

EXHIBIT A

Legal profession

Legal profession is a profession, and **legal professionals** study, develop and apply law. Usually, there is a requirement for someone choosing a career in law to first obtain a law degree or some other form of legal education.

It is difficult to generalize about the structure of the profession, because

- there are two major legal systems, and even within them, there are different arrangements in jurisdictions, and
- terminology varies greatly.

While in civil law countries there are usually distinct clearly defined career paths in law, such as judge, in common law jurisdictions there tends to be one legal profession, and it is not uncommon, for instance, that a requirement for a judge is several years of practising law privately.

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Judge

Lawyer, advocate, attorney

Solicitor

Barrister

Jurist

Paralegal

See also

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Judge

Historically, this has been the first legal specialization. In civil law countries, this is often a lifelong career. In common law legal system, on the other hand, judges are recruited from practising lawyers.

Lawyer, advocate, attorney

Practising law means advising and representing clients as a private practitioner or in a law firm. In most countries, law graduates need to undergo some sort of apprenticeship, membership in a professional organization and a licence.

The name for this profession is *lawyer* or *attorney* in most of the English-speaking world, and *advocate* in many other countries. The name for this profession in canon law is *canonist* or *canon lawyer*.



In civil law countries, but also some common law jurisdictions there is one Law society for all lawyers who want to provide services to the public. But in the United Kingdom and some of its former colonies, there are two quite separate kinds of lawyers providing legal services to the public.



Solicitor

Solicitors advise clients, draft contracts for them and represent them in lower courts of law.

Barrister

Barristers, also called *counsels*, are court specialists, who traditionally do not come into contact with their lay clients, but are instructed by solicitors. There is only about a 10% of barristers in most common law jurisdictions.

Jurist

People, who study, organize, teach, and through that also create law, often working at universities, are called jurists. In civil law countries, their role is greater, because they draft codes, which are major laws that govern whole areas of law. In common law countries, the creation and interpretation of law has traditionally been the domain of judges.

Paralegal

A paralegal or legal assistant, according to one definition, is "a person, qualified by education, training or work experience who is employed or retained by a lawyer, law office, corporation, governmental agency or other entity and who performs specifically delegated substantive legal work for which a lawyer is responsible."^[1]

See also

- Bullying in the legal profession
- History of the legal profession
- History of the American legal profession
- Jurist
- Notary public
- Paralegal

References

1. "Current ABA Definition of Legal Assistant/Paralegal," American Bar Ass'n, at [1] (http://www.americanbar.org/groups/paralegals/resources/current_aba_definition_of_legal_assistant_paralegal.html).

External links

-  Media related to Legal professions at Wikimedia Commons

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EXHIBIT B

Project management

Project management is the process of leading the work of a team to achieve goals and meet success criteria at a specified time. The primary challenge of project management is to achieve all of the project goals within the given constraints.^[1] This information is usually described in project documentation, created at the beginning of the development process. The primary constraints are scope, time, budget.^[2] The secondary challenge is to optimize the allocation of necessary inputs and apply them to meet pre-defined objectives.

The objective of project management is to produce a complete project which complies with the client's objectives. In many cases the objective of project management is also to shape or reform the client's brief to feasibly address the client's objectives. Once the client's objectives are clearly established they should influence all decisions made by other people involved in the project – for example project managers, designers, contractors and sub-contractors. Ill-defined or too tightly prescribed project management objectives are detrimental to decision making.

A project is a temporary endeavor designed to produce a unique product, service, or result with a defined beginning and end (usually time-constrained, and often constrained by funding or staffing) undertaken to meet unique goals and objectives, typically to bring about beneficial change or added value.^{[3][4]} The temporary nature of projects stands in contrast with business as usual (or operations),^[5] which are repetitive, permanent, or semi-permanent functional activities to produce products or services. In practice, the management of such distinct production approaches requires the development of distinct technical skills and management strategies.^[6]

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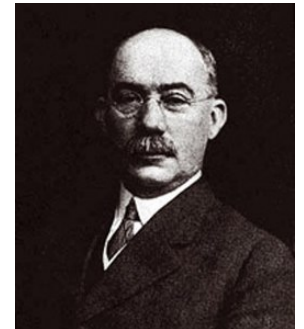
History

Until 1900, civil engineering projects were generally managed by creative architects, engineers, and master builders themselves, for example, Vitruvius (first century BC), Christopher Wren (1632–1723), Thomas Telford (1757–1834) and Isambard Kingdom Brunel (1806–1859).^[7] In the 1950s organizations started to systematically apply project-management tools and techniques to complex engineering projects.^[8]

As a discipline, project management developed from several fields of application including civil construction, engineering, and heavy defense activity.^[9] Two forefathers of project management are Henry Gantt, called the father of planning and control techniques,^[10] who is famous for his use of the Gantt chart as a project management tool (alternatively *Harmonogram* first proposed by Karol Adamiecki^[11]); and Henri Fayol for his creation of the five management functions that form the foundation of the body of knowledge associated with project and program management.^[12] Both Gantt and Fayol were students of Frederick Winslow Taylor's theories of scientific management. His work is the forerunner to modern project management tools including work breakdown structure (WBS) and resource allocation.

