

Professional Ethics in Engineering

Contemporary and Emerging Issues in Engineering (6 hours)

- 5.0 Contemporary and Emerging Issues in Engineering**
- 5.1 Globalization and cross cultural issues
- 5.2 WTO perspectives
- 5.3 Public Private Partnership (PPP)
- 5.4 Development versus Environmental Degradation
- 5.5 Addressing the Climate Change issues
- 5.6 Conflicts and Dispute management

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August 2017

Update: August 12. 2017



5.0 Contemporary and Emerging Issues in Engineering

- Efficiency in resource use (energy, human resource, bio-physical resource)
- Safety (public, workers, users)
- Environmentally and Socially justified development
- Benefit Sharing and protection of private property right
- Corporate Social Responsibility
- Gender and cultural aspects
- Child Right, Labor Right, Fair trade
- Accountability in Engineering
- Sustainability
- Reduce, reuse, recycle: zero waste
- Climate Change
- Output and outcome; technical auditing, energy auditing
- Transparency
- E-governance, instant access to public information
- Privacy of private information
- Community involvement in project design
- Automation of operation, monitoring and production process
- Robotics and mechatronics
- No trade barrier; WTO provisions
- Genetic and Medical Engineering: balance between technology and moral value
- Social Engineering
- Development in transportation and ICT: Globalization



5.1 Globalization and cross cultural issues

- Rapid development in transportation and ICT: Globalization – transfer of goods and services and movement of human beings across the world at rapid rate, and impact of an incident in one corner of the globe felt across the globe
- Need for understanding cross cultural values increase due to globalization
- Knowing when to listen, when to ask for help, and when—finally—to speak
- Developing effective relationship with people from cultures substantially different from ours.
- Individualism versus collectivism.
- Acceptance of power and authority.
- Materialism versus concern for others.
- Formality versus informality.



5.2 WTO Perspectives

- World Trade Organization (WTO) is a worldwide organization for maintaining trade relation among different countries. WTO officially commenced on 1/1/1995. Nepal got WTO membership on 11/1/2061 B.S. WTO helps in setting trade disputes among countries and creates a healthy environment for global trading.
- WTO deals with regulation of trade among member countries by providing a framework for negotiating and formalizing trade agreements and dispute resolution. It determines the Terms of Trade, International Policies, and Rules for Global Trade.
- WTO promotes world trade. It works for the implementation and operation of the various agreements made among different countries. It monitors and suggests improvements in the trade policies and rules of the member countries. It conducts programs for the livelihood upliftment and ensuring employment opportunities in member countries.
- WTO facilitates in enhancement of productivity and income level of the ordinary people including food security in the countries.



5.2 WTO perspectives

Opportunities for WTO membership:

- Government will become more rational in decision-making
- Rent seeking activities will decrease
- Problem of transit will be less
- Provisions of technical support
- Access to markets, duty-free-quota-free access among member countries

Benefits of WTO in Nepal: (a) Market access opportunities, (b) Policy stability, (c) Attract foreign direct investment, (d) Gearing up domestic institutional capability, (e) Benefits of positive discrimination and (f) Establishment of trade and transit rights

WTO challenges for developing countries

- Improving national policies
- Amending some laws and developing new laws
- Changing trade administration attitude
- Human resource development and infrastructure development
- Quality control of goods and services



5.2 WTO perspectives

Major Commitments Made by Nepal during Accession

	Measures	Initial Offer	Final Offer	Deadline
1	Agricultural tariffs	Average 51%	Average 42%	31/12/2006
2	Industrial tariffs	Average 39%	Average 24% *	31/12/2013
3	Liberalization of services sector			31/12/2009
4	Full implementation of TRIPS Agreement			31/12/2006
5	Full implementation of SPS Agreement			31/12/2006
6	Full implementation of TBT Agreement			31/12/2006
7	Full implementation of Customs Valuation Agreement			31/12/2006
8	Not to introduce export subsidy on agriculture			Accession date
9	Not to impose new Trade Related Investment Measures (TRIMS)			Accession date
10	Zero tariff on information technology products			31/12/2008
11	Complete phasing out of Other duties and charges (ODCs)			31/12/2013

* Includes categorical commitment to reduce tariff peak on motor vehicle from 130 per cent at present to 40 per cent at the end of implementation period, implying an annual reduction of 9 per cent. Source: WTO (2003) .



