

Professional Ethics in Engineering

Professional Practices in Nepal (4 hours)

3.0 Professional Practices in Nepal

- 3.1 General job description of an engineer in public and private sector
- 3.2 Public and Private sector practices
- 3.3 Roles of Professional Associations

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3.0 Professional Practices (in engineering) in Nepal

- Professional Practices of engineering in Nepal are guided
- formally by the laws/acts, guidelines, directives, cabinet decisions, standards and codes,
- Guidelines, and code of Ethics of professional bodies like Nepal Engineers' Association, SCAEF, FCAN, CAN, IEEE
- informally by the practices in specific institutions



3.1 General job description of an engineer in public and private sector

General duties of an engineer are mainly:

- Design and estimate of specific project, infrastructure etc.
- Preparation of technical specification, tender documents, contract document, agreement paper
- Evaluate and supervise the project assigned
- Allocation of resources
- Work as a member of investigation committee
- Prepare Annual Plan or Project specific plan of activities
- Provide suggestion and recommendation in area of expertise



3.1 General job description of an engineer in public sector (Gazetted Third Class)

- Perform preliminary and detail survey, design and estimate
- Execute and assign for execution of project works
- Conduct various programs for increasing people's capacity
- Prepare Progress Report , Feasibility Report , Final Report, Monitoring and Evaluation report etc.



3.1 General job description of an engineer in public sector (Gazetted Third Class)

- To execute other jobs planned specifically for engineers as the nature and case may be
- To monitor and evaluate on going projects
- To facilitate donor agencies is involved
- To monitor and coordinate the operation and maintenance of facilities
- To execute and perform works and jobs assigned by immediate superiors



3.1 General job description of an engineer in public sector (Gazetted Second Class)

- Planning, programming and execution of works
- Research on technology, cases, various skills for upgrading
- Administrative activities
- Financial administrative activities



3.1 General job description of an engineer in private sector

- Coordinate works between stakeholders, clients, consulting and contractors
- Layout works, to survey and to estimate
- Supervise, monitor, and control works
- Control quality, to assess and report to concerning authorities
- Prepare bills as a quantity surveyor
- Plan project and report progress
- Prepare technical report and prepare claims if any
- Conduct necessary training regarding site work and office organizations system to new staffs
- Overall management of construction project etc.



Typical work assignments

Electrical engineers typically do the following:

- Design new ways to use electrical power to develop or improve products
- Perform detailed calculations to develop manufacturing, construction, and installation standards and specifications
- Direct the manufacture, installation, and testing of electrical equipment to ensure that products meet specifications and codes
- Investigate complaints from customers or the public, evaluate problems, and recommend solutions
- Work with project managers on production efforts to ensure that projects are completed satisfactorily, on time, and within budget

Electronics engineers typically do the following:

- Design electronic components, software, products, or systems for commercial, industrial, medical, military, or scientific applications
- Analyze customer needs and determine the requirements, capacity, and cost for developing an electrical system plan
- Develop maintenance and testing procedures for electronic components and equipment
- Evaluate systems and recommend design modifications or equipment repair
- Inspect electronic equipment, instruments, and systems to make sure that they meet safety standards and applicable regulations
- Plan and develop applications and modifications for electronic properties used in parts and systems in order to improve technical performance



3.2 Public and Private sector practices

- The scope of work carried out by the engineers in the public and private sector covers many areas. The scope of work of each public and private organization is listed in their website
- In general, the public organization, or an organization which receives public fund, is bounded by Public Procurement Act/Rule.



3.2 Private sector practices

- In the open market system, there are thousands of private organisations and firms working in engineering sectors
- Entrepreneurs have used engineers to produce in large quantity in economic investments,
- Private sector working more efficiently under strict supervision and motivations
- More than 50 private engineering colleges affiliated to 7 universities - governmental and nongovernmental.
- Numerous consultancies, construction companies and firms
- Many computer institutes, training institutes, e-business organisations, hospitals, research centers have employed engineers



Sample List of Public Organizations (ministries) where engineers are involved/employed

1. Finance
2. Home Affairs
3. Foreign Affairs
4. General Administration
5. Law and Justice
6. Land-reform and Land Management
7. Women, Children and Social Welfare
8. Education and Sports
9. Defence
10. Health
11. Labor and Transport
12. Industry, Commerce and Supply
13. Agriculture and Cooperative
14. Population and Environment
15. Culture, Tourism and Civil Aviation
16. Irrigation
17. Energy
18. Physical Infrastructure and Transports
19. Forests and Soil Conservation
20. Science and Technology
21. Information and communication
22. Federal Affairs and Local Development

Note: The name of the ministries keep changing. Many more engineers are employed in the departments under the ministries.

