ASSESSMENT AND OPERATIONAL CONTROL OF ON-SITE ENVIRONMENTAL IMPACTS

Eng. Moemen Ahmed Abd Elfattah

MSc. Construction Management Program, Cairo University, Spring 2014

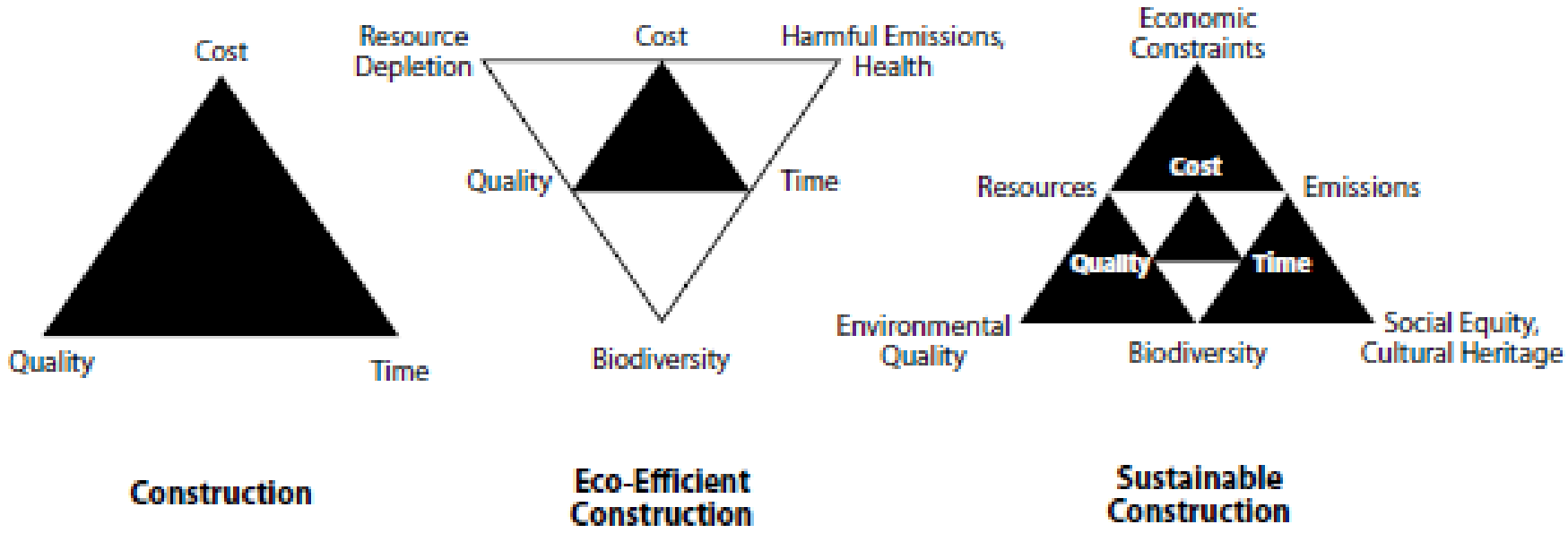
Supervision

Prof. Dr. Moheeb I. Elsaid

AGENDA

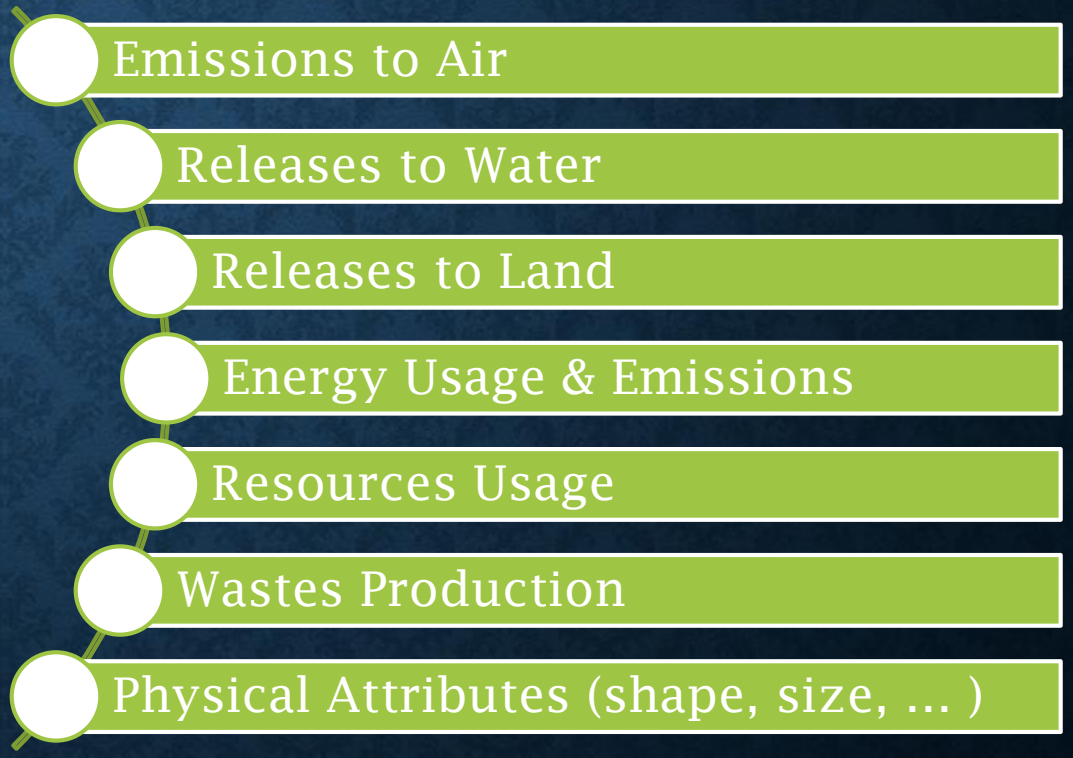
- Concepts, Definitions & Cycle of management.
- Environment Management System & ISO 14001.
- Assessment of Environmental Impacts.
- Environmental Impacts Control on-site.
- Focus Points for Construction Professionals.
- Case Study; P&R - SUSTAIN Lincolnshire, UK.
- Conclusions.

CONSTRUCTION, ENVIRONMENT & SUSTAINABILITY



ENVIRONMENTAL ASPECTS

- Environmental Aspects of construction projects include any part or activity, that interact with surroundings.
- Surroundings include; air, water, resources, land, fauna, flora, humans & their interrelations.



ENVIRONMENT MANAGEMENT SYSTEM (EMS) & ISO 14001 STANDARD

- EMS is a part of organization internal system, which is utilized to manage environment related issues; developing & implementing environmental policy & by continues management of environmental aspects.

- ISO 14001 offers a generic EMS model for organizations, which can be adopted voluntarily.

MANAGEMENT CYCLE OF EMS IN ISO14001

- ISO 14001 methodology is based on continues improvement, or progressive elaboration.

- Cycles of PLAN-DO-CHECK-ACT form the framework of environmental driven efforts into increasing organization performance.

ENVIRONMENTAL IMPACTS ASSESSMENT (EIA)

- EIA is a process by which the potential environmental impacts of a proposed development are assessed at an early stage of decision-making in order to promote sound environmental management.

- EIA was first introduced by the US National Environmental Policy Act (NEPA) of 1969, and since then provisions for it have been implemented in more than 100 countries

ASSESSMENT METHODOLOGY

- *Environmental impacts can be understood & assessed through the Risk Management framework.*
- *The Significance (SG) of the Risk related to any Environmental Impact can be assessed utilizing two factors;*
  - *The Severity of the impact (SV).*
  - *The Concerns level related to such impact (CO).*

