RISK ASSESSMENT

BY JOHN VIVIAN

MANAGING RISK CONTROL MEASURES

RISK ANALYSIS

THE RISKS WERE IDENTIFIED AND PRESENTED IN THE FORM OF A RISK REGISTER AND RISK REPORT.

THERE ARE FOUR MAJOR PHASES OF A PROJECT:

- PLANNING AND DEVELOPMENT
- CONSTRUCTION, TESTING AND COMMISSIONING.
- PROJECT OPERATION
- PROJECT SUSTAINABILITY

INCORPORATE IN YOUR RISK ASSESSMENT AT SEVERAL STAGES AND ENSURE YOU HAVE AN EFFECTIVE FEED BACK SYSTEM.

RISK MANAGEMENT *BY WIKIPEDIA*

- **RISK MANAGEMENT** IS THE IDENTIFICATION, ASSESSMENT, AND PRIORITIZATION OF RISKS (DEFINED IN ISO 31000 AS *THE EFFECT OF UNCERTAINTY ON OBJECTIVES*.
- REGARDLESS OF WHETHER POSITIVE OR NEGATIVE, RECORD THE POTENTIAL RISKS OF A DESIGN.
- CONSIDER ECONOMICAL IMPLICATIONS THE RISK AND THE PROBABILITY AND/OR IMPACT OF UNFORTUNATE EVENTS, AIM TO MINIMISE THE RISK THROUGH INNOVATION.
- RISKS CAN COME FROM *UNCERTAINTY* IN FINANCIAL MARKETS, PROJECT FAILURES (AT ANY PHASE IN DESIGN, DEVELOPMENT, PRODUCTION, OR SUSTAINMENT LIFE-CYCLES).

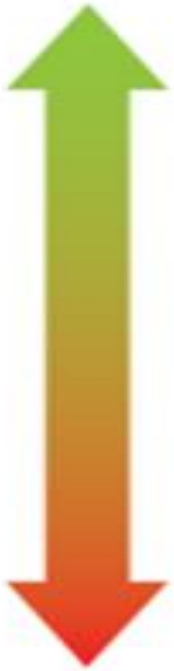
SELF RISK ASSESSMENT FOR THE LATHE

- This specific tool has been prepared to assist operators of prescribed mines to explore their risk control measures and identify opportunities for improvement. It can be used as a stand-alone document or alternatively the content contained within this tool can be used to supplement existing site procedures.
- The Self-assessment toolbox is made up of core tools covering processes that are an essential part of day to day safety management.

