DOWNLOAD PDF THE PUBLIC AND PRIVATE LIFE OF AN ENGINEER

Chapter 1 : Civil engineering - Wikipedia

The Benefits of Working in the Public Sector as an Engineer. Not all engineering is carried out by private companies - the public sector also requires top talent.

Firms come in all sizes, ranging from one-person consultancies operating out of their home to huge multinational companies that deal not only in engineering but also the construction, operation, and maintenance of facilities. And on top of that, firms are looking to find engineers from all disciplines. Ever-Growing Disciplines The main types of engineering are traditionally thought of as civil, mechanical, electrical, and chemical. Primary subsets of these include environmental, often lumped under civil; structural, a combination of mechanical and civil; geotechnical, considered another subset of civil; manufacturing, part of mechanical; aerospace, another sect of mechanical; and computer, a relatively new division of electrical engineering. Beyond this, other types you hear about include materials, ceramics, nuclear, petroleum, process, industrial, forensic, architectural, and subsurface utilities engineering. For most disciplines, the name describes the type of engineering, but civil is a different animal, as it refers to any engineering done for the public domain. Most people think of it as anything involving concrete or asphalt such as bridges, roads, or wastewater treatment plants. But it often entails things like pumping stations, which involve mechanical engineering, or streetlights, which fall under electrical engineering. Structural, geotechnical, and environmental engineering play a large role in the civil domain as well, so civil is actually a combination of disciplines. Expanding on civil, geotechnical engineering basically involves anything underground and can include areas such as building foundations, bridge piers, and landfills. Environmental engineering typically involves working with regulations to ensure that companies comply with them, and it includes cleanup and remediation operations after a company contaminates a site or body of water. Electrical engineering firms usually go one of two ways; they deal in traditional systems such as power generation, transmission, and distribution or electrical systems in buildings, including fire protection. Or they take more of a digital approach by working with computers, software, controls, and instrumentation. In the public realm, most people think of it as part of mechanical-electrical-plumbing MEP engineering, which involves designing the systems used to operate buildings and similar projects such as HVAC heating, ventilation, and air conditioning , electrical, piping, and fire protection. Obviously, this involves electrical engineers as well. Some firms specialize in this, and larger firms often have a division to handle it, where electricals and mechanicals work together. The other form of mechanical engineering comes in private industry and takes a different shape. Engineers here typically get involved in designing the products a company manufactures, ranging from initial concepts and prototyping to working with manufacturing engineers to get products into production. Mechanical design engineering firms exist that offer such services to private industry. Many engineering firms specialize in one engineering discipline, while others offer various combinations of disciplines. Many firms specialize in civil engineering. What we label as multidisciplinary firms in our Engineering Firm Directory usually consist of civil, mechanical, and MEP mechanical-electrical-plumbing disciplines for projects ranging from land development and buildings to civil projects such as roads, railroads, airports, water, and wastewater. They often have structural, environmental, and geotechnical disciplines as well, and they may offer supplementary services such as land surveying, construction materials testing, and GIS geographic information systems. Every state has a licensing board that administers and polices the licensing process and grants licenses. An engineer who oversees work done on a project can stamp drawings done for the project with their seal that comes with their license. Not every engineer in a firm needs to be licensed, but a licensed engineer must supervise every project. Firms typically have most of their engineers licensed, and an engineer is often licensed in more than one state. That way, the firm can offer its services in all the states it has a licensed engineer for. Larger firms typically have engineer licenses in most or all states. An engineering license is granted in two parts. Then, after an engineer obtains at least four years of experience doing engineering work under a licensed engineer, they can take the Professional Engineer examination, which covers more practical, real-world areas of engineering. Some engineering firms may not have any licensed

engineers on staff. How do they do this? Firms Work For a Variety of Entities Consulting firms get hired to perform engineering work for many entities and types of clients, both in the private and public sectors. Land and property developers.

Chapter 2 : Code of Ethics | National Society of Professional Engineers

I am a civil engineer worked in A Public Sector company as site engineer, left the job did my PG and now working in private sector as a consultant on transport planning and transport studies. So first Public Sector life.