$SG = SV \,.\, CO$ ... ... Assessment of Env. Impact Significance

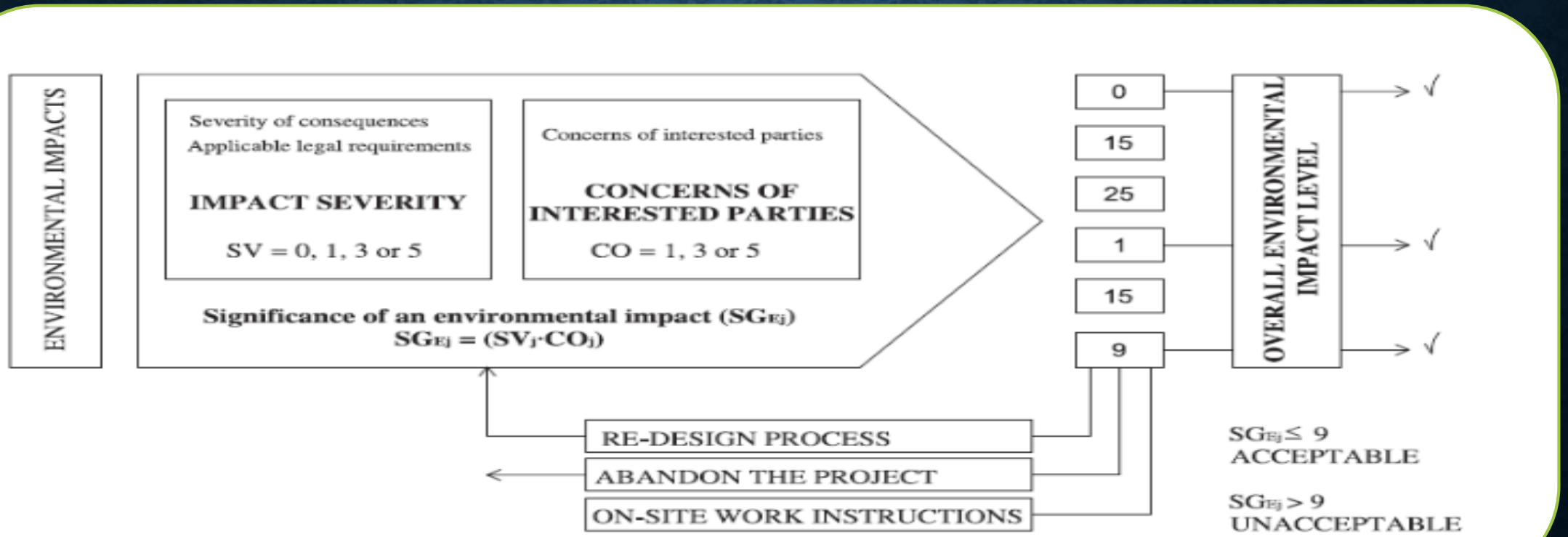
ASSESSMENT INDICATORS

To quantify the severity & concerns level factors indicators need to be developed.

