IIT KHARAGPUR

NPTEL ONLINE
CERTIFICATION COURSES

Ethics in Engineering Practice

Lecture No 16: A Brief on Paris Convention,1967 and The Berne Contract, 1971

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Outline of the module

- Paris Convention, 1967
- Scope of Industrial property
- Provisions of National treatment
- Rights of Property
- Common rules
- The Berne Contract, 1971
- Principles of Berne Contract, 1971
- Principle of National Treatment

Outline of the module

- Principle of "automatic" protection
- Principle of "independence" of protection
- Minimum Standards of Protection
- Common rules under Berne Contract, 1971

Source: The content for slides has been drawn from the Official website of WIPO (World Intellectual Property Organization)(http://www.wipo.int/treaties/en/)

Introduction

Paris Convention, 1967

It is one of the first; in a way intellectual property rights treaties which was signed in Paris, France on 20th March, 1883.

Its objective was to establish a union for protecting the industrial property. The provisions of the convention broadly fall into three main categories;

National treatment
Priority right and
Common rules.

Continued

The Paris Convention, concluded in 1883, was revised at Brussels in 1900, at Washington in 1911, at The Hague in 1925, at London in 1934, at Lisbon in 1958 and at Stockholm in 1967, and was amended in 1979.

The Paris Convention applies to industrial property in the widest sense, including patents, trademarks, industrial designs, utility models (a kind of "small-scale patent" provided for by the laws of some countries), service marks, trade names, geographical indications and the repression of unfair competition.

(The meaning of all these has already been discussed in earlier slides)

Establishment of the Union; Scope of Industrial Property (Article 1)

(1) All the member countries to which convention applies constitute Union for protecting the industrial property.

(2) The protection of industrial property is applicable to patents, utility models, industrial designs, trademarks, service marks, trade names, indications of source or appellations of origin, and the repression of unfair competition.

Continued

(3) Industrial property shall be understood in the broadest sense and shall apply not only to industry and commerce proper, but likewise to agricultural and extractive industries and to all manufactured or natural products, for example, wines, grain, tobacco leaf, fruit, cattle, minerals, mineral waters, beer, flowers, and flour.

(4) Patents shall include the various kinds of industrial patents recognized by the laws of the countries of the Union, such as patents of importation, patents of improvement, patents and certificates of addition, etc.

Provisions on National Treatment

‘The Convention provides that, as regards the protection of industrial property, each Contracting State must grant the **same** protection to nationals of other Contracting States that it grants to its own nationals. Nationals of non-Contracting States are also entitled to national treatment under the Convention if they are domiciled or have a real and effective industrial or commercial establishment in a Contracting State’

In simple words, it calls for the application of same rules to the nationals of all the states that are a member to the convention with respect to the application and granting of industrial property rights, provided they hold an establishment in that respective state.

Right of Property

The Convention provides for the **right of priority** in the case of patents (and utility models where they exist), marks and industrial designs.

This right means that, on the basis of a regular first application filed **in one** of the Contracting States, the applicant may, within a certain period of time (12 months for patents and utility models; 6 months for industrial designs and marks), apply for protection **in any of the other** Contracting States.

Continued

These subsequent applications will be regarded as if they had been filed on the same day as the first application. In other words, they will have priority (hence the expression "right of priority") over applications filed by others during the said period of time for the same invention, utility model, mark or industrial design.

Moreover, these subsequent applications, being based on the first application, will not be affected by any event that takes place in the interval, such as the publication of an invention or the sale of articles bearing a mark or incorporating an industrial design.

Continued

One of the great practical advantages of this provision is that applicants seeking protection in several countries are not required to present all of their applications at the same time but have 6 or 12 months to decide in which countries they wish to seek protection, and to organize with due care the steps necessary for securing protection.

Common rules

The Union lays down some common rules which all member states are required to follow;

Patents: Patents granted in different Contracting States for the same invention are **independent of each other**.

The granting of a patent in one Contracting State does not oblige other Contracting States to grant a patent; a patent cannot be refused, annulled or terminated in any Contracting State on the ground that it has been refused or annulled or has terminated in any other Contracting State.

Continued

The inventor has **the right to be named** as such in the patent.

The grant of a patent may not be refused, and a patent may not be invalidated, on the ground that the sale of the patented product, or of a product obtained by means of the patented process, is subject to restrictions or limitations resulting from the domestic law.