Hierarchy of controls

Start at the top and work down

Most effective control



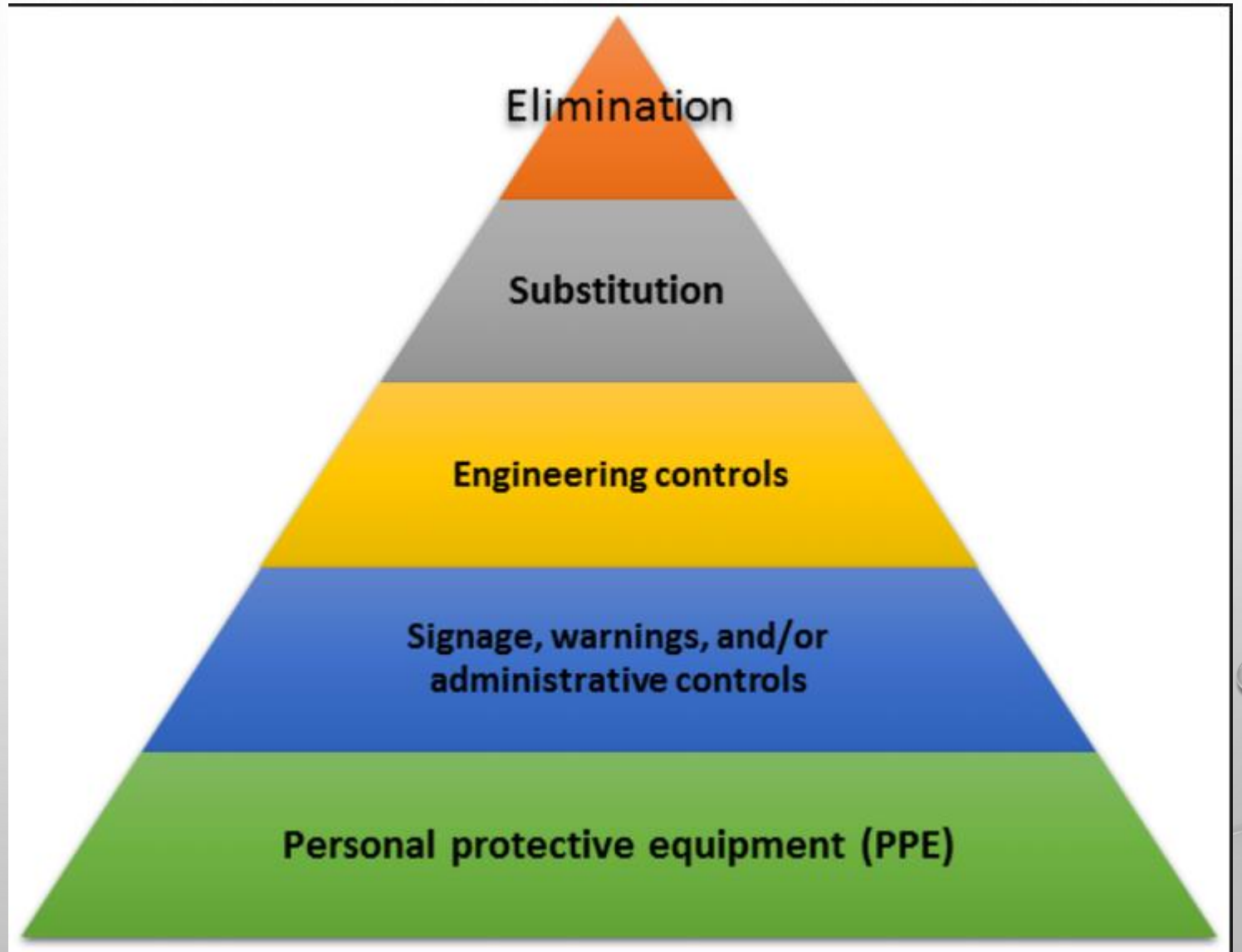
- **Elimination** e.g Discontinue use of product, equipment, cease work process, automation
- **Substitution** e.g. Replace with a similar item that does the same job but with a lower hazard level
- **Isolation** e.g Put a barrier between the person and the hazard
- **Engineering/Organisational Controls** e.g. Change the process, procedures, rosters, training etc. to minimise the risk
- **Personal protective equipment** e.g. Equipment worn to provide a temporary barrier

Least effective control

This hierarchy of controls aims to help managers understand the order in which to consider controlling health issues

HIERARCHY OF CONTROLS

- The risk control measures outlined in regulation 5.3.8 are ranked from the highest level of protection and reliability to the lowest (ie the most effective to the least effective). This ranking is known as the 'hierarchy of control' and is illustrated by the accompanying diagram.



CONSIDERATION OF RISK MANAGEMENT

- The likelihood of the hazard or risk concerned eventuating
- The degree of harm that would result if the hazard or risk eventuated
- What the person concerned knows, or ought reasonably to know, about the hazard or risk and any ways of eliminating or reducing the hazard or risk
- The availability and suitability of ways to eliminate or reduce the hazard or risk
- The cost of eliminating or reducing the hazard or risk.

ADOPTING CONTROL MEASURES TO ELIMINATE RISK

Elimination

- Have you considered that the best control option is to remove a mining hazard completely so that its associated risks to health and safety are eliminated? An example of this would be eliminating the risk associated with Load Haul and Dump (LHD) equipment operators being exposed to broken and unsupported ground in draw points by using remotely controlled LHD equipment.
- *Have you adopted risk control measures* which eliminate risk? If so, have you considered what systems you need to have in place to ensure these control measures survive and are reliable? Control measures include: management sign off of design standards and management of change systems.
- Have you recorded who was involved and who you consulted *with*?

USING SUBSTITUTION, ISOLATION OR ENGINEERING CONTROLS TO REDUCE RISK

- For the purpose of complying with subregulation (1), the operator must, so far as is reasonably practicable, use one or any combination of the following risk control measures–
  - the substitution of a new activity, procedure, plant, process or substance for that which is related to the relevant mining hazard;
  - the isolation of persons from the mining hazard;
  - engineering controls.