5.3 Public Private Partnership (PPP)

- **Definition:** Funded and operated through a partnership of government and one or more private sector companies
- Private party provides a public service or project
- **Assumption:** substantial financial, technical and operational risk in the project
- Enable public sector to harness expertise and experience
- **Fundamental principle of PPP:** Public service provision can be linked with profit making business, which makes the operation of the public service provision sustainable and efficient. Public gets the service at lower price due to risk sharing, business gets profit, efficiency increases, government can invest tax in other areas rather than in inefficient projects.
- **Conditions for successful implementation of PPP:**
 - Government's willingness, confidence & institutional capacity to adopt PPP
 - Clear policy and clear legal provisions (acts, laws, rules, regulations)
 - Society ready to accept reasonable profit as a justified
 - Fair and transparent business environment
 - Technical, financial and management capacity of private parties
- **Status of PPP policies and programs in Nepal**
 - White paper on PPP, PPP Policy
- **Reasons for low level of PPP implementation in Nepal**



5.4 Development versus Environmental Degradation

- Infrastructure construction and economic growth are not synonymous with development.
- Development activities need to be sustainable.
- Development which results in environmental degradation is unsustainable, and generates conflict.
- Development without environmental degradation is possible.
- Guidelines for project designs by considering environment prepared
- Many government agencies now has environment section
- Globalization, food security policy, energy and climate change and sustainable economic integration concepts are needed for development with environmental sustainability
- Frontier thinking in sustainable development and human well-being needed
- Ecological health and the positive relation between social and economic wellbeing is maintained.



- The Environment Protection Act 2053 (Clause 7): nobody shall create pollution in such manner as to cause significant adverse impacts on the environment or likely to be hazardous to public life and People's Health Protection Rules 2054 while practicing engineering profession.
- Two important examinations are to be carried out before initiating infrastructure projects: IEE and/or EIA
- **initial Environmental Examination (IEE)**
 - A report on analytical study or evaluation to be prepared to ascertain as to whether, in implementing a proposal, the proposal does have significant adverse impacts on the environment or not, whether such impacts could be avoided or mitigated by any means or not
- **Environmental Impact assessment (EIA)**
 - it is a report on detailed study and evaluation to be prepared to ascertain as to whether, in implementing a proposal does have significant adverse impact on the environment or not whether such impact could be avoided or mitigated by any means or not for construction of national high ways and main feeder roads.



5.5 Addressing the Climate Change issues

- **Climate Change (CC):** sustained and gradual change in the nature of climate parameters, like temperature, rainfall, humidity, and wind speed
- **Science of CC:** natural and anthropogenic; increase in green-house gas release traps terrestrial radiation from escaping, resulting in rise in temperature, which affects global circulation of air, and changes timing and intensity of rainfall.
- **Effects of CC:** rise in average and maximum air temperature, rise in night time temperature, increase in intensity of rainfall, decrease in number of rainfall days, increase in number of days with rainfall more than 100 mm, rise in devastating flood and landslide events, Glacial Lake Outburst Flood, increase in frequency and intensity of drought, increase in river bed rise and sedimentation
- **Impact of CC:** agricultural fields washed, reduced agriculture production, damage to infrastructure due to flood and landslide, flash flood washing people, GLOF damaging riverside settlements, villages under landslide, desertification resulting in migration, increase in inundation and water borne diseases, tree line going uphill, insects appearing in higher elevation and spreading diseases
- **Role of Electronics and Electrical Engineers in CC mitigation:** increase in energy efficiency – generation and use (LED bulb, motion detecting light bulbs, satellite monitoring of forest fire, litigation support against exhaust, remote monitoring of climate data using data loggers and relaying information, smart grid design, decrease in energy loss in transmission, environmentally sensitive developments, ...



5.6 Conflicts and Dispute management

- Conflict results when people have different (real or perceived) value or approach on particular issue(s).
- **Organizational Conflict:** *“Organizational Conflict is a state of discord caused by the actual or perceived opposition of needs, values and interests between people working together.”*

Three approaches to organizational conflict

- **Traditional approach (1930-40):** Conflict is opposite of cooperation, and is inherently bad, negative and harmful for smooth functioning and progress of society, organization or a project. Conflict is equated to dysfunction and destructive, and must be avoided. It results from poor communication, disagreement, lack of trust, and low management skill.
- **Human Relations approach (1950-70):** Conflict is inevitable and can be beneficial, if managed properly. It is not inherently bad.
- **Inter-actionist approach:** Conflict makes an organization dynamic, and helps in finding best solution to problems. On-going manageable level of conflict should be encouraged as it prevents organization from being static. So conflict is good.