Continued

In case of Marks, The Paris Convention does not regulate the conditions for the **filing and registration of marks** which are determined in each Contracting State by domestic law.

No application for the registration of a mark filed by a national of a Contracting State may be refused, nor may a registration be invalidated, on the ground that filing, registration or renewal **has not been affected in the country of origin**.

Continued

The registration of a mark obtained in one Contracting State is **independent** of its possible registration in any other country, including the country of origin; consequently, the lapse or annulment of the registration of a mark in one Contracting State will not affect the validity of the registration in other Contracting States.

Continued

In case of Industrial design:

Industrial designs must be protected in each Contracting State, and protection may not be forfeited on the ground that articles incorporating the design are not manufactured in that State.

Trade Names:

Protection must be granted to trade names in each Contracting State without there being an obligation to file or register the names.

Continued

Indications of Source

Measures must be taken by each Contracting State against direct or indirect use of a false indication of the source of goods or the identity of their producer, manufacturer or trader.

Unfair competition

Each Contracting State must provide for effective protection against unfair competition.

The Berne Contract, 1971

Berne Convention for the Protection of Literary and Artistic Works (1886).

The Berne Convention deals with the protection of works and the rights of their authors.

It is based on **three basic principles** and contains a series of provisions determining the **minimum protection** to be granted, as well as special provisions available to **developing countries** that want to make use of them.

Continued

The Berne Convention, concluded in 1886, was revised at Paris in 1896 and at Berlin in 1908, completed at Berne in 1914, revised at Rome in 1928, at Brussels in 1948, at Stockholm in 1967 and at Paris in 1971, and was amended in 1979.

Berne Convention for the Protection of Literary and Artistic Works (1886).

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It is based on **three basic principles** and contains a series of provisions determining the **minimum protection** to be granted, as well as special provisions available to **developing countries** that want to make use of them.

Principles of Berne Contract, 1971

A. Principle of National Treatment

B. Principle of "automatic" protection

C. Principle of "independence" of protection

Principle of National Treatment

Works originating in one of the Contracting States (that is, works the author of which is a national of such a State or works first published in such a State) must be given the same protection in each of the other Contracting States as the latter grants to the works of its own nationals (principle of "national treatment")

Principle of Automatic protection

Protection must not be conditional upon compliance with any formality (principle of "automatic" protection)

This principle implies that copyright protection exists automatically from the time a qualifying work is fixed in a tangible medium.

Principle of Independence of protection

Protection is independent of the existence of protection in the country of origin of the work (principle of "independence" of protection).

This principle indicates that the protection in question is independent of the existence of protection in country of origin where the work was produced.

In case a Contracting State provides for a longer term of protection than the minimum prescribed by the Convention and the work ceases to be protected in the country of origin, protection may be denied once protection in the country of origin ceases.

Minimum standards of protection

The minimum standards of protection relate to the works and rights to be protected, and the duration of the protection:

Works: the protection must include “every production in the literary, scientific and artistic domain, whatever may be the mode or form of its expression”.

Exclusive rights recognized (subject to certain limitations/exceptions):

- the right to translate,
- the right to make adaptations and arrangements of the work,
- the right to perform in public dramatic, dramatic-musical and musical works,

Continued

- the right to recite in public literary works,
- the right to communicate to the public the performance of such works,
- the right to broadcast,
- the right to make reproductions in any manner or form,
- the right to use the work as a basis for an audiovisual work, and the right to reproduce, distribute, perform in public or communicate to the public that audiovisual work.

Continued

The Convention also provides for **"moral rights"**, that is, the right to claim authorship of the work and the right to object to any mutilation, deformation or other modification of, or other derogatory action in relation to, the work that would be prejudicial to the author's honor or reputation.

Duration of the Protection

As to the **duration** of protection, the general rule is that protection must be granted until the expiration of the 50th year after the author's death.

There are, however, exceptions to this general rule.

In the case of unidentified or pseudonymous works, the term of protection expires 50 years after the work has been lawfully made available to the public, except if the pseudonym leaves no doubt as to the author's identity or if the author discloses his or her identity during that period; in the latter case, the general rule applies.