ENGINEERING CONTROLS

- That is, have you reduced the risk by engineering methods such as using mechanical or engineering devices or changing work processes?
- An example of this would be engineering fit for purpose be guarding for rotational machinery.
- Automatic shut off protection for time out sequencing.

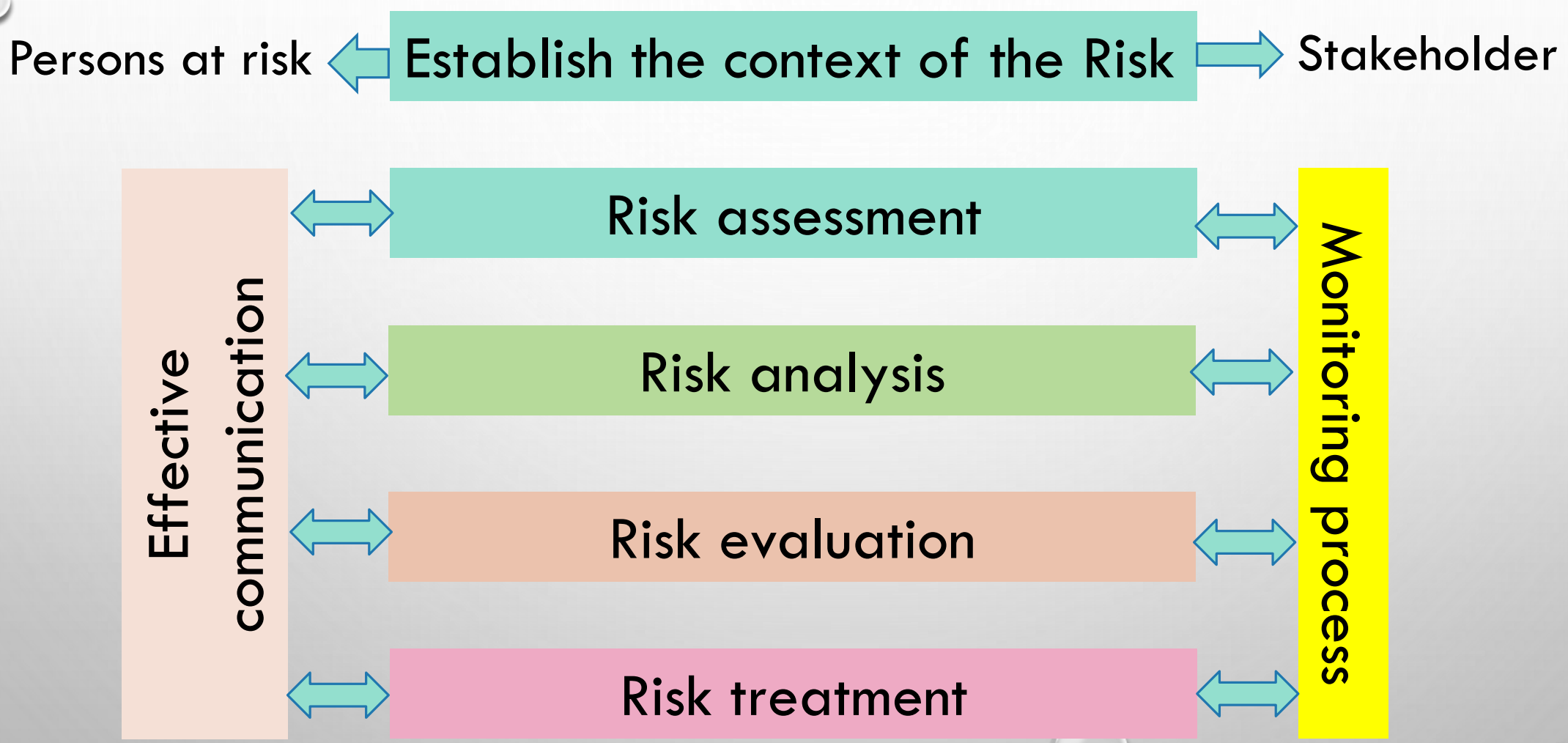
USING ADMINISTRATIVE CONTROLS TO REDUCE RISK

- If you are unable to eliminate or reduce the risk, have you adopted *administrative controls*?
- For example, developing a system procedure which specifies the requirements for effective tolerances required for support of underground workings.
- Have you considered what systems you need to have in place to ensure that administrative controls survive and are reliable?
- Some key examples of this include: supervision, accessible work instructions, auditing systems, job cycle checks, training, instruction, and competency testing.