5.6.1 Levels and sources of conflict

Levels of Conflict

- **Intrapersonal conflict:** conflict within self due to differences in goal, role, and personal values
- **Interpersonal conflict:** between two or more persons; can be due to differences in goal, role, values, culture, communication gap
- **Intergroup conflict:** between two or more groups of people
- **Inter-organizational conflict:** between two or more organizations
- **International conflict:** between two or more nations



5.6.2 Levels and sources of conflict

Sources of Conflict in an organization (or a project)

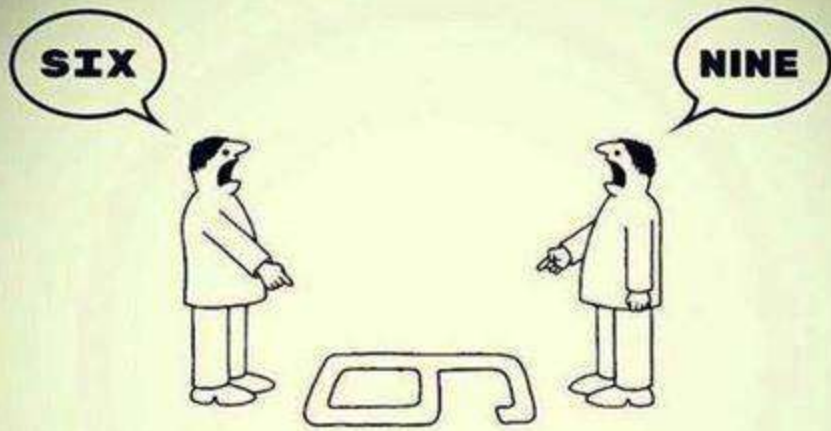
- **Personal differences/Personality clash:** When the ideas, values, culture and customs of a person (or persons) are incompatible with other persons of an organization.
- **Goal and role incompatibility:** When the ideas, values, culture and customs of a person (or persons) are incompatible with the goal of an organization or assigned role of the person in the organization.
- **Organizational climate and change:** When the work environment and rules of an organization are unpredictable, and when the rules or managers or owner of the organization suddenly changes.
- **Gender and other social differences:** When the work environment and rules are designed to favor employees from a particular socio-cultural background or particular gender.
- **Availability and access to resources:** When the availability of resources becomes too limited and/or unevenly distributed. When access to resources is uneven.
- **Communication gap:** When there is communication gap between organization and its employees.



5.6.3 Conflict resolution methods: avoidance, diffusion, containment, confrontation

- **Avoidance:** avoid conflict, ignore conflict, “time will heal” approach; in this method the management will try to create a situation where conflict does not occur, for example by hiring workers from similar socio-cultural background. If conflict occurs, the management will wait for the situation to calm down, rather than taking any proactive situation.
- **Diffusion:** distraction and defuse into multiple sectors; bring in “other” issues so that the main reason from the conflict becomes less important or one of the many issues; bring in other stakeholders..
- **Containment:** conflict contained within certain people, and resolved through discussion and bargaining, in closed meetings, in the hope to resolving the conflict before it goes out of control or before it expands.
- **Confrontation:** conflict brought in front of all concerned, conflict resolution through open dialogue, face-to-face meeting, open bargaining, and resorting to legal process, if needed.





Just because you are
does not mean, I am
You just haven't seen
from my side



5.6.4 Dispute resolution methods: conciliation, mediation, adjudication, arbitration, and litigation

- **Conciliation:** Mutually agreed terms and conditions, “give and take” approach, without direct involvement of outsiders (mediator), even though the mediator assists in bringing the parties together.
- **Mediation:** similar to conciliation, but with direct involvement of outsiders (mediator). The mediator facilitates, and intervenes, if needed, in conflict resolution process (as per Mediation Act 2068).
- **Arbitration:** Resolution through certified licensed professional arbitrators, using the clauses of acts and regulations, after thoroughly investigating the issues of conflict. The arbitrators are normally selected, by mutual consent, from panel of experts.
- **Litigation:** Resolution through court, as per prevailing laws, acts, rules, regulations, and legal precedents of a country.



