

# Engineering Professional Practice

(CVL 440)

## Case studies related to practice of engineering profession

(Chapter 6; 6 hours)

Prof. Dr. Hari Krishna Shrestha

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# Case studies related to practice of engineering profession

- 6.1 Public safety, industrialization, and protection of environment
- 6.2 conflict of interest, personal integrity, and personal privacy
- 6.3 professional negligence (duty, breach, proximate cause and damage)
- 6.4 breach of duty, criminal law and tort
- 6.5 breach of NEC code of conduct
- 6.6 breach of Public Procurement Act and Public Procurement Regulation
- 6.7 breach of intellectual property rights and copyrights
- 6.8 abuse of position and authority



# 6.1 Public safety, industrialization, and protection of environment

6.1.1 During quality control monitoring visit for an emergency relief camp building in a remote village, you noticed that the building is being constructed on the bank of a river and it will be inundated during flood. Approximately 25% of the construction was completed. The site was selected by your friend with the consent of the local people. The quality of construction materials and method was as per the specification. Your job is to **control the quality** of building. Discuss the case and recommend your views on whether to recommend continuation of the construction.

6.1.2 A client came to a designer and asked to design a multistoried building. The soil type of the proposed site was found not suitable for that type of structure. The designer hesitated to design the building. The client said that he actually was not going to build that structure. He wanted to collect money from outside sources showing that designed as a proposal for his venture and wanted to utilize that money in other lucrative business. Explain the roles of the client and the designer in the perspective of professional ethics.



6.1.3 The Changunarayan Temple, which is enlisted in the World Heritage Sites List, is at high risk after landslides occurred on the east and west sides of the temple following incessant rains. According to Temple Priest, Mr. C. Rajopadhyaya, the landslide has reached near the west side of the Temple. Rajopadhyaya complained that concerned line agencies have shown no interest to protect the Temple when it is at high risk of landslide. Locals said this situation came about with the failure of the local administration to stop the rampant mining of sand and stones from the Manohara River and deforestation in Changunarayan Hill, going on since long.

Sand smuggling at the Manohara River should be stopped to save the Temple from the risk of landslide, said Rajopadhyaya. Ms. A. Nakarmi, Chief of the Department of Archeology, Bhaktapur, said they have been informed of the landslide and they would inspect the area soon. Central Office of the Department of Archeology has asked its local office to submit a report on the extent of the damage to the Temple structure caused, which they will submit after monitoring the area, said Ms. Nakarmi.

Discuss the situation of the parties involved in this case.



## 6.2 Conflict of interest, personal integrity, and personal privacy

**6.2.1 As a consulting engineer you were asked to monitor a water supply project financed by an NGO and handled by local water users committee at Gulmi district. The project was to be completed by the end of May, 2017; otherwise the donor would stop the payment. When you visited the site at the middle of February 2017, you found that the project was not completed. The users committee requested to submit the completion report so that they could finish the work after sometime and will be beneficial to 100 household of the project.**

**Answer the following questions.**

- a) In your opinion, who is/ are responsible to finish the project in time?**
- b) Do you think, the local users committee must be reformed?**
- c) Water is basic need for the people. As an engineer, what is your role to continue the project and to finish it in time?**
- d) Discuss different options for the engineer in reporting the project progress status, considering personal integrity.**

## 6.2 Conflict of interest, personal integrity, and personal privacy

**6.2.2** Tiptop Engineering College (TEC), a government organization, wanted to install management information system (MIS) software at TEC to increase its efficiency and enhance quality education. TEC asked Er. Sabhasad Bahadur (SB), a full time TEC teacher and a part time software developer at Sosoftware Consult, to prepare a detailed technical specification and to publish a tender notice. TEC's technical evaluation committee, headed by Er. SB, awarded highest mark (99 out of 100) to Sosoftware's technical proposal. Sohard Consult's proposal scored the high mark in overall evaluation (technical plus financial), but Er. SB recommended the TEC management to select Sosoftware for the MIS project. Before any decision was made, Sosoftware increased the warranty period and expressed readiness to negotiate price of MIS if annual maintenance contract is also awarded to them, which was a very attractive offer for TEC.

You are the decision maker at TEC. Analyze the situation carefully and prepare a list of options along with potential consequences of each, and make a decision with appropriate justification.

### 6.2.3 Read the case carefully and answer the question given:

- Contractor of a road construction project (RCP) sponsored a 5-day-training of the Department of Road's Engineer Mr. Dhruba Raj Sharma to be held in New Delhi in the first week of Asadh 2073. Mr. Sharma is a site engineer of that RCP.

