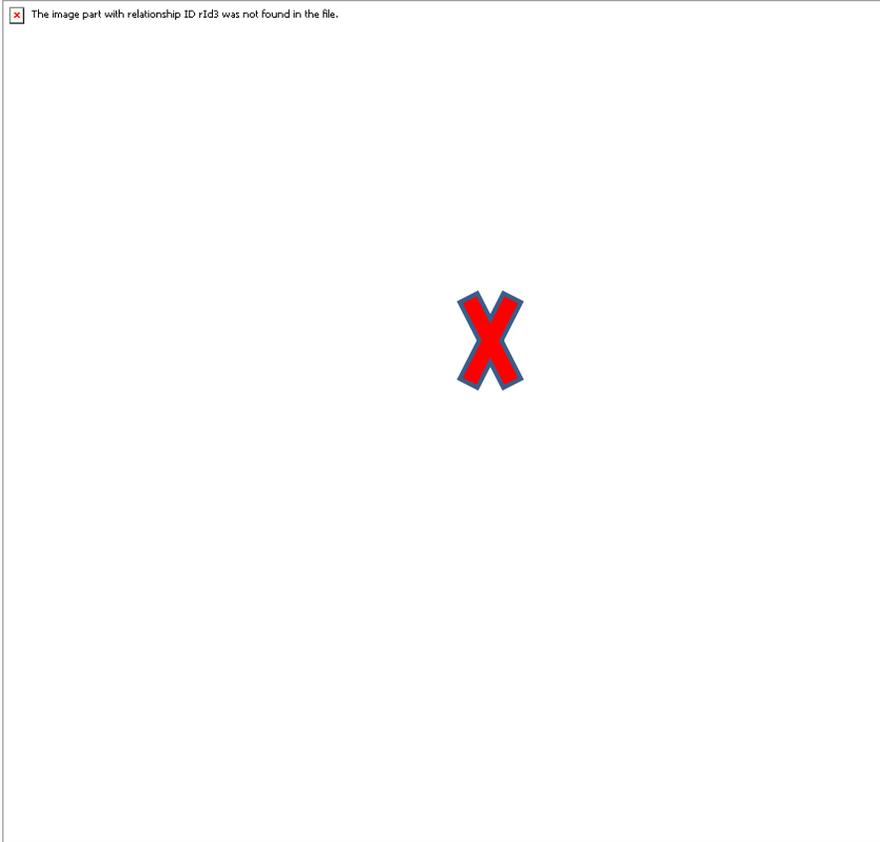
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EVERY JOURNEY STARTS WITH A STEP, WE ARE ALL INVOLVED





Hydrocarbon Hazards



Locate generator away from Hydrocarbon fuel source

Storage of Hydrocarbon fuel in same location with Generator or other ignition sources have cost some people very valuable possessions, including human lives -

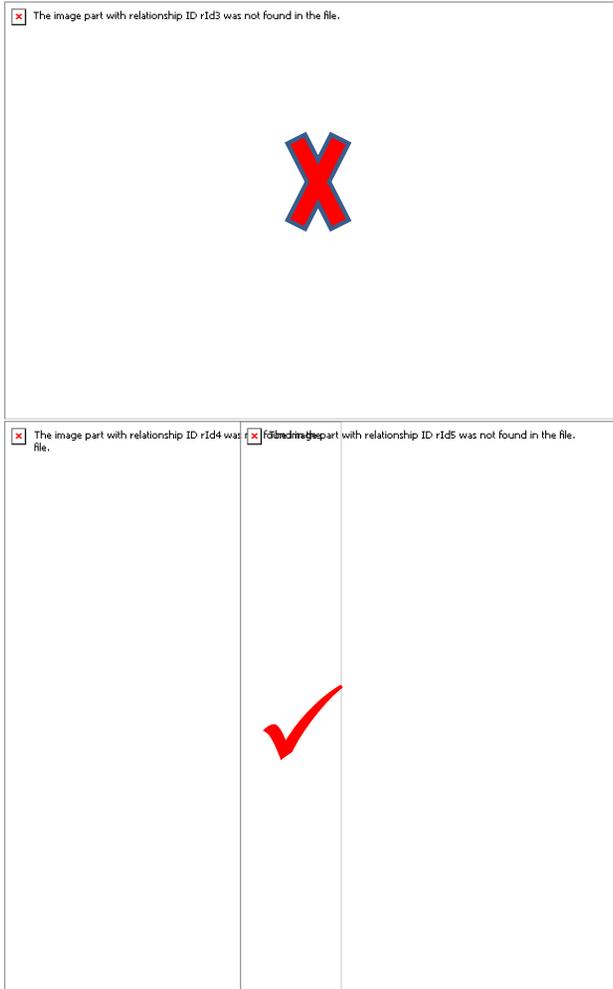
Beware of the explosive properties of Hydrocarbon

Do not fuel your Generator while running

Products of Hydrocarbon combustion can lead to asphyxiation

Keep generator distance from residential and office accommodation reasonable

Hydrocarbon Hazards



Locate your Hydrocarbon gas bottles away from the kitchen

Storage of cooking Hydrocarbon gas bottles inside the kitchen is a bad practice and could cost you valuable possessions, including human lives

Hydrocarbon Hazards

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Do not travel with cans of Hydrocarbon fuel stored in the trunk of your vehicle

Hydrocarbon Hazards

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Do not travel with cans of Hydrocarbon fuel stored in a boat

Burning Open Boat (Cotonou boat) containing drums of Crude Oil

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