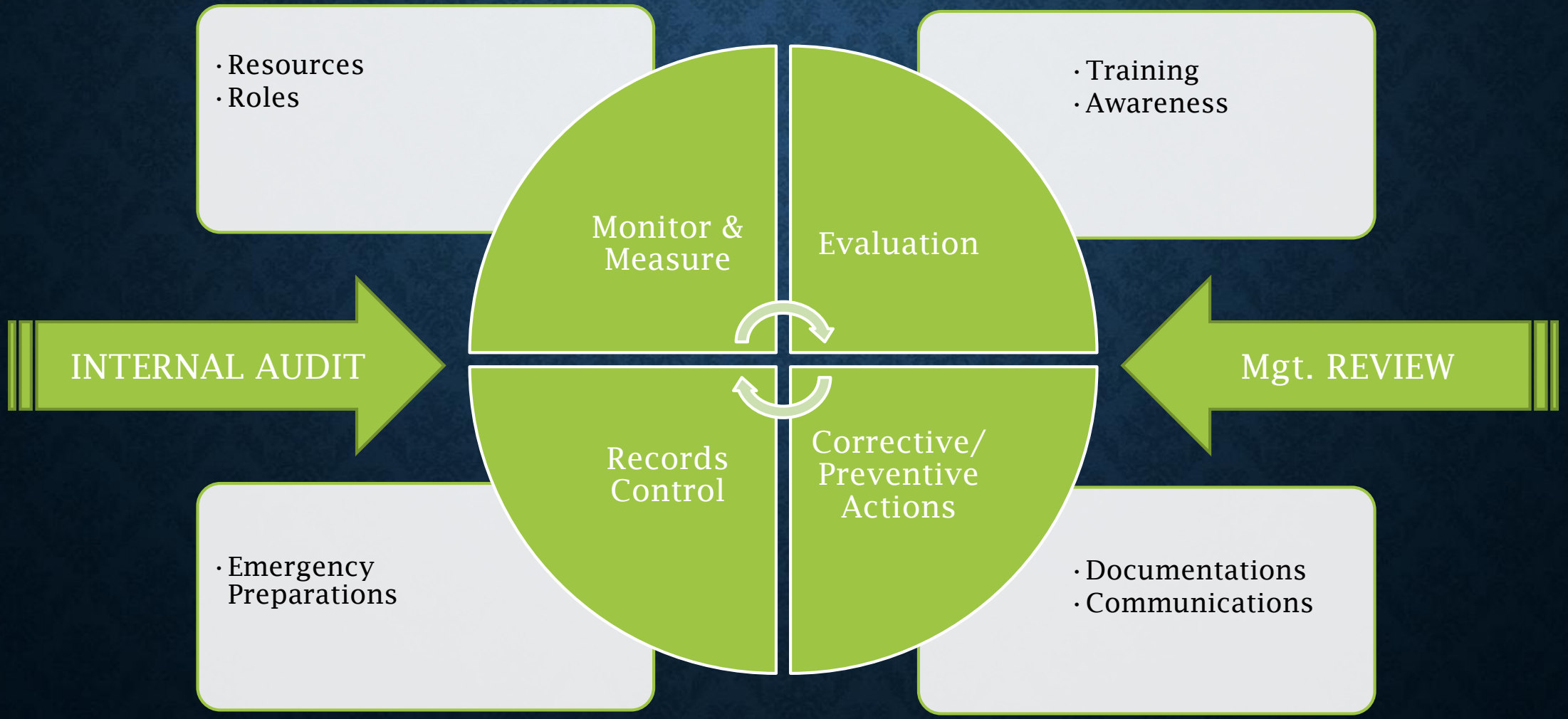
Indicators must be specific and measurable

Aspect	Indicator	SV=0	SV=1	SV=3	SV=5	CO=1	CO=3	CO=5
Dumping of sanitary water resulting from on-site sanitary conveniences in municipal engineering works	Average number of workers per day [number of workers]	P = 0.00	0.00 < P ≤ 6.37	6.37 ≤ P < 16.54	P ≥ 16.54	Connection to sewage system	Dumping in septic tank and/or existence of previous treatment	Direct dumping to the natural or urban environment

ASSESSMENT & DECISION MAKING



IMPLEMENTATION & CONTROL ON-SITE



COMMON H.R. ISSUES FOUND ON-SITE

Three main issues were found, that hurdle the work of environmental personnel on-site [*G. Rodríguez, 2011, Community of Madrid*];