USING PPE TO REDUCE RISK

- If the risk to health and safety remains after consideration of higher level control strategies, have you adopted the use of PPE to reduce the risk? Some key examples of this include: self-rescuers, mandatory issue of safety shields for personnel working in the risk zone.
- Have you *considered that identifying PPE* for use will depend on the type of work or process and what you know about an injury or disease that can be caused by doing the work or process?
- Have you considered that this type of control will only be effective if you have chosen suitable *protective equipment,* it is fitted and maintained correctly, and used at all times when needed?

Risk Management process



WHY HAVE SAFETY DATA SHEETS

SAFETY DATA SHEET (MSDS), PREVIOUSLY CALLED A MATERIAL SAFETY DATA SHEET (MSDS), IS A DOCUMENT THAT PROVIDES INFORMATION ON THE PROPERTIES OF HAZARDOUS CHEMICALS AND HOW THEY AFFECT HEALTH AND SAFETY IN THE WORKPLACE.

THE SDS SHOULD ALWAYS BE REFERRED TO WHEN ASSESSING RISKS IN THE WORKPLACE.

Class activity

You will be asked as an individual to make a list of potential risks for your team project as we consider each classification.

WHAT AREAS SHOULD I INCLUDE SAFETY DATA SHEETS IN MY PROJECT?

1. IDENTIFY ANY CHEMICALS YOU MAY BE APPLYING TO YOUR PROCESS.

2. MSDS *ALSO* ARE USED TO ILLUSTRATE AND DOCUMENT SAFE WORKING PROCEDURES.

3. TO PROVIDE A WRITTEN DOCUMENT THAT USERS AND EMERGENCY PERSONNEL CAN USE WHEN WORKING WITH CHEMICALS AND ADDRESS;
    1. PRECISELY WHAT THE RISKS OF THAT CHEMICAL
    2. THE IDENTITY OF THE CHEMICAL,
    3. HEALTH AND PHYSIO-CHEMICAL HAZARDS,
        E.G MELTING/FREEZING POINT (°C OR K): BOILING POINT (°C OR K): RELATIVE DENSITY; VA POUR PRESSURE (PA OR N/M^2): SURFACE TENSION (N/M): WATER SOLUBILITY (KG/M^3
    4. SAFE HANDLING AND STORAGE PROCEDURES,
    5. EMERGENCY PROCEDURES, AND FLASH POINT (°C OR K):
    6. DISPOSAL CONSIDERATIONS.

WHAT AREAS SHOULD I INCLUDE SAFETY DATA SHEETS IN MY PROJECT?

IDENTIFY USING A SCHEMATIC OF YOUR DESIGN PROCESS AND CONSIDER THE FOLLOWING AREAS YOU MAY BE APPLYING TO YOUR PROCESS.

1. TO PROVIDE A WRITTEN DOCUMENT THAT USERS AND EMERGENCY PERSONNEL CAN USE WHEN WORKING WITH CHEMICALS AND ADDRESS;
    1. AREAS YOU NEED TO RECONSIDER TO MITIGATE THE RISK OF OVER PRESSURISATION AND DEVISE WAYS THIS MAY BE DONE.
    2. WHAT MATERIALS DO YOUR NEED TO CONSIDER IN TERMS OF EXPOSURE TO VARIOUS ELEMENT AND THE EFFECT THAT CAN ARISE IN TERMS OF CORROSION.

USE YOUR FISH BONE DIAGRAM TO DO THIS.