In some types of PPP, the cost of using the service is borne exclusively by the users of the service and not by the taxpayer. Government contributions to a PPP may also be in kind notably the transfer of existing assets. In projects that are aimed at creating public goods like in the infrastructure sector, the government may provide a capital subsidy in the form of a one-time grant , so as to make the project economically viable. In some other cases, the government may support the project by providing revenue subsidies, including tax breaks or by guaranteed annual revenues for a fixed time period. In all cases, the partnerships include a transfer of significant risks to the private sector, generally in an integrated and holistic way, minimizing interfaces for the public entity. An optimal risk allocation is the main value generator for this model of delivering public service. There are many drivers for PPPs [2]. One common driver involves the claim that PPPs enable the public sector to harness the expertise and efficiencies that the private sector can bring to the delivery of certain facilities and services traditionally procured and delivered by the public sector. Rather, the PPP borrowing is incurred by the private sector vehicle implementing the project. Generally, financing costs will be higher for a PPP than for a traditional public financing, because of the private sector higher cost of capital. However, extra financing costs can be offset by private sector efficiency, savings resulting from a holistic approach to delivering the project or service, and from the better risk allocation in the long run. Typically, a private sector consortium forms a special company called a " special purpose vehicle " SPV to develop, build, maintain and operate the asset for the contracted period. It is the SPV that signs the contract with the government and with subcontractors to build the facility and then maintain it. In the infrastructure sector, complex arrangements and contracts that guarantee and secure the cash flows make PPP projects prime candidates for project financing. A typical PPP example would be a hospital building financed and constructed by a private developer and then leased to the hospital authority. The private developer then acts as landlord, providing housekeeping and other non-medical services while the hospital itself provides medical services. Governments sought to encourage private investment in infrastructure , initially on the basis of accounting fallacies arising from the fact that public accounts did not distinguish between recurrent and capital expenditures. The idea that private provision of infrastructure represented a way of providing infrastructure at no cost to the public has now been generally abandoned; however, interest in alternatives to the standard model of public procurement persisted. In particular, it has been argued that models involving an enhanced role for the private sector, with a single private-sector organization taking responsibility for most aspects of service provisions for a given project, could yield an improved allocation of risk , while maintaining public accountability for essential aspects of service provision. Initially, most publicâ€"private partnerships were negotiated individually, as one-off deals, and much of this activity began in the early s in the UK. PPPs are organized along a continuum between public and private nodes and needs as they integrate normative, albeit separate and distinct, functions of societyâ€"the market and the commons. A common challenge for PPPs is allowing for these fluctuations and reinforcing the intended partnership without diminishing either sector. Multisectoral, or collaborative, partnering is experienced on a continuum of private to public in varying degrees of implementation according to the need, time restraints, and the issue at hand. It is at the merger of these sectors that we see how a unified partnership has immediate impact in the development of communities and the provision of public services. In specific countries[edit] Australia[edit] A number of Australian state governments have adopted systematic programmes based on the PFI. The first, and the model for most others, is Partnerships Victoria. Canada[edit] The federal conservative government under Stephen Harper in Canada solidified its commitment to P3s with the creation of a crown corporation, P3 Canada Inc. The Canadian vanguards for P3s have been provincial organizations, supported by the Canadian Council for Publicâ€"Private Partnerships established in a member-sponsored organization with representatives from both the public and the private sectors. As a proponent of the concept of P3s, the Council conducts research, publishes findings, facilitates forums for

discussion and sponsors an Annual Conference on relevant topics, both domestic and international. Each year the Council celebrates successful publicâ€"private partnerships through the National Awards Program held concurrently with the annual conference in November. At lower levels of government P3s have been used to build major infrastructure projects like transit systems, such as Viva Rapid Transit and Ontario Highway , and to build public buildings such as schools. The project, named Shantou Coastal New Town, aims itself to be a high-end cultural, leisure, business hub of the East Guangdong area. Sector-wise, road projects account for about As of [update] , these sectors are expected to get an investment of Rs. Proposed infrastructure in the Philippines. Publicâ€"private partnerships in Puerto Rico. Still all those laws and documents do not cover all possible PPP forms. The most developed region was Saint Petersburg with rating 7. The programme focused on reducing the public sector borrowing requirement , although, as already noted, the effect on public accounts was largely illusory. The Labour government of Tony Blair , elected in , expanded the PFI initiative but sought to shift the emphasis to the achievement of "value for money," mainly through an appropriate allocation of risk. However, it has since been found that many programs ran dramatically over budget and have not presented as value for money for the taxpayer, with some projects costing more to cancel than to complete. The platform aims to replace traditional approaches to infrastructure financing and development with "performance-based infrastructure" marked by projects that are funded where possible by internal rates of return , as opposed to tax dollars, and evaluated according to life-cycle social, ecological and economic impacts, as opposed to capacity addition and capital cost. In , the State of Texas sought its first ever private partner to join in a project to renovate the G. Sutton , the first African-American elected official in San Antonio, the six-acre complex was vacated by the state in because of bat infestation and a deteriorating foundation. The state expects to see the property used at some point in the future for office space and parking slots. Because of recurring state financial issues, the fate of state parks in Louisiana remain in doubt after July 1, This particular arrangement involves no financial risk to the for-profit utility. Where the utility has existing easements, they share the right-of-way. Where the utility does not have an existing easement but wishes to gain state approval for constructing new transmission lines on state property, the utility reproduces designs of rail trails in its petition to the state Energy Facilities Siting Board EFSB. Approval would enable the utility to have construction of transmission lines and gravel utility paths fully funded through electric ratepayer bills. The legality of steering greenfield transmission projects into environmentally sensitive conservation and wetlands, and using electric ratepayer funds for non-reliability purposes is being tested. In a related case, the Massachusetts Supreme Judicial Court ruled that electricity customers can no longer be asked to help cover the costs of building gas pipelines. Much of the early infrastructure of the United States was built by what can be considered public-private partnerships. The advancement of PPPs, as a concept and a practice, is a product of the new public management of the late 20th century and globalization pressures. The term "publicâ€"private partnership" is prey to thinking in parts rather than the whole of the partnership, which makes it difficult to pin down a universally accepted definition of PPPs. According to a survey, two primary reasons were expressed: A report by PriceWaterhouseCoopers argued that the comparison between public and private borrowing rates is not fair, because there are "constraints on public borrowing", which may imply that public borrowing is too high, and so PFI projects can be beneficial by not putting debt directly on government books. A number of Australian studies of early initiatives to promote private investment in infrastructure concluded that, in most cases, the schemes being proposed were inferior to the standard model of public procurement based on competitively tendered construction of publicly owned assets. The underlying framework was one in which value for money was achieved by an appropriate allocation of risk. These assessment procedures were incorporated in the private finance initiative and its Australian counterparts from the late s onwards. Government coalitions are revealed as susceptible to a number of problems primarily corruption and conflicts of interests. This slippery slope is generally created by a lack of sufficient oversight. Instead of lower prices, large volumes of investment and improvements in the connection of the poor to water and sanitation, water tariffs have increased out of reach of poor households. Water multinationals are withdrawing from developing countries and the World Bank is reluctant to provide support. In the survey of U. The study revealed that communities often fail to sufficiently monitor collaborative agreements or other