#### *Question:*

- Assume that you are Mr. Sharma, the site engineer of RCP, responsible for approval of bills, which are generally submitted and approved at the end of each fiscal year. Do you participate in the training to be held at New Delhi? Explain clearly taking adequate reference why or why not? Also discuss the possible issues associated with this event.



## PPR 2064 Clause 138 Provisions on Conflict of Interest

### **Prohibition on making conflicts of interest:**

- (1) A consultant shall provide professional, objective and impartial consultancy service in the best interest of the public entity procuring consultancy.
- (2) In providing consultancy service, the consultant shall not so carry out the assignment that it would be in conflict with his or her other current or future assignments.
- (3) A consultant shall not be appointed for any consultancy service assignment that would by its nature be in conflict with his or her prior or current obligations to any other clients or that may place him or her in a position of not being able to carry out the assignment in the best interest of the concerned public entity.

**Example:** A consultant appointed to prepare engineering design of any project shall not be appointed as a consultant to prepare environmental assessment of the same project or a consultant on the privatization of any enterprise owned by the government shall not be appointed as a consultant of the buyer of such assets nor shall such consultant be allowed to purchase such assets in the name of his or her close relative or a partner in his or her firm.



**Facts:**

Engineer A, a structural engineer, is retained by the defense attorney for an insurance company to evaluate damages to a structure owned by its insured, Mr. X. Eight months later, and without notice to the insurance company, Engineer A is retained by Mr. X. Engineer A provides a professional opinion completely different than the one provided to the insurance company.

**Questions:**

1. Was it ethical for Engineer A to agree to be retained by Mr. X?
2. Was it ethical for Engineer A to provide a professional opinion completely different than the one provided to the insurance company?

Source:

<https://www.nspe.org/sites/default/files/resources/pdfs/Ethics/EthicsResources/EthicsCaseSearch/2004/BER%2004-12-Approved-May2005.pdf>

**Facts:**

Engineer A is a principal in a consulting engineering firm which also serves as an equipment manufacturing sales representative. When preparing specifications for the design and construction of manufacturing facilities, Engineer A almost without exception specifies the equipment and products developed by the manufacturer which Engineer A represents.

**Question:**

Is it ethical for Engineer A to serve as an equipment manufacturing sales representative at the same time he is practicing as a consultant and to specify the equipment and products developed by the manufacturer in his role as a consultant?

Source: <https://www.cs.cmu.edu/~bmclaren/ethics/cases/trial/94-3.html>



Er. Bhoj Ram Pant (BRP) is the Campus Chief of a government college, and also an executive member of Nepal Engineering Council (NEC). NEC formed a three-member Inspection Committee (IC), which included BRP, for the annual inspection of Mega College of Engineering (MCE), a private college, which was partly owned by BRP's wife. The IC found several grave deficiencies at MCE, however, BRP refused to sign in the IC's findings, and requested other IC members to prepare a favorable report. BRP promised that all the shortcomings found at MCE will be addressed within two months and there is no need to submit a negative report to NEC. BRP threatened the IC members to publish incriminating documents about their personal life in public media if the request is refused, and also hinted at financial incentive if the request is accepted. If you are one of the other two IC members, what are your options as a professional, and would you do in this case?



## 6.3 Professional negligence (duty, breach, proximate cause and damage)

6.3.1 Er. Dharm Nath Sharma has designed a single storied residential building as per client's (Tapendra Sharma) requirements. Construction of the building completed in 2004 and the building worked well. In 2006, the client decided to add two more floors so as to use the floors as class rooms for tuitions. For this new work, the design was prepared by Architect Sima Shrestha and it was approved by Kathmandu Municipality also. The construction completed on 2008.

After completion of this construction, the client rented both the floors for garment factory. Workers worked from early in the morning to late night. After few months, local people opposed it saying that they are producing noise till late night and it created problems for the children. Due to conflict between garment owner and local people, the environment of that area became worse. Local people suggested to the garment owner to close the factory after 6 P.M. but garment owner and Tapendra did not listen to them. Local people closed the factory and nearly 20 workers whose economic condition is very poor, lost their job.

Furthermore, house owner noticed cracks on ceiling and walls .The house owner made a claim against garment owner demanding compensation of Rs. 5 lakh which was the estimated repair and maintenance cost of the building and loss suffered by him.