Sample List of Public/Semi-Public Organizations where engineers are involved/employed

- | | |
|---|---|
| 1. Nepal Telecommunication Authority | 13. Nepal Telecom |
| 2. Nepal Airlines Corporation | 14. CAAN |
| 3. Dairy Development Corporation | 15. Dairy Development Corporation |
| 4. Nepal Industrial Development Corporation | 16. Investment Board Nepal |
| 5. Nepal Electricity Authority | 17. Salt Trading Corporation |
| 6. Nepal Rastra Bank | 18. Industrial Estates (Balaju, Patan, Pokhara, Hetauda, ...) |
| 7. Agricultural Development Bank | 19. Central Bureau of Statistics |
| 8. Rastriya Banijya Bank | 20. Nepal Bureau of Standards and Metrology |
| 9. TU/PU/PU/MWU/FWU/KU | |
| 10. University Grants Commission | |
| 11. Hetauda Cement Factory | |
| 12. Udayapur Cement Factory | |



3.3 Roles of Professional Associations

- Regulate professional practices through enactment of rules and reward and punishment system
- Develop norms, standards, and codes of professional practices
- Monitor practices and performance
- Orient new professional members
- Enhance professionalism through professional development programs
- Provide platform for knowledge sharing and mutual learning
- Provide suggestions for development and update of policies/ acts/ laws/ rules/ regulations/ codes



Professional Associations Regulate Profession

One of the fundamental roles of professional associations is to regulate the professional practices of the persons or institutes engaged in a particular profession. E.g., the FCAN regulates the ways contractors, act when performing duties related to their profession, through:

- developing guidelines & procedures to be followed by its members,
- developing minimum standards of profession,
- developing and issuing codes of conduct for FCAN members,
- developing and approving written/unwritten rules of the profession,
- preparing standard procedure/formats of submitting bids,
- monitoring and evaluating compliance of the rules, and
- taking actions against breakers of the rules and/or code of conduct.

NEC and NEA regulate engineering profession by developing policies, plans/programs for the smooth functioning of engineering profession and execute them. The NEC regulates higher engineering education in Nepal through evaluation, recognition and monitoring of academic institutes providing formal engineering education.



3.3.1 Roles of professional organizations in induction of new entrants into the profession

Another major role of the professional associations is to guide new entrants into the profession by

- providing orientation and training,
- guiding on the conventions of the profession,
- providing information on the dos and don'ts of the profession,
- potential pitfalls when the Code of Conduct are not followed,
- linking the new comers with established members of the profession.
- Guiding on general job description and employers' expectation from new recruits
- Training new entrants for job seekers, proposal writing, bidding, project terms and conditions negotiation, etc.



3.3.2 Upgrading and maintaining the professional and technical competence of members of professional association

Professional societies take various steps for upgrading and maintaining the professional and technical competence of its members by

- Organizing regular professional development courses and continuing education programs, like running Engineering Staff College
- Organizing skill development oriented training programs
- Organizing regular talk programs to share experiences and lessons learned from different projects
- Providing platform for its members to expose their works by organizing national and international seminars/workshops on regular basis
- Publishing technical journals and news bulletin
- Organizing exposure field visits to different projects
- Providing exposure to national and international experiences by organizing national and international visits to its members
- Proactively working with academic institutes on development and update of university curriculums
- Proactively working with research institutes for involving its members in research and development activities
- Proactively working with service providing organizations (consulting companies, contractors, material suppliers, software developers, equipment operators) to establish link of its members with established organizations.

3.3.2 Upgrading and maintaining the professional and technical competence of members of professional association

Some of the ways in which the professional associations in Nepal have been playing this role in Nepal are:

- Providing Continuing Education Programs (NEA, SCAEF, FCAN, CAN)
- Engineering Staff College (proposed by NEA, not yet fulfilled)
- Provision of Professional Engineer (NEC)
- Provision of periodic test as part of NEC registration renewal (proposed)
- Professional Development as part of evaluation of engineering colleges (NEA)
- Organizing professional meeting/seminar/conferences/conclave: (NEA, SCAEF, FCAN, CAN...)
- Organizing trainings, weekly lecture series (NEA);
<http://www.neanepal.org.np/showmodule.php?what=weeklytalk&under=home>
- Organizing workshop on specific issues related to engineering education in Nepal (NEC, AECON, OPEN, TUTA)

Some examples: Rapid Assessment Training after April 25, 2015 Gorkha Earthquake; recommendations after Jure Landslide

3.3.3 Providing technical expertise to public authorities in developing policies, acts, standards, project implementation procedures and international agreements and negotiations

- The legislators and other governmental organizations frequently seek technical expertise from professional associations in the development, drafting and amendments to the existing acts, rules, regulations, policies, guidelines, bylaws, provisions, plans and programs.
- NEC, NEA, SCAEF, FCAN, CAN and other professional organizations provide technical expertise to different government organizations, including legislators, as and when requested. When these professional associations do not have in-house expertise, they coordinate with individual (or institutional) members to provide such services.
- NEA and DPNet independently conducted study of Jure Landslide (Sunkoshi) in 2014 and submitted expert advice to deal with the disaster.