forms of service delivery: By , that was down to Performance monitoring is a general concern from these surveys and in the scholarly criticisms of these arrangements. The private sector receives payment for its services and assumes substantial financial, technical and operational risk while benefitting from the upside potential of shared cost savings. The private entity is made up of any combination of participants who have a vested interested in working together to provide core competencies in operations, technology, funding and technical expertise. The opportunity for multi-sector market participants includes hospital providers and physician groups, technology companies, pharmaceutical and medical device companies, private health insurers , facilities managers and construction firms. Funding sources could include banks, private equity firms , philanthropists and pension fund managers. For more than two decades publicâ€"private partnerships have been used to finance health infrastructure. Governments are increasingly looking to the PPP-model to solve larger problems in healthcare delivery. There is not a country in the world where healthcare is financed entirely by the government. As PPPs move from financing infrastructure to managing care delivery, there is an opportunity to reduce overall cost of healthcare. The larger scope of health PPPs to manage and finance care delivery and infrastructure means a larger potential market for private organizations. According to PwC projections, the countries that are expected to have the highest health spending growth between and are China, where health spending is expected to increase by percent, and India, which will see a percent increase. As health spending increases it is putting pressure on governments and spurring them to look for private capital and expertise. These include preventive medicines such as vaccines and microbicides, as well as treatments for otherwise neglected diseases. International PDPs work to accelerate research and development of pharmaceutical products for underserved populations that are not profitable for private companies. They may also be involved in helping plan for access and availability of the products they develop to those in need in their target populations. Publicly financed, with intellectual property rights granted by pharmaceutical industry partners for specific markets, PDPs are able to focus on their missions rather than concerns about recouping development costs through the profitability of the products being developed. These not-for-profit organizations bridge public- and private-sector interests, with a view toward resolving the specific incentive and financial barriers to increased industry involvement in the development of safe and effective pharmaceutical products. International product development partnerships and publicâ€"private partnerships include: MVI was established in to accelerate the development of malaria vaccines and ensure their availability and accessibility in the developing world. RBM is the global framework for coordinated action against malaria. It forges consensus among key actors in malaria control, harmonises action and mobilises resources to fight malaria in endemic countries. The Drugs for Neglected Diseases Initiative DNDi was founded in as a not-for-profit drug development organization focused on developing novel treatments for patients suffering from neglected diseases. FIND [2] is a Swiss-based non-profit organization established in to develop and roll out new and affordable diagnostic tests and other tools for poverty-related diseases. IAVI is financially supported by governments, multilateral organizations, and major private-sector institutions and individuals. The International Partnership for Microbicides is a non-profit product development partnership PDP , founded in , dedicated to the development and availability of safe, effective microbicides for use by women in developing countries to prevent the sexual transmission of HIV. See also Microbicides for sexually transmitted diseases. Medicines for Malaria Venture MMV is a not-for-profit drug discovery, development and delivery organization, established as a Swiss foundation in , based in Geneva. MMV is supported by a number of foundations, governments and other donors. The TB Alliance is financed by public agencies and private foundations, and partners with research institutes and private pharmaceutical companies to develop faster-acting, novel treatments for tuberculosis that are affordable and accessible to the developing world. Publicâ€"private partnerships for disaster management bring together the private sector for PPP models with a tool box of partnership opportunities towards resilience, capacity building, and sustainability goals. Financing[edit] A key motivation for governments considering publicâ€"private partnerships is the possibility of bringing in new sources of financing for funding public infrastructure and service needs. A number of key risks need to be taken into consideration as well.

Chapter 3 : Chemical Engineer Careers | The Princeton Review

1. In modern sociology, respectively, the realm of politics, public institutions, and paid employment and the domestic world of the home and family relations. Public life is governed by shared norms and values while private life is the realm of the intimate, of personal identity, and free will.

Preamble Engineering is an important and learned profession. As members of this profession, engineers are expected to exhibit the highest standards of honesty and integrity. Engineering has a direct and vital impact on the quality of life for all people. Accordingly, the services provided by engineers require honesty, impartiality, fairness, and equity, and must be dedicated to the protection of the public health, safety, and welfare. Engineers must perform under a standard of professional behavior that requires adherence to the highest principles of ethical conduct. Fundamental Canons Engineers, in the fulfillment of their professional duties, shall: Hold paramount the safety, health, and welfare of the public. Perform services only in areas of their competence. Issue public statements only in an objective and truthful manner. Act for each employer or client as faithful agents or trustees. Conduct themselves honorably, responsibly, ethically, and lawfully so as to enhance the honor, reputation, and usefulness of the profession. Rules of Practice Engineers shall hold paramount the safety, health, and welfare of the public. Engineers shall approve only those engineering documents that are in conformity with applicable standards. Engineers shall not reveal facts, data, or information without the prior consent of the client or employer except as authorized or required by law or this Code. Engineers shall not permit the use of their name or associate in business ventures with any person or firm that they believe is engaged in fraudulent or dishonest enterprise. Engineers shall not aid or abet the unlawful practice of engineering by a person or firm. Engineers having knowledge of any alleged violation of this Code shall report thereon to appropriate professional bodies and, when relevant, also to public authorities, and cooperate with the proper authorities in furnishing such information or assistance as may be required. Engineers shall perform services only in the areas of their competence. Engineers shall undertake assignments only when qualified by education or experience in the specific technical fields involved. Engineers shall not affix their signatures to any plans or documents dealing with subject matter in which they lack competence, nor to any plan or document not prepared under their direction and control. Engineers may accept assignments and assume responsibility for coordination of an entire project and sign and seal the engineering documents for the entire project, provided that each technical segment is signed and sealed only by the qualified engineers who prepared the segment. Engineers shall issue public statements only in an objective and truthful manner. Engineers shall be objective and truthful in professional reports, statements, or testimony. They shall include all relevant and pertinent information in such reports, statements, or testimony, which should bear the date indicating when it was current. Engineers may express publicly technical opinions that are founded upon knowledge of the facts and competence in the subject matter. Engineers shall issue no statements, criticisms, or arguments on technical matters that are inspired or paid for by interested parties, unless they have prefaced their comments by explicitly identifying the interested parties on whose behalf they are speaking, and by revealing the existence of any interest the engineers may have in the matters. Engineers shall act for each employer or client as faithful agents or trustees. Engineers shall disclose all known or potential conflicts of interest that could influence or appear to influence their judgment or the quality of their services. Engineers shall not accept compensation, financial or otherwise, from more than one party for services on the same project, or for services pertaining to the same project, unless the circumstances are fully disclosed and agreed to by all interested parties. Engineers shall not solicit or accept financial or other valuable consideration, directly or indirectly, from outside agents in connection with the work for which they are responsible. Engineers in public service as members, advisors, or employees of a governmental or quasi-governmental body or department shall not participate in decisions with respect to services solicited or provided by them or their organizations in private or public engineering practice. Engineers shall not solicit or accept a contract from a governmental body on which a principal or officer of their organization serves as a member. Engineers shall avoid deceptive acts. They shall not misrepresent or exaggerate their responsibility in or for the subject