Continued

In the case of audiovisual (cinematographic) works, the minimum term of protection is 50 years after the making available of the work to the public ("release") or – failing such an event – from the creation of the work. In the case of works of applied art and photographic works, the minimum term is 25 years from the creation of the work

Rights and Limitations on Rights

The Berne Convention allows certain limitations and exceptions on economic rights, that is, cases in which protected works may be used without the authorization of the owner of the copyright, and without payment of compensation.

These limitations are commonly referred to as "free uses" of protected works, and are set forth in Articles 9(2) (reproduction in certain special cases), 10 (quotations and use of works by way of illustration for teaching purposes), 10*bis* (reproduction of newspaper or similar articles and use of works for the purpose of reporting current events) and 11*bis*(3) (ephemeral recordings for broadcasting purposes).

Continued

The Appendix to the Paris Act of the Convention also permits developing countries to implement non-voluntary licenses for translation and reproduction of works in certain cases, in connection with educational activities. In these cases, the described use is allowed without the authorization of the right holder, subject to the payment of remuneration to be fixed by the law.

Continued

The Berne Union has an Assembly and an Executive Committee. Every country that is a member of the Union and has adhered to at least the administrative and final provisions of the Stockholm Act is a member of the Assembly. The members of the Executive Committee are elected from among the members of the Union, except for Switzerland, which is a member *ex officio*.

Under the Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS Agreement), the principles of national treatment, automatic protection and independence of protection also bind those World Trade Organization (WTO) Members not party to the Berne Convention.

Continued

In addition, the TRIPS Agreement imposes an obligation of "most-favored-nation treatment", under which advantages accorded by a WTO Member to the nationals of any other country must also be accorded to the nationals of all WTO Members. It is to be noted that the possibility of delayed application of the TRIPS Agreement does not apply to national treatment and most-favored obligations.

Under the TRIPS Agreement, an exclusive right of rental must be recognized in respect of computer programs and, under certain conditions, audiovisual works.

Continued

Under the TRIPS Agreement, any term of protection that is calculated on a basis other than the life of a natural person must be at least 50 years from the first authorized publication of the work, or – failing such an event – 50 years from the making of the work. However, this rule does not apply to photographic works, or to works of applied art.

It is to be noted that WTO Members, even those not party to the Berne Convention, must comply with the substantive law provisions of the Berne Convention, except that WTO Members not party to the Convention are not bound by the moral rights provisions of the Convention.

For more information

Please visit the link below:

http://www.wipo.int/treaties/en/text.jsp?file_id=288514#P77_5133

Thank You!!

Ethics in Engineering Practice

Lecture No (17,18): Computers , Software and Digital Information

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Outline of the module

- Emergence of Computer ethics
- Issues in Computer ethics
- Power relationships – job elimination, customer relations, biased softwares, military weapons
- Property issues – Embezzlement and Data sand software issues
- Privacy issues – Inappropriate access, Data bank errors, Hackers
- Professional issues – Computer failures and health conditions

Source : Ethics in Engineering, Martin and Schinzinger, Mc-Graw hill publication

Continued

- What makes digital systems and digital information different?
- Software as Intellectual property
- Hacking
- Changing culture of cloud computing – Facilitating downloads- equally a crime
- Challenges in this information age

Source : Ethics in Engineering Resercah and practice, Whitbeck

Computer Ethics

Today computers occupy an important place in our society. To a very great extent, they can be considered as the technical backbone of our society.

There is hardly any field today where computers are not being used, whether its personal or professional

With the increasing use of consumers across the globe, a new area of computer ethics have emerged

Continued

These ethics hold special importance for new group of professionals emerging with the growth of computer technology like computer engineers, designers, programmers, system analysts and computer operators

Issues in Computer ethics

- Power relationships
- Property issues
- Issues of privacy
- Professional issues

Power Relationships

Computers have dramatically increased the ability of the organizations to not just manage huge heaps of data easily but also carry out many jobs effectively

When the computers were introduced social critics were alarmed that computers would lead to concentration of power in few hands

The emergence of micro computers that portable and can be used at multiple locations has created a lot of ethical concerns for those in control of these

Continued

Job Elimination

Computers have led and will continue to eliminate some of the jobs. The emergence of computers in any organization leads to the removal of a few people as computers can handle many tasks with just one operator.

However in large organizations there is possibility of readjust work assignments, adjust work loads or assign other tasks of people but such possibilities do not exists in small organizations

There is a need to weigh moral considerations of human costs attached with emergence of computers in the organizations

Continued

Customer Relations

There are also questions about public accountability of businesses using computer based services. The personal and financial details of consumers are usually taken by there companies and maintained as records, it should be made sure that these companies do not use details of computers unethically.