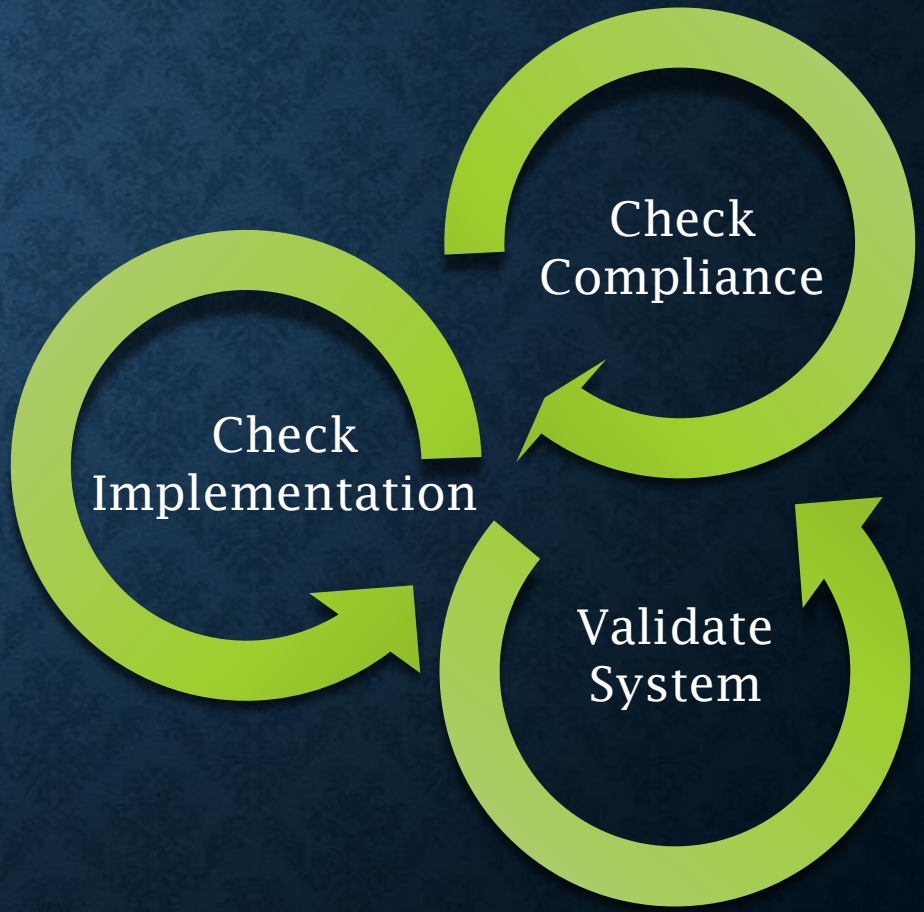
(1) Appointing environmental supervisor, who doesn't have adequate knowledge, relative experience, or did not receive appropriate training.

(2) Environmental supervisors did not get the required autonomy in work, and did not have enough authority to perform as required.

(3) Not allocating enough resources to the support implementing EMS onsite.

ENVIRONMENTAL AUDIT ON-SITE

Audit is a systematic, documented verification process of measurements to determine whether the environmental aspects of the project complies with determined allowable criteria or not. And to produce feedback reports, which can be used to develop and implement corrective actions



AUDIT CHECKLIST SAMPLE

Audit Checklist	Implemented?		N/A	Remarks Specify taken measurements, refer to required standard, define exact evidences and propose resolution.
	Yes	No		
1. Water Alteration Control				
▪ Are water discharge licenses valid?				
▪ Are wastewater treatment system being used and properly maintained on site?				
▪ Are there any wastewater discharged to the surface water channels? Is the wastewater being treated?				
▪ Are sewage channels and manholes free of silt and sediment?				
▪ Are sedimentation traps and tanks free of silt and sediment?				