matter of prior assignments. Brochures or other presentations incident to the solicitation of employment shall not misrepresent pertinent facts concerning employers, employees, associates, joint venturers, or past accomplishments. Engineers shall not offer, give, solicit, or receive, either directly or indirectly, any contribution to influence the award of a contract by public authority, or which may be reasonably construed by the public as having the effect or intent of influencing the awarding of a contract. They shall not offer any gift or other valuable consideration in order to secure work. They shall not pay a commission, percentage, or brokerage fee in order to secure work, except to a bona fide employee or bona fide established commercial or marketing agencies retained by them. Professional Obligations Engineers shall be guided in all their relations by the highest standards of honesty and integrity. Engineers shall acknowledge their errors and shall not distort or alter the facts. Engineers shall advise their clients or employers when they believe a project will not be successful. Engineers shall not accept outside employment to the detriment of their regular work or interest. Before accepting any outside engineering employment, they will notify their employers. Engineers shall not attempt to attract an engineer from another employer by false or misleading pretenses. Engineers shall not promote their own interest at the expense of the dignity and integrity of the profession. Engineers shall at all times strive to serve the public interest. Engineers are encouraged to participate in civic affairs; career guidance for youths; and work for the advancement of the safety, health, and well-being of their community. If the client or employer insists on such unprofessional conduct, they shall notify the proper authorities and withdraw from further service on the project. Engineers are encouraged to extend public knowledge and appreciation of engineering and its achievements. Engineers are encouraged to adhere to the principles of sustainable development1 in order to protect the environment for future generations. Engineers shall continue their professional development throughout their careers and should keep current in their specialty fields by engaging in professional practice, participating in continuing education courses, reading in the technical literature, and attending professional meetings and seminars. Engineers shall avoid all conduct or practice that deceives the public. Engineers shall avoid the use of statements containing a material misrepresentation of fact or omitting a material fact. Consistent with the foregoing, engineers may advertise for recruitment of personnel. Consistent with the foregoing, engineers may prepare articles for the lay or technical press, but such articles shall not imply credit to the author for work performed by others. Engineers shall not disclose, without consent, confidential information concerning the business affairs or technical processes of any present or former client or employer, or public body on which they serve. Engineers shall not, without the consent of all interested parties, promote or arrange for new employment or practice in connection with a specific project for which the engineer has gained particular and specialized knowledge. Engineers shall not, without the consent of all interested parties, participate in or represent an adversary interest in connection with a specific project or proceeding in which the engineer has gained particular specialized knowledge on behalf of a former client or employer. Engineers shall not be influenced in their professional duties by conflicting interests. Engineers shall not accept financial or other considerations, including free engineering designs, from material or equipment suppliers for specifying their product. Engineers shall not accept commissions or allowances, directly or indirectly, from contractors or other parties dealing with clients or employers of the engineer in connection with work for which the engineer is responsible. Engineers shall not attempt to obtain employment or advancement or professional engagements by untruthfully criticizing other engineers, or by other improper or questionable methods. Engineers shall not request, propose, or accept a commission on a contingent basis under circumstances in which their judgment may be compromised. Engineers in salaried positions shall accept part-time engineering work only to the extent consistent with policies of the employer and in accordance with ethical considerations. Engineers shall not, without consent, use equipment, supplies, laboratory, or office facilities of an employer to carry on outside private practice. Engineers shall not attempt to injure, maliciously or falsely, directly or indirectly, the professional reputation, prospects, practice, or employment of other engineers. Engineers who believe others are guilty of unethical or illegal practice shall present such information to the proper authority for action. Engineers in private practice shall not review the work of another engineer for the same client, except with the knowledge of such engineer, or unless the connection of such engineer with the work has been terminated. Engineers in governmental, industrial, or