There are other issues to be dealt with this as well. For eg, a grocery tore which issues computerized bill should not use codes to display items as computers may not get complete picture about what they actually purchased and what they are paying for

Continued

Biased Software

The computer software used for running the programs should be neutral. They should not be created to get biased results. The coding and algorithm designed for running the software should be created to get unbiased results, not what the developer intends to get.

Engineers, who design soft wares for checking feasibility scores for projects should make sure that they never show results that re biased in one direction

Continued

Stock Trading

Stock trading is the automatic, hands off, computer trading of the stocks, futures and options on the stock market

What assurances exists with respect to the fact the power controllers in organizations who have control over the algorithms that are developed to run these soft wares do not exercise power to manipulate markets and control the prospective selling and purchases processes keeping their interests in mind

Continued

Military weapons

Many countries today are creating autonomous weapons that can be aimed and fired onboard through new emerging technologies

Computerized defense softwares have created a dangerous instability, even if they are working perfectly

One wrong command can prove to be costly beyond imagination

Continued

This can also make countries who are in control of these computerized nuclear weapons to dominate others and get their undue demands fulfilled

Property

Two of the most widely publicized forms of computer crimes are;

Embezzlement of funds

Stealing money or financial assets

With the control of computer technology, in just a few clicks, millions of money can be transferred from one account to another, creating the bankruptcy in seconds for the other

Embezzlement

Computers have been many times found to be incidentally involved when extortions are attempted via phones which is covered under computerized telephone system

Sometimes unauthorized persons use computers to obtain private phone numbers or use them for malicious activities

The computer technology has made it easy for people to contact people by hiding their identity and make fools out of them by embezzling their funds

Continued

There are two factors that make computers troublesome and where the need for ethics arises with respect to their wise usage arises;

Their speed and geographical coverage which allows large number of people to be victimized

The difficulty of tracing the underlying transactions to get hold of the theives

This problem becomes more acute when calls are made lonling lines by crossing national boundaries

Continued

Some of the commonly discussed cases of computer abuse relate to the embezzlement of funds by people from accounts of others by hacking their passwords or stealing their private and financial confidential information online

These cases have been reported in many forms with respect to stealing or cheating by employees at work, stealing by non-employees to former employees, cheating clients, violating contracts of computer sale etc

Receiving mails

I am sure many of you must received mails from anonymous ids who declare millions of rupees as rewards for you and for processing ask you to provide you important personal and private financial information online.

Beware of such mails!!

Data and Software

Data here denotes information stored in computer, Softwares refers to programs that direct an electronic machine to perform certain tasks specially solving problems

Because of the developments in technology it has become quite easy for people to steal huge heaps of information and store them in small chips or devices like hard disks

Softwares makes it people even to decode the information written inc odes and use them for their own purposes.

Privacy

Storage and retrieval of huge data bases has become quite easy because of the developments in technology and it has thus made easy for people to access the private information of people

By making data easily available to people , computers have made it difficult for people to protect their privacy

Issues in privacy

Inappropriate access

Because of the advancements in technology, it is quite easy for the people who know how to hack to inappropriately access the information of individuals or even organizations

Suppose if the data pertaining to the account (financial) details of the people is inappropriately accessed by the people planning a crime, it can lead to many blunders and can even led to bankrupsy for a lot of people

Continued

Data recording errors

Sometimes the errors made while making records in data bases or not updating the records on time could prove to be very costly

For eg, while maintaining record of the criminals, photos of two criminals are replaced by the innocent people

Or Mr. Yen had already cleared the loan amount but the details were not updated by the bank officials in the system. Because of his visibility of name under defaulters, a case was lodged against him.

Continued

Hackers

These are people who compulsively challenge any computer security system

Some even carry the art to place “Trojan horses”, (unwanted codes that copy themselves into larger programs) that choke networks with dead end tasks and spew out false information, erase files or even destroy equipments

Continued

This form of vandalism can be extremely harmful and is majorly a clear case of violation of property rights

Just think for a minute, someone hacking your bank account, you would have nothing left in the account in next few seconds and it may even not be possible to get hold of the hacker because of the complexities in the system involved

Professional issues

Many of the issues in engineering ethics arise within the context of computer work.