5.6.5 Dispute resolution methods: adjudication and arbitration as per PPA

Disputes are inevitable in construction projects and in engineering professional works. Dispute resolution procedures are normally mentioned in the conditions of contract. The Public Procurement Act 2063 (PPA 2063, Chapter 7, Section 58) and Public Procurement Rules 2064 (PPR 2064, Chapter 12) have provisions for dispute resolution.

If the parties in dispute cannot resolve the dispute through mutual consensus (amicable settlement), then, as per Section 129 of PPR 2064,

- For works of value up to Rs. 100 million, disputes can be settled by sole adjudicator (निर्णयकर्ता).
- For works of value above Rs. 100 million, disputes shall be settled by a Dispute Resolution Board (DRB) consisting of three members (one from private party, one from public entity and one agreeable to both, Clause 130-2).
- If the parties cannot settle dispute through adjudicator or DRB, then the dispute can be resolved through arbitration (मध्यस्थकर्ता) or litigation (court), PPR, Section 135.
- The adjudicator is a related technical expert with at least 5 years of experience.
- Remuneration of the adjudicator will be borne equally by the private party and public entity.



5.6.5a Dispute resolution methods: adjudication and arbitration

Adjudication:

- The adjudication is “a quick and relatively inexpensive way of resolving a dispute, whereby an impartial third party adjudicator decides the issues between the parties”.
- The following are the characteristics of adjudication.
 - It is a mechanism of dispute resolution.
 - An independent third party, called adjudicator, awards the decision
 - Quicker and inexpensive mechanism of dispute resolution, compared to arbitration and litigation, normally taking less than 30 days after submission all relevant documents.
- The Public Works Directive (PPD) and the Public Procurement Act (PPA 2063, Section 58) have provisions for dispute resolution through adjudication.



5.6.5b Dispute resolution methods: adjudication and arbitration

Arbitration

- The arbitration is a formal mechanism of dispute resolution conducted outside a court, as per Arbitration Act 1999. The following are the advantages of arbitration over litigation.
- It is a private alternative to formal court procedure: voluntary in nature
- The arbitrators are technical experts; can result in creative solutions
- Faster conclusion, within 120 days after submission of documents (Section 24)
- Less expensive
- No public hearing, so low publicity and less stress (which is normally preferred by the parties)
- Less confrontational and formal, hence more convenient to the parties of dispute
- Can appeal against decision in Appellate Court within 15 days (Section 21-2)

- The PPA 2063 has recognized arbitration as a means of dispute resolution. Arbitration Act 1999 (Section 17) governs the arbitration procedure in Nepal. The Nepal Arbitration Council 1991 has been providing arbitration services in Nepal. However, in Nepal, most of the disputes go to court, or settled out of court through mutual consent, even after arbitration, by ignoring the arbitrators' decisions.



5.6.6 Conflict versus Dispute

Conflict	Dispute
Long term serious disagreement, non-specific issues	Short term disagreement, over specific issues, can be resolved
Non-negotiable issues	Negotiable issues
Involves principle, values, ego, belief, interest	Involves amount, money
Conflict does not turn into dispute, unless intervened.	Disputes, if unsettled, can convert into conflict
Each side is fundamentally opposed to the success of the other and will not compromise their own values at the risk of allowing those they despise to achieve even the slightest victory (Burton, 1990)	specific disagreement concerning a matter of fact, law or policy in which a claim or assertion of one party is met with refusal, counter-claim or denial by another; Win-win scenario can be compromised.



Self Test

- Define conflict and explain the sources (causes) of conflict.
- Discuss different levels of conflict.
- Discuss different methods of conflict resolution.
- Differentiate between conflict and dispute.
- Discuss dispute resolution methods. Which method is better: adjudication or arbitration?
- What are the major differences between mediation and adjudication?
- Which method of conflict resolution is preferred by private parties, and why?
- What are the major sources of dispute in an infrastructure development related construction project in (a) a remote area of Nepal, and (b) in urban areas?
- Discuss the potential sources of conflict in (a) a high dam hydropower project, (b) fast tract highway, (c) broad gauge railway through mid-hills of Nepal, (d) international airport in Nijgadh, (e) multi-purpose water resources development project, (f) land pooling project for planned city development