educational employ are entitled to review and evaluate the work of other engineers when so required by their employment duties. Engineers in sales or industrial employ are entitled to make engineering comparisons of represented products with products of other suppliers. Engineers shall conform with state registration laws in the practice of engineering. Engineers shall not use association with a nonengineer, a corporation, or partnership as a "cloak" for unethical acts. Engineers shall give credit for engineering work to those to whom credit is due, and will recognize the proprietary interests of others. Engineers shall, whenever possible, name the person or persons who may be individually responsible for designs, inventions, writings, or other accomplishments. Engineers using designs supplied by a client recognize that the designs remain the property of the client and may not be duplicated by the engineer for others without express permission. Engineers, before undertaking work for others in connection with which the engineer may make improvements, plans, designs, inventions, or other records that may justify copyrights or patents, should enter into a positive agreement regarding ownership. The employer should indemnify the engineer for use of the information for any purpose other than the original purpose. Footnote 1 "Sustainable development" is the challenge of meeting human needs for natural resources, industrial products, energy, food, transportation, shelter, and effective waste management while conserving and protecting environmental quality and the natural resource base essential for future development. As Revised July By order of the United States District Court for the District of Columbia, former Section 11 c of the NSPE Code of Ethics prohibiting competitive bidding, and all policy statements, opinions, rulings or other guidelines interpreting its scope, have been rescinded as unlawfully interfering with the legal right of engineers, protected under the antitrust laws, to provide price information to prospective clients; accordingly, nothing contained in the NSPE Code of Ethics, policy statements, opinions, rulings or other guidelines prohibits the submission of price quotations or competitive bids for engineering services at any time or in any amount. Statement by NSPE Executive Committee In order to correct misunderstandings which have been indicated in some instances since the issuance of the Supreme Court decision and the entry of the Final Judgment, it is noted that in its decision of April 25, , the Supreme Court of the United States declared: Engineers and firms may individually refuse to bid for engineering services. Clients are not required to seek bids for engineering services. Federal, state, and local laws governing procedures to procure engineering services are not affected, and remain in full force and effect. State societies and local chapters are free to actively and aggressively seek legislation for professional selection and negotiation procedures by public agencies. State registration board rules of professional conduct, including rules prohibiting competitive bidding for engineering services, are not affected and remain in full force and effect. State registration boards with authority to adopt rules of professional conduct may adopt rules governing procedures to obtain engineering services. As noted by the Supreme Court, "nothing in the judgment prevents NSPE and its members from attempting to influence governmental action. The Code deals with professional services, which services must be performed by real persons. Real persons in turn establish and implement policies within business structures. The Code is clearly written to apply to the Engineer, and it is incumbent on members of NSPE to endeavor to live up to its provisions. This applies to all pertinent sections of the Code.

Chapter 4 : What does an Electrical Engineer do?

"A public private partnership is a partnership arrangement in the form of a long-term performance-based contract between the public sector (any level of government) and the private sector (usually a.

History[edit] Civil engineering as a discipline[edit] Civil engineering is the application of physical and scientific principles for solving the problems of society, and its history is intricately linked to advances in understanding of physics and mathematics throughout history. Because civil engineering is a wide-ranging profession, including several specialized sub-disciplines, its history is linked to knowledge of structures, materials science, geography, geology, soils , hydrology , environment , mechanics and other fields. Throughout ancient and medieval history most architectural design and construction was carried out by artisans , such as stonemasons and carpenters , rising to the role of master builder. Knowledge was retained in guilds and seldom supplanted by advances. Structures, roads and infrastructure that existed were repetitive, and increases in scale were incremental. Brahmagupta , an Indian mathematician, used arithmetic in the 7th century AD, based on Hindu-Arabic numerals, for excavation volume computations. History of structural engineering Engineering has been an aspect of life since the beginnings of human existence. The earliest practice of civil engineering may have commenced between and BC in ancient Egypt , the Indus Valley Civilization , and Mesopotamia ancient Iraq when humans started to abandon a nomadic existence, creating a need for the construction of shelter. During this time, transportation became increasingly important leading to the development of the wheel and sailing. Leonhard Euler developed the theory explaining the buckling of columns Until modern times there was no clear distinction between civil engineering and architecture, and the term engineer and architect were mainly geographical variations referring to the same occupation, and often used interchangeably. The Romans developed civil structures throughout their empire, including especially aqueducts , insulae , harbors, bridges, dams and roads. The northeast column temple also covers a channel that funnels all the rainwater from the complex some 40 metres ft away to a rejollada, a former cenote. In the 18th century, the term civil engineering was coined to incorporate all things civilian as opposed to military engineering. Though there was evidence of some technical meetings, it was little more than a social society. John Smeaton , the "father of civil engineering" In the Institution of Civil Engineers was founded in London, [10] and in the eminent engineer Thomas Telford became its first president. The institution received a Royal Charter in , formally recognising civil engineering as a profession. Its charter defined civil engineering as: Civil engineer Civil engineers typically possess an academic degree in civil engineering. The length of study is three to five years, and the completed degree is designated as a bachelor of technology , or a bachelor of engineering. The curriculum generally includes classes in physics, mathematics, project management , design and specific topics in civil engineering. After taking basic courses in most sub-disciplines of civil engineering, they move onto specialize in one or more sub-disciplines at advanced levels. After completing a certified degree program, the engineer must satisfy a range of requirements including work experience and exam requirements before being certified. Once certified, the engineer is designated as a professional engineer in the United States, Canada and South Africa , a chartered engineer in most Commonwealth countries , a chartered professional engineer in Australia and New Zealand , or a European engineer in most countries of the European Union. There are international agreements between relevant professional bodies to allow engineers to practice across national borders. The benefits of certification vary depending upon location. For example, in the United States and Canada, "only a licensed professional engineer may prepare, sign and seal, and submit engineering plans and drawings to a public authority for approval, or seal engineering work for public and private clients. In Australia, state licensing of engineers is limited to the state of Queensland. Almost all certifying bodies maintain a code of ethics which all members must abide by. There are a number of sub-disciplines within the broad field of civil engineering. General civil engineers work closely with surveyors and specialized civil engineers to design grading, drainage, pavement , water supply, sewer service, dams, electric and communications supply. General civil engineering is also referred to as site engineering, a branch of civil engineering that primarily focuses on converting a tract of land from one usage to another. Site

engineers spend time visiting project sites, meeting with stakeholders, and preparing construction plans. Civil engineers apply the principles of geotechnical engineering, structural engineering, environmental engineering, transportation engineering and construction engineering to residential, commercial, industrial and public works projects of all sizes and levels of construction.