New variations of difficulties may be involved , often owing to the high degree of job complexity and required technical proficiency introduced by computers.

Professional issues involved

Computer failures

Failures can occur because of errors in software and hardware

Software error are indeed serious and can lead to the collapse of the designed applications . Like because of a wrong code, deaths of several patients happened when several patients received uncontrolled amounts of radiations from radiation therapy machines

Continued

Errors can occur because of faulty logic in the design formulation or could occur because of the faulty coding instructions

Thus, it is essential that engineers carry out trials ethically and should not let the issues evolve so that they can once again charge the clients for resolving these issues

Continued

Health Conditions

Engineers who supervise computer personnel or design computer terminals should check that ergonomic considerations are in effect to reduce back problems, provide wrist support and good keyboard layouts to prevent the occurrence of health problems to the users of such systems.

Digital systems and Digital information

Digital systems and digital information undoubtedly have special characteristics that sets them apart and hence, influence the moral significant problems

Like the ability to steal the digital information without entering the premises, from a distance poses new challenges for the legal system relating to theft of the digital information.

The plasticity of digital information increases the possibility of transferring to it to small devices which increases the chances of forgery and thus requires more checks.

Distinctive characteristics of Digital information

✓No tangible form

✓Carry high intrinsic value

✓Even when stolen or pirated, it is not gone . Someone may be selling your licensed software to others without your knowledge

✓ Easy to create unlicensed copies of software, music or videos which threatens artistic integrity

Continued

✓Can be easily copied online if it is made available by other people in public forums

✓That's how copyrights and intellectual property rights become significant (Discussed in detail in further sections of the module)

Software as Intellectual property

The software code may be either patentable or covered by copyright depending upon how novel the software is as a technology.

Other technologies are subject to patent only. However software is a written work and therefore subject to copyright. It also possesses functionality unlike other written work.

Because any one can use the source code without reading it, property protections for digital information work differently as they work for other technologies.

Continued

Even if one buys software, there are by law only bound to use it for themselves only and specifically not allowed to do reverse engineering to create one of their own, as the license forbids them from doing so.

For better understanding and insights, refer to the case
Lotus development corporation vs. Paperback software international and Stephenson Software ltd.

Case for Reference

Hacking

Hacking is a way of making something function the way, it was not designed to. Unfortunately, it is celebrated as *"a clever, benign and ethical prank or a joke which is both challenging the perpetrators and amusing"*

It is also referred in a sense to gaining unauthorized access to computers, phone systems and so on, which is illegal.

Is it considered to be illegal and prima facie wrong?

If there is a reasonable suspicion that something is being planned and would harm the nation or a group or a society at large, hacking may be justified but the questions that arise relate to, who shall do it?

Changing culture of cloud computing – Facilitating downloads- equally a crime

Privacy in Information age

- Express your views on how safe is private information in this new age of technology?

Challenges in this information age

Authentication – *It is harder to prove that you are you and somebody else is not you. You can be anything and anyone on internet*

Phishing – *Deceiving people and churning out their financial important information like their account passwords*

Spam – *unwarranted messages usually advertisements sent to a large number of people without taking their permission*

Thank You!!

Ethics in Engineering Practice

Lecture No (19,20) :Engineers, Nuclear Testing and Weapons

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Outline of the module

- Introduction
- Nuclear ethics
- Importance of Nuclear ethics
- Role of engineers
- Special code of ethics for organizations as well as people working in Nuclear
- Agencies
- General and specific duties of Nuclear Engineers
- Formation of ethical policies
- Is it ethical for engineers to develop nuclear weapons

Continued

- View of Utilitarianism on Nuclear weapons
- Theory of deontology and Nuclear weapons
- From the point of view of ‘Nuclear Deterrence

(source: *Yue Zhao ,* Student Conversations about Professional Responsibilities of the Engineer @ The University of Sheffield), IAEA Nuclear Energy Series Guides Establishing a Code of Ethics for Nuclear Operating Organizations No. NG-T-1.2) https://wwwpub.iaea.org/MTCD/Publications/PDF/P_1311_web.pdf, , //www.bls.gov/ooh/architecture-and-engineering/nuclear-engineers.htm#tab-2)

Introduction

Almost all countries in the world today are aspiring to be nuclear states today.