### Questions:

- Do you think it is ethical to add two more floors on the already designed single storied residential building?
- Discuss Sima Shrestha and Kathmandu Municipality's position with **duty and negligence**.
- In your opinion, how the conflicts can be resolved?

6.3.2 A number of cracks, structural as well as settlement appeared in a building designed by an engineer, within two years of its completion. Municipality had approved the design and drawing. Later it is found that without any soil investigation, structural design and detailing of reinforcement report had been prepared during the construction of the building.

- a) Discuss the position of the house owner.
- b) The engineer's role.
- c) The role of the Municipality
- d) Who is ultimately responsible for the damage?



6.3.3 Engineer A designed a two-story residential building, located close to Pokhara Sub-metropolitan Office (PSMO). Mr. B bought that building and started a primary school there, and added three stories on the building to accommodate growing number of students. Super Consultants (SC), owned by Engineer A, was responsible for design and supervision of the building extension and was also responsible of getting approval of the extension works from PSMO. One year after the building extension, structural cracks begin to appear in the building. Mr. B blamed SC and asked for compensation. SC rejected Mr. B's claim, saying that building extension design was thoroughly checked and approved by PSMO. Analyze the role of Engineer A, Mr. B, SC and PSMO in this dispute.



## 6.4 Breach of duty, criminal law and tort

Read the case carefully and explain clearly, taking adequate reference, who should be liable.

- The plaintiff was a factory worker in the defendant's factory. The factory become flooded and management did everything possible to remove the effects of the flood. However the factory floor was still slippery from the flood. The plaintiff who was walking on the floor, fell and suffered injury. He sued the defendant in the **tort** of negligence.
- The plaintiff, who had only one good eye, was employed by the defendant. The defendant failed to provide goggles to the plaintiff for his work. While working, the plaintiff injured his one good eye and sued his employer.
- Two appellants were cooks employed by the respondent in the respondent's restaurant. They suffered severe burns on 13 March 2015 when an explosion occurred in the restaurant kitchen because of a defective gas cylinder.



# 6.5 Breach of NEC code of conduct

6.5.1 A recently built RCC slab of a single storied poultry plant collapsed and killed all the chickens. The farm owner blamed the labor contractor for the defective work. The contractor accused the client for providing rusted and inadequate amount of steel bars and old cement for the roof slab. The farm owner then asked for compensation from the material supplier (for inferior materials) and the consultant (for improper supervision). The material supplier claimed that the farm owner bought the cheapest rusted bar and old cement, despite warning of unsuitability for slab casting. The consultant reported that the cause of the roof collapse is the use of very dirty water in mixing the concrete, which was provided by the farm owner and used by the contractor despite verbal objections from the consultant's site supervisor.

Analyze the situation carefully and decide which party (client, contractor, material supplier and consultant) is more responsible or less responsible for the roof collapse. Explain your decision with reference to the Professional Code of Conduct of Nepal Engineering Council and the Federation of Contractors' Association of Nepal.

## 6.6 Breach of Public Procurement Act and Public Procurement Regulation

6.6.1 An engineer is posted as a project manager of a new hydropower project of NEA. The first work was to excavate soil for foundation of boundary wall of planned project office area. After discussing with engineer friends from the same area, he called a reliable local contractor and asked him to provide rate of earthwork excavation. Since the rate was reasonable, a contract was signed and work started immediately. After completing first phase of work, which consisted to excavation work worth Rs. 1 million, the engineer measured the work, found the work to be satisfactory, and a bank cheque of Rs. 1 million was provided to the contractor.

Answer the following questions, with proper reference.

1. Was everything done as per the prevailing acts of Nepal?
2. Were any laws of Nepal breached in the process of contract awarding and payment to the contractor?





# LED bulb incidence of May 2017

- NEA called for bid to supply LED, on 24 April 2015, 3 companies shortlisted, decision pending.
- PPA Clause 41, Sub-clause Gha-2: Direct procurement of goods and services from international organizations, at their rate, without tendering
- PPA Clause 41, Sub-clause Gha-3: Direct procurement of goods and services under special condition, without tendering
- 27-28 June 2016, Secretary level meeting: India can provide technical assistance to reduce energy demand, meeting minute says EESL's bulb supply proposal was "noted". EESL is Government of India enterprise.
- 24 March 2017: MoU between NEA and EESL to procure 20 million 9Watt LED bulbs at IRs. 65 (KM Ghising signed for NEA); contract to be signed after cabinet approval.
- 4 May 2017: Cabinet approved in principle Ministry of Energy's proposal to authorize NEA to directly buy LED bulbs from EESL, ignoring Chief Secretary's advice to follow PPA: 41-Gha-3
- 8 May 2017: Kantipur news: NEA paying IRs 65 for LED bulbs which cost IRs. 38 (20 million x IRs. 27 x 1.6 = 86.4 Million NRs overprice); corruption suspected.
- Public reaction: Kantipur playing unfair; at IRs. 38 only one bulb per Ration Card at highly subsidized rate; this is buying rate, not selling rate; Current market price in India: IRs. 285, tender process too lengthy to tackle load shedding in winter of 2017, no guarantee of IRs. 38 during tender, Chinese bulbs result in low quality and high energy demand, boycott Kantipur