Chapter 5 : Why Get Licensed? | National Society of Professional Engineers

A Day in the Life of a Chemical Engineer more junior chemical engineers undertake. Private firm employees earn larger wages than those in the public sector, but.

Comments An electrical engineer is someone who designs and develops new electrical equipment, solves problems and tests equipment. They work with all kinds of electronic devices, from the smallest pocket devices to large supercomputers. Electrical engineering deals with electricity, electro-magnetism and electronics. It also covers power, control systems, telecommunications and signal processing. These engineers are usually concerned with large-scale electrical systems such as motor control and power transmission, as well as utilizing electricity to transmit energy. Electrical engineers may work on a diverse range of technologies, from the design of household appliances, lighting and wiring of buildings, telecommunication systems, electrical power stations and satellite communications. They may plan their designs using computer-aided software or they may also sketch ideas by hand. What does an Electrical Engineer do? Electrical engineers work on a variety of projects, such as computers, robots, cell phones, cards, radars, navigation systems, wiring and lighting in buildings and other kinds of electrical systems. Electrical engineers start out a project by defining what a new electronics should be able to do. They will then design the circuits and parts of the electronics using a computer. They will create a prototype and test the product to improve it. Most products do not work initially or have some bugs that need to be fixed. The electrical engineer needs to figure out the problem and make the product work. There are many sub-disciplines of electrical engineering. Some electrical engineers specialize exclusively in one sub-discipline, while others specialize in a combination of sub-disciplines. The most popular sub-disciplines are: Electronic Engineer - deals with electronic circuits such as resistors, capacitors, inductors, transistors and diodes Microelectronics Engineer - deals with design and micro-fabrication of tiny electronic circuit components Signal Processing Engineer - deals with signals, such as analog or digital signals Power Engineer - deals with electricity and design of related electrical devices such as transformers, generators, motors and power electronics Control Engineer - deals with design of controllers that cause systems to behave in a certain way, using micro-controllers, programmable logic controllers, digital signal processors and electrical circuits Telecommunications Engineer - deals with transmission of information via a cable or optical fiber Instrumentation Engineer - deals with the design of measuring devices for pressure, flow and temperature. This involves a deep understanding of physics Computer Engineer - deals with the design of computers and computer hardware Find your perfect career Would you make a good electrical engineer? Take the free career test What is the workplace of an Electrical Engineer like? Electrical engineers usually work in a lab, an office, a mine or in industrial plants. An electrical engineer usually can pursue a technical career in any industry. They usually supervise computer programmers , electricians , scientists and other engineers. A typical work week is composed of 40 hours although there might be some overtime to meet deadlines. An electrical engineer also spends a lot of time doing project management, such as meeting with clients, determining budgets and preparing project schedules. Engineering projects usually require written documentation, so strong writing and communication skills are important. What is the difference between an electrical engineer and a computer engineer? Both electrical engineers and computer engineers are involved in developing and enhancing nearly every aspect of our lives, and are in demand by a wide range of industries. Electrical and computer engineering are very close, and are built around the same core subjects. Each major represents an area of study, and these areas overlap - there is no finite end of electrical engineering and start of computer engineering, or vice-versa. Electrical engineering students have required courses, such as power systems and energy conversion, semiconductor devices and circuits, and electromagnetic fields and waves. Computer engineering students have required courses in software systems and software engineering, digital system design, and microprocessor interfacing. Where can an electrical engineer work? An electrical engineer can work in a variety of engineering industries: Electrical engineers can work for corporations, non-profit organizations, or government agencies. They can also become managers, patent attorneys, professors, or work in the financial sector. Can an electrical engineer become a good

programmer? Electrical engineers are exposed to computer programming early on, as they need to take introductory programming coursework as part of their electrical engineering curriculum. An electrical engineer has the choice of avoiding all but the introductory programming courses if learning how to code is not something that is of interest. But some students decide to double major in electrical engineering and computer engineering, as many of the courses are the same. What is some good advice for electrical engineering students? Here are a few obvious but essential pieces of advice to help electrical engineering students make the best of their years in university: Go to class and do your homework. Not doing your homework is a surefire way to fail; if anything, you should do more problems than what the professor assigns. Work with your professors. This will show the professor that you are interested in the class and willing to put in the effort to learn. Choose your friends wisely. Learn how to code. Make sure you do an internship. It is safe to say that most employers look for some work experience when hiring a new engineer. It is also a great way to make connections in the industry that may come in handy in the future.

Chapter 6 : Essay argues that public universities, not privates, are key to engineering education

This is a fascinating, candid memoir of a pioneer of Washington's `revolving door' of public service and political and special interest advocacy.

