

# [Computer diligence for civil engineers essay](https://assignbuster.com/computer-diligence-for-civil-engineers-essay/)

General characters desired in computers are speed, accuracy, reliability, versatility and diligence. It can store huge volumes of data and with the lad of many Input and output devices data of dif f rent f arms can be f De In to and taken out. T here are many sofa tare packages available In the market exclusively f or Call Engineers. T hey can be put to use f or many uses like design of huge structures, virtual reality, solving equations f or optimization of resources tender bidding, earth- work estimation, cost estimation, project management, structural drawing predictive model making and much more. Computers also aid satellite surveying.

Data trans ere, its interpretation and analysis are all done by computers. It helps making of maps, deciding of highways alignment etc very easy f or civil engineers. T he paper deals with many types of sofa tare available In the market as tools f or Civil Engineers. Among them, the most popular ones are, Auto CIVIL (Civil engineering with Auto CAD), STEAD/Pro (Structural Analysis And Design), AD Home Architect Deluxe (Dream Home), NANAS (Structural Analysis). Computers these days have advanced very much and with the advent of powers LU PC’S and Internet, computer as become a immensely useful LU tool f or any one in any f lied.

With the advent of Internet, which is of ten called as mankind’s greatest invention till date, it has yielded very much f or the civil engineers. T here are many portals dedicated f or civil engineers alone. T here are construction site updates in the net. With the arrival of E- commerce, the computers have avoided the hassle of traveling to shops to buy goods like cement, timber etc. Civil engineers have one of the world’s most important jobs; they build our quality of life e with creativity and technical skill.

T he civil engineers plan, design, construct and operate the f acclivities essential to modern Elf e, ranging f room f stories, bridges and highway systems to water treatment plants and energy fee f Accent buildings. T he Call engineers meet the challenges of pollution, Tara f LLC congestion, drinking water and energy needs f or present and f true generation. T he paper discusses recent applications of computer in the f ; led of civil engineering and addresses the role of rendering and providing technical advice on line.

With the technological revolution and world’s increasing population great threat is posed on natural resources and lobar environment. T he role of planners becomes important and they need to improve the design skills and construction management techniques in a cost fee f active manner to make our world a better place to live. Civil engineering is the proof session f souses on analysis, design, construction and maintenance of buildings, bridges, transportation systems, water and wastewater systems, and other info restructure of direct relevance to society’s well-being.

More recently, amidst growing awareness on environmental protection, this proof session is also entrusted with safe e awarding the natural environment around us to promote sustainable development. In all modern scientific ICC and technological endeavors, computers and sofa tare play an increasingly important role. Computers can be used to generate models off monumental physical processes, which can be solved using numerical methods. In almost all the dif f rent aspects of Civil Engineering, it is virtually impossible to escape the application of computer technology.

T his application of computers in Civil Engineering goes beyond the normal black-box application and requires an engineer o be intelligent and cogent user in order to derive physically sound design and analysis. For example, repetitive and highly involved calculations based on regulatory (Indian standard) code may be needed in the design of multistoried buildings where the tolerance of error is very low; probability modeling may be required in the design of transportation systems, dams and bridges etc. And analysis of new class of problems in civil engineering with project management techniques (PERT /CPM).

Very rapid progress has been achieved in the last f ewe years in the development of behavior of engineering structures. At the same time trans erring info orientation over the internet has started to play an important role in achieving economy in the design process as well as delivering engineering solutions fee f exigently and promptly making it easier f or project managers to meet critical deadlines and obtaining/providing technical advise on line, as well as con rendering and participating in discussion sessions. T his is not Just about saving time and money.

T he Web gets creative too. One of the most widely used sofa tare tools in the civil engineering proof session is imputer-aided design (CAD) sofa tare which enables engineers to create AD models, AD drawings, and schematics of their designs, satellite surveying, data trans ere, structural and f lid behavior modeling etc. T here are number of portals and websites dedicated f or civil engineers. Computers: Computers data handling and analysis capacity have increased naif olds and used in all branches of engineering f or design, optimization and innovation as a tool.

T he computational capabilities are listed. Info orientation processing and calculation are done by computers at a very high speed. It can execute millions of instruction in a f ration of a second. For example if we want to design a multistoried building, to do the analysis and design, we need a group of engineers working together f or weeks together. But in a computer you need a single person with sofa tare knowledge and the results in relatively less time. Satellite surveying is conducted f or map preparation and other projects like highway alignment.

Satellite surveying without computers is quite dif f ‘ cult to imagine. Since most of the work is done by the host of computers on board and in ground station. T he camera in the satellite is completely controlled by the computer. T he photograph taken by satellite will be converted into digital images and sent to earth. At the ground station the receiving end there is a computer, which interprets the data and gives us the real image as taken. T he photograph taken can be used as base map and f or other purpose like the military use since every thing will be in the proper scale.

With out the aid of satellite to survey, it would take many weeks and huge manpower to do the work and that too ends up with many kinds of errors. Condition Monitoring of Structures: T he bridges and other structures are decaying at very f aster rate than expected these structures needs constant monitoring. With suitable hardware support (measurement devices like Smart materials, strain gauge, thermometers, environmental devices etc) and suitable intern acing these structures can be monitored and required alarm can be triggered f or safe TTY.