1. ELECTRICAL NON COMPLIANCE . AS/NZS 3439.1 - 2002

- IDENTIFY WHAT AREAS WILL BE LOW FOR US GPO IS 240 VOLTS FROM EXTRA LOW VOLTAGE NOT EXCEEDING 50 V A.C. OR 120 V AS DEFINED IN AS/NZS

DEVELOPING A MATERIALS SPECIFICATION

TYPICALLY THEY CONTAIN

- MATERIAL PROPERTIES
- DESCRIPTION
- DIMENSIONAL DETAIL
- LIMITATIONS OF MATERIAL TO BE USED.
- TOLERANCES THAT MUST BE MET
- COMPLIANCE STANDARDS AND THEIR RELEVANT CLAUSES.
- THE NAME OF THE COMPANY AND AUTHOR WITH THE LATEST REVISION NUMBER.
- SHIPPING AND STORAGE REQUIREMENT AIMED AT PROTECTING THE PRODUCT FROM DAMAGE AND COMPROMISING THE QUALITY.
- SAFETY ISSUES OR CONSIDERATIONS.

Identify Hazards and subsequent Risks	Analyse Risks Evaluate Risks			Identify and evaluate existing risk controls			Further Risk Treatments
Hazards/Issues/Risks	Consequence	Likelihood	Risk level	What we are doing now to manage this risk.	Effectiveness of our strategies	New risk level	Further action needed Opportunities for improvement

			Consequences				
			1 – Insignificant Dealt with by in-house first aid, etc	2 – Minor Medical help needed. Treatment by medical professional/hospital outpatient, etc	3 – Moderate Significant non-permanent injury. Overnight hospitalisation (inpatient)	4 – Major Extensive permanent injury (eg loss of finger/s) Extended hospitalisation	5 – Catastrophic Death. Permanent disabling injury (eg blindness, loss of hand/s, quadriplegia)
Likelihood	A -	Almost certain to occur in most circumstances	High (H)	High (H)	Extreme (X)	Extreme (X)	Extreme (X)
	B -	Likely to occur frequently	Moderate (M)	High (H)	High (H)	Extreme (X)	Extreme (X)
	C -	Possible and likely to occur at some time	Low (L)	Moderate(M)	High (H)	Extreme (X)	Extreme (X)
	D -	Unlikely to occur but could happen	Low (L)	Low (L)	Moderate(M)	High (H)	Extreme (X)
	E -	May occur but only in rare and exceptional circumstances	Low (L)	Low (L)	Moderate (M)	High (H)	High (H)

Risk Register

Risk Rank	Name	Consequences	Likelihood	Risk Level	Engineering Solution
1	Vibration	Major	Unlikely	High	The hub is intentionally heavier with higher gauge material to absorb vibrations. Adding a vibration sensor in the internal electrical components to monitor the amount of vibration within the turbine.
2	Mechanical Breakdown	Major	Unlikely	High	Hardened materials such as high tensile steels used for internal and external components.
3	Overheating internal components	Moderate	Unlikely	High	Installing internal fan over the gears to cool components. Installing temperature gauge to monitor Battery Pack, Alternator, if it becomes too hot, PLC will shut down system.
4	Structural Failure	Major	Unlikely	Very High	Static Forces team did necessary calculations to ensure the turbine had the correct support structure. A Hot dip galvanised steel was used for the pole.
5	Wind volatility	Major	Likely	High	Control the cam so that we can angle the wings 180 degrees so that they are in a perfect stall therefore no lift will be generated resulting in a significant decrease in speed.
6	Excessive Centrifugal Forces	Major	Unlikely	Medium	Increased the diameter of the turbine to reduce rotational speed but increase tip speed. Still creating efficient power.

CLASS ACTIVITY

- STAGE 3
  - FINAL ASSEMBLY USING YOUR *VSM* PROJECT AND PROJECT PLAN.
    - *PREPARE JOB SAFETY ANALYSIS (JSA) AND PERFORM A RISK ASSESSMENT.*
    - *PERFORM A FINAL REVIEW OF RESOURCES AND SKILL AUDIT.*
    - *ENSURE PERSONNEL TRAINING PRECEDES THE DOING PHASE.*
    - *SET UP THE SUB GROUPS FOR TASK AND VERIFY THINGS ARE ON SCHEDULE.*
    - *QUALITY CONTROL CHECKING PROCESSES FOR THE FINAL CONSTRUCTION PROCESS.*
    - *IMPLEMENT THE PLAN .*

LEARN MICROSOFT PROJECT IN 16 MINUTES FLAT

. HTTP://WWW.YOUTUBE.COM/WATCH?V=SPWURRG9_GS