Share via Email David Ramage: Many workers who have spent their entire careers in the private sector are peering across the divide with public services â€" and they like what they see. According to exclusive research for Work, private-sector employees are more than twice as likely as their public-sector counterparts to think the grass is greener on the other side in respect of job security, training, holidays and equal opportunities. Only on pay and financial rewards do fewer private-sector workers look jealously at public-sector staff than vice versa. Overall, public-sector employment is seen as more attractive, even at a time when spending cuts are anticipated. You can easily see why. While the private sector has been shedding jobs remorselessly, the public sector has been creating them. In the 12 months to last October, ONS data shows private companies cut , posts while the public sector added ,, to chalk up a record of almost 6. Shury agrees it is curious that public-sector workers should still think themselves poor relations on pay and rewards. As something health managers, they have been undertaking a mid-career "sector swap". Both say they have learned a lot to take back to their substantive roles. Ramage is hospital director of Windermere House, a bed mental health rehabilitation unit in Hull run by the independent Barchester care group. Dye is general manager of the substance misuse and psychological therapies directorate at Nottinghamshire Healthcare NHS trust. For six months last year, Ramage moved to the trust as a project manager while Dye took over the running of his unit. The idea stemmed from a growing partnership between the trust and Barchester, which offers specialist services not available within the NHS. At Windermere House, people who have been treated in medium- or low-secure mental health units spend up to two years preparing for life in the community. Ramage has been director of the facility since He trained as a mental health nurse in the NHS, qualifying in , but left to work in the prison service two years later. Having completed a psychology degree part-time, two evenings a week for five years, he moved into the private sector in He had been out of the NHS for more than decade when he went to Nottinghamshire Healthcare last spring to lead a project in adult mental health services looking at "whole-systems change in a highly regulated environment" â€" a bit of a mouthful, as he himself puts it. Did that typify the kind of jargonised, bureaucratic environment he found? Yes and no, says Ramage. Certainly going back to the NHS underscored for him how much more flexible he finds the private sector. And he still believes it is much easier to incentivise staff in a commercial environment. Public v private sector table On the other hand, he found the quality of NHS services much better than he remembered. At Nottinghamshire, there were two of us for the whole of [local] adult mental health services, each overseeing upwards of 15 units or more. The profit was the most important thing," she says. One of the things I have learned is that if you provide the quality, the business comes. We have to keep the [NHS] commissioners happy. Staff have been recruited this month, will be trained in February and are due to receive patients in the first week of March. But in the independent sector, if they want to do something they just get on and do it. Ramage is already settled back at Barchester, though his connections with the NHS are set to be maintained by his wife, Sandra, who has been studying at the University of Hull to become a mental health nurse herself and is due to qualify this year. She hopes to work in the health service locally. Andy Robling, public services director at recruitment group Hays, thinks that crossing sectors will become more common in future â€" and that the boundary between public and private will grow more blurred. Insecurity in public services employment may start to outstrip that on the private side. But he anticipates continuing need among state agencies for private-sector skills such as procurement and project management.

Chapter 7 : A blend of public and private financing brings project to life - Daily Journal of Commerce

Consider some of the very best engineering universities in the world, public and private. According to U.S. News and World Report, the schools with the most top-five-ranked undergraduate engineering specialties are the University of California at Berkeley, Massachusetts Institute of Technology, Stanford University, the University of Illinois.

Responsibilities range from research and design to development, production, technical sales, and, for those with good communication skills, management. Chemical engineers translate the discoveries chemists make into real-world products. If a chemist invents a better fertilizer, for example, a chemical engineer might design the method to make mass production of that fertilizer possible. Much of this work is planning: Chemical engineers work with chemists, accountants, human resource personnel, and regulators to create efficient, safe and cost-effective methods of reproducing valuable items. Chemical engineers work in teams, mostly for large corporations. Engineers thrive on the intellectual challenge they get from their work. Good chemical engineers are always trying to refine their systems, improve them, and make them safer and more efficient. Paying Your Dues Like all engineers, the would-be chemical engineer must pass a rigorous set of academic requirements. Coursework must include a full spectrum of chemistry courses, some physics, electrical engineering, mathematics, computer science, and biology, as well as some applied materials science courses for those who want to go into manufacturing industries. English courses are extremely helpful, as many chemical engineers must write and review reports. Over colleges and universities offer accredited chemical engineering curricula. The most difficult thing about becoming a chemical engineer is adapting theoretical knowledge to a practical discipline. Many engineers find it helpful to attend professional seminars and subscribe to publications, such as Chemical Engineering, which explore their area of responsibility in the light of industry breakthroughs. Employers, for the most part, view chemical engineering as a practical discipline and look for experience in production, manufacturing, or management to verify these traits in potential employees. Each state has its own written exam for chemical engineers who wish to work in the public sector. Present and Future Chemical engineers have been around since the first distilling process took place. Chemical engineering became a science beginning in the Renaissance, with the codification of experiments and results. This organization was coupled with achievements in pure not applied chemistry. Chemical engineering began to be taught as a discipline in at the Massachusetts Institute of Technology. Currently, 40 percent of chemical engineers are employed by the chemicals industry, followed distantly by environmental organizations, the food industry, biotechnology companies, and electronics. The level of employment is expected to remain static, with the notable exception that many employed in the chemicals industry, which includes the petroleum industry, will migrate to the emerging bio- and electronic-technology fields. While the number of jobs is expected to remain stable for the next ten years, fewer applicants are expected to vie for these jobs, leading to a potentially bright future for the aspiring chemical engineer. Many have limited input and low levels of responsibility during these early years. Hours are unremarkable, but professional associations, professional reading and additional research may eat up the time of the ambitious chemical engineer. Those who leave get the yearnings to do so in these early years, but few follow through until later. Responsibility has increased, and many get their first taste of managerial status. Significant input is expected from the five-year engineer. People skills become more important. Five-year veterans are judged on the success of their track record. Those who leave to start their own companies most often do so between years seven and nine. Many are involved in the coordination and development phase of projects the initial planning stages and offer experienced direction without having to do any of the more mundane modeling that more junior chemical engineers undertake. Private firm employees earn larger wages than those in the public sector, but many choose to work for the EPA or the Department of Agriculture, citing more regular hours and less corporate politics.