T he advantage is that it can take into account multi criteria, f or example in case if a bridge deft election of the span, sinking of pier, f inundation decay, bulking of pier etc. Multitudinously and substitute them in the any complex stability equation given and come out with the results in no time. It can monitor and indicate the time when additional progressing is required in SC structures. Probes like deft election gauges can be implanted at dif f rent points of a buildings at the time of natural disaster like earthquake, cyclone etc. You can artic socially make f or study purpose) T Hess outputs can be f De into a computer and a data base can be made and learnt. T he designers can f Arthur modify y designs economically, to notation these hazards safe Ely in f true. In another case a probe can be set upstream in case of a submersible bridge and Tara f ICC can be blocked in time. Monitoring hydraulic structures is a work, which can be done by computer brilliantly. T he whole administration with a number of probes in the catchments area can be very well administered.

In a project, the regulatory odds can be beaten using sofa tare with simulation models. T he probability of disputes can be predicted and there by handled off actively. T here are risk management sofa tares, which can redirect the amount of risk involved in a project very realistically, with which the management can take decisions fee f actively. Figure 1 Health monitoring of a Bridge using smart material sensors Software: T here are many types of sofa tare available in the market as tools f or Civil Engineers.

Among them, the most popular ones are: ; Auto CIVIL (Civil engineering with Auto CAD) ; STEAD/Pro (Structural Analysis And Design) ; AD Home Architect Deluxe (Dream Home) ; NANAS ( Structural Analysis) Auto Civil uses Auto CAD in civil engineering f lied. T he usual areas of its b) Roadway design ) Hydraulics T he digital terrain modeling can be done with Auto contour and Auto DOT M in which generation of contour map, point interpolation, AD residual cut and f ill map and even the volume calculations can be done. T he roadway design can be done with great ease with Auto roads, which is developed only f or this purpose.

Similarly Outwear, Outhouses and Adjustors are the packages, which deal with water supply, sewage, transport and drainage works respectively. T he power tool for Computerized Structural engineering STEAD. Pro is the most popular structural engineering sofa tare product f or AD del generation, analysis and multi-material design. It has an intuitive, user-f roundly GU’, visualization tools, powers LU analysis and design f acclivities and seamless integration to several other modeling and design sofa tare products. T he sofa tare is f Lully compatible with all Windows operating systems(Figure 2).

For static or dynamic analysis of bridges, containment structures, embedded structures (tunnels and culverts), pipe racks, steel, concrete, aluminum or timber buildings, transmission towers, stadiums or any other simple or complex structure, STEAD. Pro has been the hospice of design proof sectionals around the world f or their specific ICC analysis needs. Figure 2. Shear Force and Bending Moment Diagram f room STEAD. Pro AD Home Architect Deluxe creates complete, proof seasonal-looking residential f lour plans that let you design a remodel, an addition, or even an entire home. D Home Architect Deluxe simplify less the task of accurately drawing plans, letting you experiment with possible alternatives and convey your ideas to others. It displays multiple, independent windows, so you can have several views of a single plan open at once (f r example, Plan, Cross-section/Elevation, and Camera views), plus several versions of each view Figure 3 (f or example, Camera views f room two angles), and even several dif f rent plans (to compare designs). T he program is designed in such a way that we can create objects or carry out commands, like drawing walls, placing windows, and changing views.

Dimension lines locate walls and openings in walls by showing how f ar one wall is f room another, or how f ar an opening is down a wall. We can create interior and exterior dimension lines. Using landscape we can create our own ream house. Some of the drawing f room the AD Home Architect is given below. Figure 3 T here dimensional drawing using AD Home Architect T he NANAS program has many f unite-element analysis capabilities, ranging f room a simple, linear, static analysis to a complex, nonlinear, transient dynamic analysis.

NANAS provides specific ICC procedures to peer arm analyses f or dif f rent engineering disciplines. Figure 4. Analysis in NANAS T he process involves three general tasks Building the Model, Applying Loads and Obtaining the Solution, Reviewing the Results. Building a f unite element model requires more of your time than any other part of types, element real constants, material properties we can model the geometry using preprocessor. In the next step, the analysis type and analysis options is deft indeed by applying loads, load step options and initiate the f unite element solution.

We choose the analysis type based on the loading conditions and the response you wish to calculate. For example, if natural f regencies and mode shapes are to be calculated, you would choose a modal analysis. You can peer arm the f allowing analysis types in he NANAS program: static (or steady-state), transient, harmonic, modal, spectrum, buckling, and sub structuring. After the solution has been calculated, the postprocessor is used in NANAS to review the results. We can obtain contour displays, deft armed shapes, and tabular listings to review and interpret the results of the analysis.

Concluding Remarks T he rapid progress that has been achieved in the last f ewe years in the development of general-purpose engineering sofa tare as well as the technology of trans erring info orientation over the internet has started to play an important role in achieving economy in the design process as well as delivering engineering solutions fee f exigently and promptly making it easier f or project managers to meet critical deadlines and obtaining/providing technical advise on line, as well as con rendering and participating in discussion sessions.