FOCUS POINT ON-SITE: AWARENESS

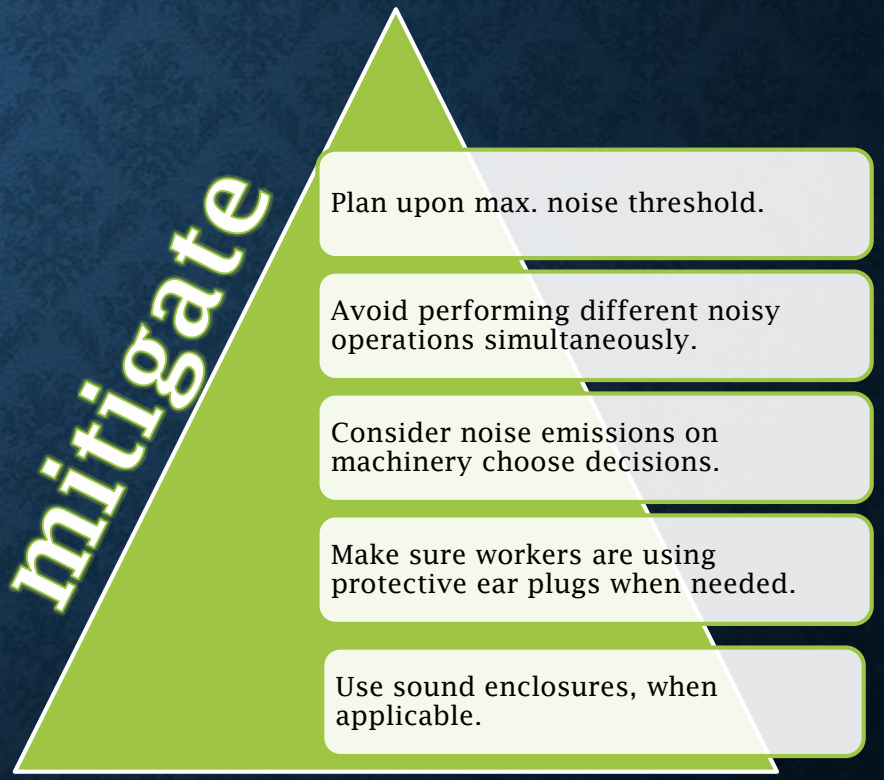
Applying EMS on construction onsite work requires a comprehensive efforts through both planning and execution phases, such efforts should be based on systematic approach as discussed. Still, due to the dynamic nature of construction work, which requires responsible personnel on site to take immediate decisions and actions on daily base, it is important to develop an environmental sound of awareness among those professionals.

REMEMBER

Air Pollution	Ensure that all vehicles and machinery are fitted with appropriate emission control equipment, maintained frequently and serviced.
Littering	Provide bins for construction workers and staff at locations where they consume food.
Chemicals & Fuel	Minimize fuels and chemicals stored onsite. Implement a contingency plan to handle spills.
Roads	Cover all loads of soil being taken off site for disposal.

FOCUS POINT ON-SITE: NOISE

- Construction activities are major source for acoustic pollution in development areas. Noise pollution has a direct impact on both neighbors and workers on-site.
- Many regions lack specific regulations to control construction's noise impacts on surrounding, therefore internal awareness of this impact is highly required.
- Excavation is the noisiest stage, since it is directly linked to the machinery used. Concrete pouring, and material unloading follow.
- Construction noise is usually of low frequency & variable nature, which makes it very annoying.



FOCUS POINT ON-SITE: WASTE

- Construction and Demolition waste is one of the largest global waste streams and makes up an estimated 50% of all waste in some regions [M.INGLIS, NZ, 2007].

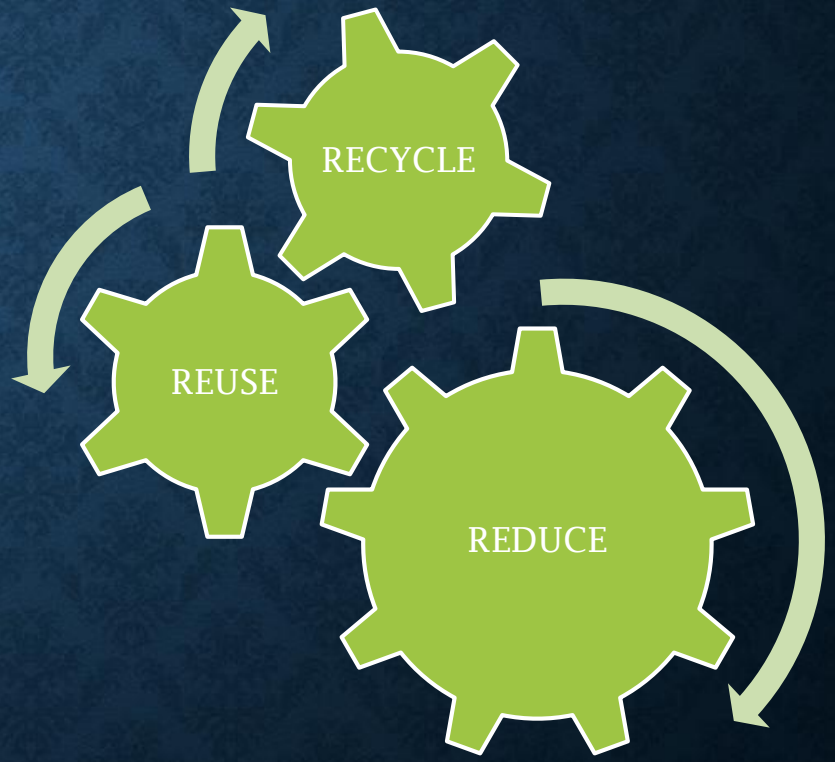
- Researches and case studies show that between 50% and 80% of construction wastes are reusable [G.Rodrıguez, Spain, 2006].