As a professional engineer, analyze the situation and state what went wrong and what when right. Should messenger be blamed? Should NEA have followed PPA? Is it wrong to reduce energy demand by promoting LED bulbs? Will this incidence be a precedent if no action is taken against NEA? Should NEA be prized or punished in this incidence? Only MoU has been signed, there is no contract, did NEA violated PPA?

Source: <http://kantipur.ekantipur.com/news/2017-05-12/20170512073452.html>



४९. सोभै खरिद सम्बन्धी व्यवस्था : (१) यस ऐनमा अन्यत्र जुनसुकै कुरा लेखिएको भएता पनि देहायको अवस्थामा मालसामान वा परामर्श सेवा वा अन्य सेवा सोभै खरिद गर्न वा निर्माण कार्य सोभै गराउन सकिनेछ :-

- (क) तोकिएको रकमसम्मको फुटकर खरिदमा,
- (ख) खरिद सम्बन्धी शर्तहरू पूरा गर्ने प्राविधिक दक्षता वा क्षमता एउटा मात्र आपूर्तिकर्ता वा निर्माण व्यवसायी वा परामर्शदाता वा सेवाप्रदायकसँग भएमा,
- (ग) खरिद गरिने मालसामान आपूर्ति गर्ने अधिकार एउटा मात्र आपूर्तिकर्तासँग भएको र अन्य उपयुक्त विकल्प नभएमा,
- (घ) मौजुदा मालसामान वा सेवा वा जडित संयन्त्रको पार्टपूजाको प्रतिस्थापन वा विस्तार गर्न आपूर्तिकर्ता वा परामर्शदाता वा सेवाप्रदायक परिवर्तन गरेमा सार्वजनिक निकायमा रहेको मालसामान वा सेवाहरू प्रतिस्थापन वा विस्तार गर्न नसकिने कुरा प्रमाणित भई साविकको आपूर्तिकर्ता वा परामर्शदाता वा सेवाप्रदायकबाट तोकिएको सीमाभित्रको प्रोप्राइटरी स्वरूपको अतिरिक्त मालसामान वा सेवा खरिद गर्नु परेमा,

- ☐(घ१) एक सार्वजनिक निकायले अर्को सार्वजनिक निकायसँग कुनै खरिद गर्नु परेमा,
- ☐(घ२) अन्तर्राष्ट्रिय अन्तर सरकारी संस्थासँग सो संस्थाले तोकेको दररेटमा मालसामान वा सेवा खरिद गर्नु परेमा,
- ☐(घ३) विशेष परिस्थितिमा खरिद गर्नु परेमा,



## 6.7 Breach of intellectual property rights & copyrights

6.7.1 A fresh water resources engineering graduate (Engineer A) is approached by a Department of Groundwater (DoG ) senior engineer. The DoG engineer asks Engineer A to conduct a district-wide study of groundwater-surface water inter-link in Palpa, and provides a sample of a report to be produced. Engineer A finds that the sample report is based on a superficial study, with all the data taken from USA, and requests money to visit Palpa and collect field data. The DoG engineer refuses, saying that they got the project from low bid, asks Engineer A to prepare the report based on assumed data and assures that Engineer A will not face problem since the contract to conduct the study was obtained by a consulting firm registered in DoG engineer's spouse's name, the DoG engineer himself is responsible to check the report quality, and Engineer A's name will not be in the report.

- List all the options for Engineer A.
- Separate the options into moral, ethical, and legal categories.
- Analyze each option based on ethics and risk to Engineer A.

## 6.7 Breach of intellectual property rights & copyrights

### 6.7.1 List of options for Engineer A.

- Follow the suggestions of the DoG engineer (use data from textbooks to prepare report)
- Visit the site at Engineer A's own expense, and prepare good report based on field data.
- Collect and study previous reports of the same area which provides related data and prepare report based on secondary information.
- Refuse to be involved in the work and return the sample report to DoG Engineer.
- Accept the assignment, secretly record further conversations with the DoG engineer and report the case to CIAA, with proof.
- Publish an article in newspaper/magazine about the case, with the name of the DoG engineer.