This is primarily for their own security as well as freedom from dependence from other countries like United States of America.

The need for countries as well as the aspiration to emerge as nuclear states has led to the emergence of new branch called nuclear ethics.

Nuclear Ethics

An emerging branch of ethics which examines the issues pertaining to;

nuclear warfare
nuclear deterrence,
nuclear arms control,
nuclear disarmament, *or*
nuclear energy

from the lens of ethical theories or moral conduct

Nuclear Warfare

It is a from of conflict leading to mass destruction in which nuclear weapons are used by the country to inflict damage on the enemy.

Nuclear weapons are weapons of mass destruction and can cause a much extensive damage in a very short period of time and can have a long-lasting radiological warfare result.

Nuclear Deterrence

It is a strategy to prevent war.

It follows the rationale of first user principle, which states the right of the country to use nuclear weapons for self defense in situation of an armed attack for protecting its security.

Nuclear deterrence is merely the possibility of thwarting an enemy's plans with nuclear weapons.

Nuclear disarmament

Nuclear disarmament is the act of reducing or eliminating nuclear weapons.

The objective is to create a world free of nuclear weapons, in which nuclear weapons are not used by nay of the states.

It can also be described as **denuclearization,** which denotes the process of is complete nuclear disarmament.

Continued

Arms control refers to treaties made **between** potential adversaries that reduce the likelihood and scope of war, usually imposing limitations on military capability.

Although **disarmament** always involves the reduction of military forces or weapons, **arms control** does not.

Nuclear arms control

It is a term that is mainly used to describe the international restrictions relating to the development, production, stocking, proliferation and usage of small arms, conventional weapons and weapons of mass destruction .

What is the difference between nuclear arms control and nuclear disarmament?

Importance of Nuclear ethics

Consequences of nuclear accidents can be monumental

Emissions from nuclear reactors can cause huge harm to the life around them

Tragic incidents can occur if unethical choices are made by engineers like selecting a wrong a site for testing of the nuclear weapons.

Reactor meltdowns, which have been identified amongst the serious nuclear accidents usually occurs when proper security measures are not taken.
This in a way highlights the role of the engineers.

Continued

It is important to avoid accidents like meltdowns as these can cause death and injury to the surrounding community through explosions and leakage of radioactive material.

Disposition of nuclear waste is another major issue. Nuclear waste can again be deadly to both human and animal life as well the environment.

It is needless to say that huge money and resources are involved, which also makes creates an ethical responsibility for engineers to make sure that resources are not wasted.

Needless to say about the role of engineers

One group that plays an eminent role with respect to nuclear weapons development and testing is undoubtedly the group of engineers.

This is because they not just play an important role in designing but are also supposed to make sure that testing is done in such a way that no harm reaches mankind.

International atomic energy agency has given a special code of behavior for the people working in as well as for nuclear facility operating organizations.

Code of Ethics specially for people working in Nuclear agencies

- Adopt a conservative, risk-based approach to decision making
- Always place safety before commercial gain
- Accept personal responsibility for own and others' safety
- Integrate safety and environmental considerations into business practices

Continued

- Ensure that there are effective mechanisms for communication between the Board and operational level managers in order that Board-level decision making is done with appropriate consideration of safety and environmental risks

- Communicate openly and honesty with regulators, employees and all other stakeholders

- Maintain a “blame-free” reporting culture that encourages full reporting of unsafe or unethical practices, incidents and near misses, and that uses this information to continually improve the organization

Continued

- Openly share operating experience information with other industry operating organizations, including benchmarking, and make effective use of the experiences of others, while respecting commercial confidentiality

- Participate objectively and honestly in local, national and global discussions and policy making processes regarding energy supply decisions

- Bribery and corruption are not tolerated at any level, or in any area of the organization.

Continued

- Materials, technology, and information regarding nuclear activities are not illegally sold or distributed, or otherwise misused.

- Being a good neighbour to, and supporter of, the local community, including advising them of measures taken to protect their health and safety, and the local environment.