3.3.4 Ensuring occupational health, safety and general welfare of the public

- The professional engineering associations are expected to play the role of monitors of quality of works of its members, including the matter of safety and general welfare of the public.
- When a particular member is found to violate the codes of conduct, compromise on quality of works, and neglect public safety and public welfare, the concerned professional engineering association can warn them, and reprimand/cancel their membership.
- NEC is planning to introduce a system of Accountability in Engineering Professional services.
- The standard design manuals, design procedures, building codes, including professional judgments will be evaluated as a part of safety and general welfare of public in engineering works.
- NEC/NEC/ SCAEF/FCAN etc. can monitor provision of occupational health, safety and general welfare of workers and general public in specific projects.



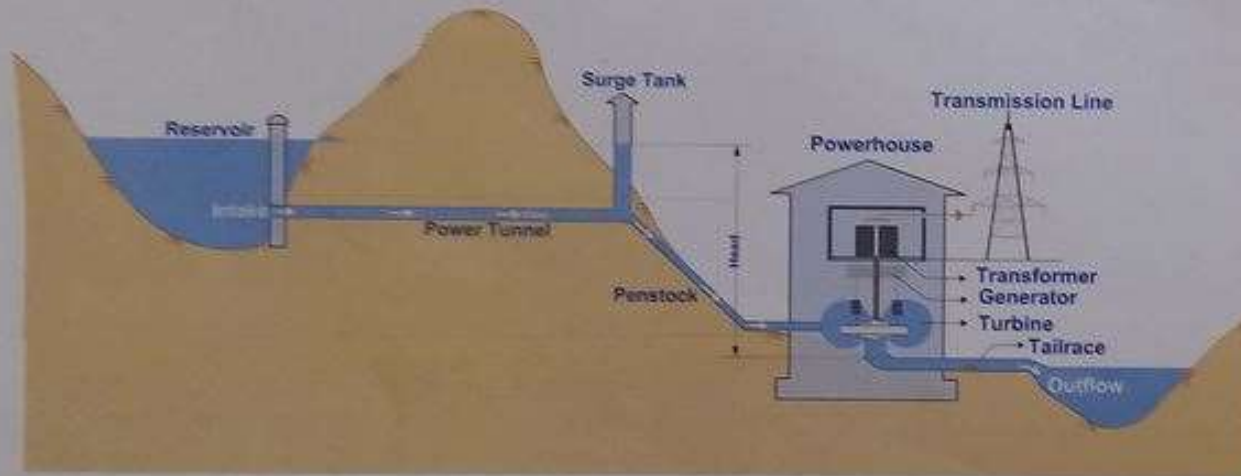
3.3.5 Role of professional societies in environment protection

- Raise awareness among society members, public decision makers, and legislators on environment & sustainable development issues; work with universities in developing environment protection courses
- Circulate environment protection related acts, rules and regulations to society members
- Study and publish results of impacts (short term and long term) of development works on environment
- Develop manuals and guidelines on design, operation and maintenance of development projects by considering environment protection
- Conduct training courses on environmental law compliance
- Conduct advocacy programs for environment sensitive development methods
- Monitor specific development projects from environment protection aspect and suggest improvements, if needed, in carrying out project works with environment compliance
- Award organizations with excellent environment protection records.

140	ACE Development Bank Ltd.	4441110/4445554
141	Feedback Ventures Nepal Ltd.	4169104/4169106
142	Qiankang Allonward Hydro-Equipment Co. Pvt. Ltd.	4228816/4223570
143	Structo Nepal (P) Ltd.	5521192/5542118

158	Doima Advisor Pvt. Ltd.	4431376
159	Neupane Law Associates	4101631
160	Hydro Magus Pvt. Ltd.	9808953879
161	ACME Technotrade Concern	5552413
162	ChainLink Engineering Private Limited	16636267

Schematic layout of a typical hydroelectric power plant.



Mathematically, electric power generated by Q (m^3/sec) amount of water falling under gravity through height H (m) is given as

$$\text{Power (Watts)} = \eta \times \rho \times Q \times g \times H$$

Where,

Q = Flow of water per unit time (Litre/sec or Cubic Metre/sec)

η = Overall efficiency of the system, generally between 70% - 85%

ρ = Density of water, 1000 kg/m^3

g = Acceleration due to gravity, 9.81 m/sec^2



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What information can you obtain from this photograph?

Self test

- Briefly discuss the code of ethics of Nepal Engineering Council.
- Explain the code of ethics applicable to engineering profession.
- What do you understand by the code of conduct? Describe the code of conduct for engineers.
- How do you judge the ethical standard of Engineers in Nepal? Describe the role of Nepal Engineering Council in maintaining ethical standard of Nepalese Engineers.
- Differentiate between the NEA and NEC with suitable examples.
- What are the meaningful roles of professional societies or associations? Why are they needed? Explain.
- Explain roles of Engineering council and Nepal Engineers Association. In what regards, they are different?
- What are the general job descriptions of engineers working in public sector?
- Describe the basic duties of an engineer.