# 6.7 Breach of intellectual property rights & copyrights

- [Weak IPR laws bane for foreign investment](#); Published: March 14, 2017; by **PUSHPA RAJ ACHARYA**
- *Owing to trademark dispute with a local firm, Kansai Paint mulling over pulling out from Nepal*
- At a time when the government has been harping on foreign investment in a bid to advance Nepali economy, one of the reputed foreign joint ventures is mulling over retracting its investment from Nepal as a consequence of intellectual property rights (IPR) dispute with a local firm.
- A Japanese foreign investment in Nepal, Kansai Paint, which entered Nepal in 2012 in joint venture with Nepal's Shalimar Paints, has failed to obtain trademark from the Department of Industry (DoI). This is because capitalising on the weak intellectual property rights (IPR) laws in the country, a local investor had registered a firm under the name 'Kansai Nerolac Paint Nepal Pvt Ltd' at the Office of Company Registrar and had applied for trademark before the foreign joint venture.
- The local firm — Kansai Nerolac Paint Nepal Pvt Ltd, which is run by Goyal Group — is in no way related to the Kansai Paint.
- Since Nepal is a member of World Intellectual Property Organisation (WIPO), it is a pity that the country was unable to identify even a globally reputed brand like Kansai. The country may lose foreign investment worth Rs 350 million of the Kansai Paint, which entered the country through its Indian subsidiary Kansai Nerolac Paints India, as the DoI has scrapped the application of the foreign joint venture to obtain trademark of its own name.
- As per Pradip Koirala, director general of DoI, the authorised agency under the Ministry of Industry to enforce Patent, Design and Trademark Act, the department had scrapped the application of the foreign venture as per the provision of law that provides favourable treatment on 'first come, first served' basis. He, however, admitted that the laws need to be amended to lure foreign investment citing foreign firms are sensitive in regard to intellectual property rights.
- The globally renowned Kansai Paint had purchased 68 per cent stake of Nepal's Shalimar Paints through its Indian subsidiary Kansai Nerolac Paints India and registered a company Kansai Paints Nepal Pvt Ltd. However, the foreign joint venture had faced a court case from the local company — Kansai Nerolac Paints Nepal Pvt Ltd. The Supreme Court, some four months back, had issued a verdict in favour of the local firm citing that it had registered the company prior to the foreign joint venture.
- The local firm, which is producing paints under the brand of Nerolac and Kansai, again filed a case at the DoI and the DoI also scrapped the application of foreign joint venture and refused to issue the trademark it had sought. The foreign joint venture also faced unfavourable decision from the Patan High Court, where it had filed a case seeking protection of its trademark. As per the court's decision, the company has to change the name of its product because the local firm has already captured the brand of reputed Kansai Nerolac Paint in the Nepali market.
- Due to all these reasons, the foreign investors are now thinking about exiting from Nepal, according to sources. Nepali partners of the foreign joint venture have also backed this claim. "Kansai Paint, which came to Nepal through its Indian subsidiary after signing of bilateral investment promotion and protection agreement (BIPPA) with India during the premiership of former prime minister Baburam Bhattarai, has been left red-faced in Nepal," said Ashok Vaidya, who is a Nepali partner of the foreign joint venture.
- Kansai Paint, originally from Japan, has set up factories in 25 countries and is selling its product under its own name. Due to the country's weak IPR laws, this case will establish a false precedence among potential foreign investors in Nepal, according to Vaidya. "The country will not only lose foreign investment, there are chances it will also lose its reputation across the globe if the foreign investors withdraw investment from Nepal."
- The foreign joint venture Kansai has been providing direct employment to 100 individuals and contributing revenue worth Rs 500 million to the government every year. Kailash Chandra Goyal, who has been operating the local firm under the name of 'Kansai Nerolac Paint Nepal Pvt Ltd' and producing paints under the brand name of Nerolac and Kansai refused to comment on the matter.