Chapter 8 : Publicâ€“private partnership - Wikipedia

I interview Looly Lee, a civil engineer who has a bachelor's degree from Carnegie Mellon University. She does virtual design and construction (VDC), and building information modeling (BIM).

Licensure is the mark of a professional. There are many powerful reasons both professional and personal for earning and maintaining a PE license. Only a licensed engineer, for instance, may prepare, sign, seal and submit engineering plans and drawings to an public authority for approval, or to seal engineering work for public and private clients. For consulting engineers and private practitioners, licensure is a virtual necessity. In fact, it is a legal requirement for those who are in responsible charge of work, be they principals or employees. More and more with each passing day, government agencies, educational institutions and private industries are requiring that they hire and contract only with licensed professional engineers. This is a trend that is almost certain to continue in the future. Today, no matter what career path a professional engineer chooses, a successful, ongoing career virtually requires PE licensure. Just as the CPA defines the accountant, and a law license defines the lawyer, the PE license tells the public that you have mastered the critical elements of your profession. It demonstrates your commitment to the highest standards of engineering practice. The PE after your name is an advantage that will open doors for the rest of your life. Five Reasons to Get Licensed Prestige: PEs are respected by the public and are seen in the same light as licensed professionals in other fields. PEs are also held in high esteem by their peers within the engineering community, who see the PE as part of an elite group. Employers are impressed with engineers who have their PE license. Licensure not only enhances your stature, it shows commitment to the profession and demonstrates heightened leadership and management skills. Licensure is also a necessity for rising to increased levels of authority and responsibility. Only PEs can sign and seal engineering drawings; and only PEs can be in responsible charge of a firm in private practice or serve as a fully qualified expert witness. Also, many government agencies and educational institutions are emphasizing licensure among their engineers as well. Have a PE license opens up your career options. You can become a specialist, or establish your own business. It also protects you during industry downsizing or outsourcing. The PE license allows you to go as far as your initiative and talent will take you. Studies have shown that most PEs earn higher pay throughout their business careers. Having your PE allows expanded opportunities beyond a company structure - as an independent consultant for example. I found that preparing for the examinations required to qualify for the license broadened my skills and caused me to become more knowledgeable of other engineering disciplinesâ€¦. So, when young people ask me about professional licensure, I tell them without reservation to pursue it.

Chapter 9 : Code of Ethics | ASCE

Because a politician represents the public, constituents will be better represented if he or she practices the virtues of honesty and trustworthiness in both personal and private life. The reputation of local officials may have an important impact on the business climate of the city or public support for local initiatives, so the personal.

Save Career A Day in the Life of a Industrial Engineer Industrial engineers analyze and evaluate methods of production and point out ways to improve them. They decide how a company should allocate its limited tangible resources equipment and labor within the framework of existing physical constraints physical plant. Each company that hires an industrial engineer, either as a consultant or as an internal manager, has its own specific limitations. An industrial engineer must quickly become an expert not only in the manufacturing and production processes of the industry, but also in the specific culture, problems, and challenges that the company faces. This may mean face-to-face meetings with executives, extensive stays on manufacturing floors, and review of historical production data. Industrial engineers receive information from others about what goes on in the day-to-day work environment, but they must also make their own observations of these activities. Industrial engineers must be tactful in what they say and in how they say it. The large majority of industrial engineersâ€”around 70 percentâ€”works at manufacturing companies, and many have specific areas of specialization, such as assembly, raw-product processing, or administrative paperwork practices. Most industrial engineers have good working conditions, intellectually challenging work, and a high level of satisfaction. Hours can be long, but this tends to be outweighed by the satisfaction derived from the education that each different project brings. Recommended coursework includes statistics, computer skills, ergonomics, management science, quality control, sociology, psychology, organizational behavior, economics, finance, labor relations, and mathematics. Those who plan to specialize in manufacturing areas find it useful to study shipping, billing, and automated systems, along with computer science. Graduate programs in industrial engineering are primarily for those who wish to enter academia. Employers consider production or manufacturing experience extremely useful; they also favorably view administrative experience in large-paperwork industries such as insurance, health care, or brokerage. Many find joining a professional organization supportive of their careers some join while still in school because it helps them to keep them abreast of important topics and trends in industrial engineering. The future of industrial engineering is linked to the future of American manufacturing. Manufacturing is affected by tariffs, employment levels, inflation, advertising, demand, public perception, inventory levels, seasonability of productâ€”the list is endless. Computers make the job more efficient, and will continue to do so in the future, but the fate of the industrial engineer is tied to these unpredictable factors. Industrial engineers will continue to be in demand, but their numbers are expected to increase only as fast as manufacturing in the United States increases. They are overseen by more senior industrial engineers and have limited responsibility for implementing change. Daily duties include collecting data, putting it into usable form, analyzing it, and writing reports. Often these reports are co-written by a junior industrial engineer and a senior industrial engineer. Many young industrial engineers are asked to take an actual production position for three months to learn firsthand the daily challenges faced in that sector of production. Those who have gone directly into freelance consulting have been through training programs and work as part of teams. Hours are long for these consultants, and client contact in these first two years is limited. Computer skills are important during these early years. Many meet with senior managers to discuss suggestions, improvements, and budgetary decisions. About ten percent move out of the industrial engineering field into management positions by this stage. Those in consulting firms lead teams instead of merely working on them. Hours increase; salaries increase, but more for those in consulting than for those in manufacturing. Those who work for a single company have generally moved into management positions; those who work for consulting firms are at the senior-associate or vice-president level and have extensive client contact and supervisory responsibilities; and those who have worked for a number of firms continue to enjoy the day-to-day challenge that industrial engineering poses. Hours have decreased for all but the last group; salaries have risen across the board. Satisfaction levels are high for all groups as well.