FOCUS POINT ON-SITE: WASTE MGT.

Waste Management Plan is normally required to handle wastes effectively on-site.

Common measures to deal with construction wastes on-site include;

- Obtaining construction materials, paints, lubricants and other liquids in reusable packaging or containers·
- Sending waste concrete from demolition activities to a concrete recycler instead of landfill·
- Segregating and recycling solid wastes generated by construction activities, offices and mess-rooms·
- Collecting lubricating oil from the construction vehicle fleet and sending it to a recycler.



CASE STUDY, EMS IN S.M.E. : P&R CO.

- P&R Plant Hire is a medium size construction company in UK, which specializes in groundwork, civil engineering and plant hire.
- In order to be able to compete in market, and under major clients' pressure, P&R needed to adopt to ISO 14001 EMS, and to show improvement in environmental performance.
- In 2011, P&R found technical help from SUSTAIN Lincolnshire, an environmental program that aims to support organizations to improve their performance from environmental point of view.

CASE STUDY, EMS IN S.M.E. : P&R CO.

P&R and SUSTAIN Lincolnshire worked out a plan to implement EMS into P&R constructions operations. *Major Activities included;*

- Check of existing environmental performance. And defining significant environmental impacts of P&R operations.
- Implementing a sustainable change, as part of this, P&R organized staff diploma training in work-based environmental conservation
- P&R obtained Green level accreditation, which they used to prepare for their full ISO14001 assessment.

CASE STUDY, EMS IN S.M.E. : P&R CO.

High fuel consumption & Emissions by company's vehicles was identified as a major environmental aspect, and its resulted impact was assessed as critical to mitigate. Actions included;

- Investment in new trackers for its fleet of vehicles.
- Investment in advanced software, generating stats such as vehicle GPS location, time spent on site and fuel consumption data.
- The staff have also taken a fuel efficiency driving course, helping them to develop their eco-driving skills.

CASE STUDY, EMS IN S.M.E. : P&R CO.

Other changes were implemented to mitigate influence of other environmental aspects of the company operations, included;

- Reduce Energy Impact: Adopting a switch-off policy. And investment in solar PV for installation on roof of workshops.
- Waste Management & Reduce Resources Consumption: Hiring a concrete crusher and sorting, in order to be able to break down old concrete heavy elements and to reuse it in operations.
- Waste Management: Switching to recycled paper, quality has not been comprised and are now using a 100% recycled resource. Coupled with changing printers usage policies on sites, and usage of scrap papers for drafting.

CASE STUDY, EMS IN S.M.E. : P&R CO.

These change actions have helped P&R significantly to mitigate the previously defined environmental impacts. Significant Results obtained;

- 15% savings on site operational costs is achievable.
- The company diverted hundred tons of waste from going to landfill. Reusing the concrete reduced consumption of resources, and achieved economical saving for the company.
- During 2013, P&R has been certified by ISO 14001, an accreditation that will certainly help the company to have a competitive edge in market, and to get more work.

CONCLUSIONS

- On-Site environmental impacts control should be seen as a major part of the total efforts seeking sustainable constructions development.
- The findings of pre-construction assessment job facilitates a better decision making for top management on early stage.
- Environmental personnel should receive suitable training, and must have autonomy and authority on site.
- Internal audits & continues reassessment help verifying the EMS system efficiency, improve performance and minimize environmental risks exposure.
- Applying EMS to construction operations can provide organizations with competitive advantage.

THANK YOU!