# 6.8 Abuse of position and authority

6.8.1 Engineer Mohit was appointed as an engineer by District Development Committee (DDC) of Nuwakot. He was assigned an alignment survey for a proposed road connecting A VDC to B VDC. He went for alignment survey and completed his task. During survey, he used his professional skill and knowledge. After alignment survey, a group of Peoples' Hak Party (PHP) protested at DDC stating that (a) Engineer Mohit has touched his 5 Ropanis of land through proposed road alignment to increase value of his land and (b) Engineering Mohit also included in his alignment survey a small piece of land of Mr. Ranabir because of his personal conflict with Ranabir some 10 year ago. On these ground the alignment survey shall be discarded and need a survey and also need to take action against Engineer Mohit. Answer the following questions using adequate reference.

- What Er. Mohit should have done?
- What the DDC should do?
- Did Er. Mohit abuse his position and authority?



# Some basic guidelines in analyzing case studies

- Read the question carefully, paying attention to adjectives.
- Analyze the case from ethical, moral, social, legal and professional angle, and assign role/responsibilities of each party involved in the case.
- Base your analysis, wherever appropriate, on professional code of conduct of NEC, NEA, FCAN, SCAEF, IEEE, CAN, or any other professional organization. Do not forget to specifically mention code, if you can.
- Many cases involve conflict of interest (COI); if the case you are dealing with is related to COI, specifically mention it.
- If specific laws are applicable, perform legal analysis and mention the law, and specific clause(s).
- Make your recommendations impartially, thinking of you as an impartial judge, considering existing social, technical, legal and professional codal provisions.

**Sample Case studies (i):** A client came to a designer and asked to design a multistoried building. The soil type of the proposed site was found not suitable for that type of structure. The designer hesitated to design the building. The client said that he actually was not going to build that structure. He wanted to collect money from outside sources showing that designed as a proposal for his venture and wanted to utilize that money in other business. Explain the roles of the client and the designer in the perspective of professional ethics.

Your answer should address the following issues.

**Role of Client and Designer (a)** Is the intention of the client legal? (b) Is the intention of the client moral? (c) Is the intention of the client ethical?

Morally, ethically, and legally, what should the designer do after knowing the real intention of the client?

Should the client be penalized for telling the “real intention” to the designer?

Should the designer refuse to design? If yes, why? If no, why?

Should the designer refuse to design and just keep quiet?

Should the designer just submit a design and keep quiet because what the client does with the design is none of the designer’s business?

Should the designer design with piles (or other suitable foundation design) to make the structure suitable for the type of soil?

Since the client is not going to build the structure anyway which does not increase hazard from the building to anyone, what is wrong in just providing a design, as a hypothetical case?

Should the designer refuse to design and inform the government officials about the client’s intention?

Should the designer refuse to design and inform the media, or write an article in the newspaper, about the intention of the client?

As long as the design is structurally sound, is the designer responsible (morally, ethically, legally) for what the client does with the design?



**Sample Case studies (ii)** A recently built simply supported RCC roof slab of a single storied poultry farm in Chitwan, collapsed and killed all the chickens in the farm. The farm owner blamed the labor contractor for the defective work. The contractor denied and accused the client for providing low quality and inadequate amount of steel bars for the roof slab. The farm owner then asked for compensation from the steel bar supplier (for inferior quality bars) and the consultant (for improper supervision during construction). The bar supplier defended herself by saying that the farm owner bought the cheapest bar from her which has no guarantee. The consultant reported that the cause of the roof collapse is the use of very dirty water in mixing the concrete, which was provided by the farm owner and used by the contractor despite objections from the consultant's site supervisor.

Analyze the situation carefully and decide which party (client, contractor, and consultant) is more responsible or less responsible for the roof collapse. Explain your decision with reference to the Code of Conduct of NEC and FCAN.

Things to notice before assigning degree of responsibility:

**Client:** (a) Did only labor contract with the contractor, supplied materials on her own, (b) Supplied low quality steel bars (thinks all steel bars are same), (c) Supplied inadequate quantity of steel bars (shows no faith in design details), (d) Supplied dirty water for concrete mixing, despite objections from consultant (thinks water quality unrelated to concrete quality)

**Contractor:** (a) Worked with low quality steel bars, knowingly. Thought that contractor is not responsible for material quality since it is only labor contract. (b) Tied inadequate numbers of steel bars (increased steel bar spacing), knowingly. Thought that contractor is not responsible for material quantity since it is only labor contract. (c) Used very dirty water to mix concrete, knowingly, despite objections from consultant.

**Consultant:** (a) Did not or could not stop client from supplying low quality steel bars, (b) Did not stop contractor from tying inadequate number of steel bars, (c) Did not or could not stop client and contractor from use of very dirty water to mix concrete, (d) Reported the problems only after roof collapse and client's compensation claim