(Source: https://www-pub.iaea.org/MTCD/Publications/PDF/P_1311_web.pdf)

General Duties of Nuclear Engineers

- Designing or developing nuclear equipments like reactor cores, radiation shielding, and associated instrumentation

- Direct operating or maintenance activities of operational nuclear power plants to ensure that they meet safety standards

- Write operational instructions to be used in nuclear plant operation or in handling and disposing of nuclear waste

- Monitor nuclear facility operations to identify any design, construction, or operation practices that violate safety regulations and laws

Continued

- Perform experiments to test whether methods of using nuclear material, reclaiming nuclear fuel, or disposing of nuclear waste are acceptable

- Take corrective actions or order plant shutdowns in emergencies

- Examine nuclear accidents and gather data that can be used to design preventive measures

(source://www.bls.gov/ooh/architecture-and-engineering/nuclear-engineers.htm#tab-2)

Specific Duties of Nuclear Engineers with respect to Nuclear weapons testing

Designing and testing weapons for building a strong base for ensuring the security of the country

Making sure that complete secrecy is maintained and no information is leaked out which could hamper the security of the country, this is in a way like the rule of confidentiality

Implementing tests in such a way that it doesn't hampers the mankind as well as the animal life in the surroundings.

Continued

This implies that several precautionary measures should be taken. Like testing should be done in ranges which are quite far from densely or even medium populated areas

All loopholes while testing should be indentified and properly recorded by the engineers, such that these mistakes are not repeated as can be very deadly for the mankind.

Disposition of nuclear waste should be done in such a way that it leaves minimum negative impact on our environment.

Formation of ethical policies

There is a need for formulating ethical policies in nuclear organizations with respect to

- Conducting operations at nuclear facilities
- Management systems including quality management and safety culture
- Human resource management including human performance improvement Training and qualification of personnel

Continued

- Open and transparent decision making and communication methods
- Physical protection and control of nuclear materials
- Experience feedback and corrective action systems.

Is it ethical for engineers to continue developing nuclear weapons

Nuclear weapons undoubtedly have disastrous effects due to their destructive power.

Their bad effects on environment can only be marginalized but cannot be completely eradicated, hence, a few humanitarians have although raised voices for their abolition to protect humanity,

But the paradox.. Relates to not compromising with the security of the country and it is considered ethical for engineers to develop nuclear weapons for the purpose of defense of the country defense.

Continued

The main stakeholders include;

- Government
- Alliances (Government partnership with other countries in form of any
- treaties signed with respect to nuclear weapons developments and testing)
- Nuclear weapons manufacturers
- Engineers and Scientists
- Common public

Continued

While the companies want to shoot up the production to make more money,

The common people of the public want to live in a safe environment,

And

Governments' main interest lies in protecting the country from foreign invasion and threat.

Continued

Hence, the relevant values should include

National sovereignty
Territorial integrity,
Public welfare
World peace
Sustainability of environment
and
integrity of the engineer.

(source: *Yue Zhao ,* Student Conversations about Professional Responsibilities of the Engineer @ The University of Sheffield)

Continued

The disputed fact can be whether the nuclear weapons should still exist in the world.

Options for actions include

(1) Use nuclear deterrence as an important instrument for security

(2) Every country gives up the nuclear weapon at the same time.

(source: *Yue Zhao ,* Student Conversations about Professional Responsibilities of the Engineer @ The University of Sheffield)

Theory of Utilitarianism and Nuclear weapons

Theory of Utilitarianism : ***"Those actions should be chosen that lead to maximum amount of happiness"***

This indicates that out of the various options available only that option should be picked up which results in greatest happiness for the people.

As everyone in the world pursues peace, people will feel happier if there are fewer wars and deaths.

Continued

On grounds of Utilitarian ethics,

Is it right if few people are killed or animal life is affected or harmful radiations are released in environment to assure you the security of nation of millions or billions of people? - A point of debate

Continued

From the theory of deontology,

Deontology focuses on whether the action is right or wrong instead of analyzing the consequences.

As nuclear weapons often claim innocent lives in both the opponent and retaliatory countries at risk, then it too is intrinsically wrong

From the point of view of ‘Nuclear Deterrence’

Nuclear deterrence, means that any country say X is very much unlikely to attack another country Y, if it (X) knows that Y has more nuclear weapons.

Nuclear deterrence is very much essential to safeguard a country and protect its people from invasion and attacks from other countries.

A balance of nuclear weapons is very much essential for reducing the aggression as well as chances of large scale wars as it restricts other countries from attacking You.

Continued

As a result, nuclear deterrence makes the country safer.

So it is ethically justified for engineers to continue developing nuclear weapons as they do the best for the most people in the end.

Thank You!!