The 1950s marked the beginning of the modern project management era where core engineering fields come together to work as one. Project management became recognized as a distinct discipline arising from the management discipline with engineering model.^[13] In the United States, prior to the 1950s, projects were managed on an ad-hoc basis, using mostly Gantt charts and informal techniques and tools. At that time, two mathematical project-scheduling models were developed. The "critical path method" (CPM) was developed as a joint venture between DuPont Corporation and Remington Rand Corporation for managing plant maintenance projects. The "program evaluation and review technique" (PERT), was developed by the U.S. Navy Special Projects Office in conjunction with the Lockheed Corporation and Booz Allen Hamilton as part of the Polaris missile submarine program.^[14]

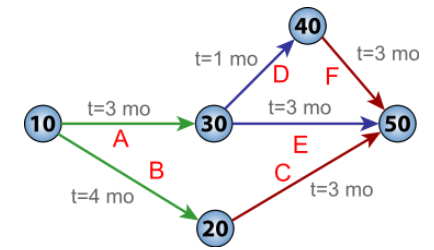
PERT and CPM are very similar in their approach but still present some differences. CPM is used for projects that assume deterministic activity times; the times at which each activity will be carried out are known. PERT, on the other hand, allows for stochastic activity times; the times at which each activity will be carried out are uncertain or varied. Because of this core difference, CPM and PERT are used in different contexts. These mathematical techniques quickly spread into many private enterprises.



Henry Gantt (1861–1919), the father of planning and control techniques

At the same time, as project-scheduling models were being developed, technology for project cost estimating, cost management and engineering economics was evolving, with pioneering work by Hans Lang and others. In 1956, the American Association of Cost Engineers (now AACE International; the Association for the Advancement of Cost Engineering) was formed by early practitioners of project management and the associated specialties of planning and scheduling, cost estimating, and cost/schedule control (project control). AACE continued its pioneering work and in 2006 released the first integrated process for portfolio, program and project management (total cost management framework).

In 1969, the Project Management Institute (PMI) was formed in the USA.^[15] PMI publishes the original version of *A Guide to the Project Management Body of Knowledge* (PMBOK Guide) in 1996 with William Duncan as its primary author, which describes project management practices that are common to "most projects, most of the time."^[16]



PERT network chart for a seven-month project with five milestones

Project management types

Project management methods can be applied to any project. It is often tailored to a specific type of projects based on project size, nature, industry or sector. For example, the construction industry, which focuses on the delivery of things like buildings, roads, and bridges, has developed its own specialized form of project management that it refers to as *construction project management* and in which project managers can become trained and certified.^[17] The information technology industry has also evolved to develop its own form of project management that is referred to as *IT project management* and which specializes in the delivery of technical assets and services that are required to pass through various lifecycle phases such as planning, design, development, testing, and deployment. *Biotechnology project management* focuses on the intricacies of biotechnology research and development.^[18] *Localization project management* includes application of many standard project management practices to translation works even though many consider this type of management to be a very different discipline. There is public project management that covers all public works by the government which can be carried out by the government agencies or contracted out to contractors. Another classification of project management is based on the hard (physical) or soft (non-physical) type.

Common among all the project management types is that they focus on three important goals: time, quality, and budget. Successful projects are completed on schedule, within budget, and according to previously agreed quality standards i.e. meeting the Iron Triangle or Triple Constraint in order for projects to be considered a success or failure.^[19]

For each type of project management, project managers develop and utilize repeatable templates that are specific to the industry they're dealing with. This allows project plans to become very thorough and highly repeatable, with the specific intent to increase quality, lower delivery costs, and lower time to deliver project results.

Approaches of project management

A 2017 study suggested that the success of any project depends on how well four key aspects are aligned with the contextual dynamics affecting the project, these are referred to as the *four P's*:^[20]

- *Plan*: The planning and forecasting activities.
- *Process*: The overall approach to all activities and project governance.
- *People*: Including dynamics of how they collaborate and communicate.
- *Power*: Lines of authority, decision-makers, organograms, policies for implementation and the like.

There are a number of approaches to organizing and completing project activities, including: phased, lean, iterative, and incremental. There are also several extensions to project planning, for example based on outcomes (product-based) or activities (process-based).

Regardless of the methodology employed, careful consideration must be given to the overall project objectives, timeline, and cost, as well as the roles and responsibilities of all participants and stakeholders.^[21]

Benefits realization management

Benefits realization management (BRM) enhances normal project management techniques through a focus on outcomes (benefits) of a project rather than products or outputs, and then measuring the degree to which that is happening to keep a project on track. This can help to reduce the risk of a completed project being a failure by delivering agreed upon requirements (outputs) i.e. project success but failing to deliver the *benefits* (outcomes) of those requirements i.e. product success.

In addition, BRM practices aim to ensure the strategic alignment between project outcomes and business strategies. The effectiveness of these practices is supported by recent research evidencing BRM practices influencing project success from a strategic perspective across different countries and industries. These wider effects are called the strategic impact.^[22]

An example of delivering a project to requirements might be agreeing to deliver a computer system that will process staff data and manage payroll, holiday and staff personnel records in shorter times with reduced errors. Under BRM, the agreement might be to achieve a specified reduction in staff hours and errors required to process and maintain staff data after the system installation when compared with without the system.

Critical chain project management

Critical chain project management (CCPM) is an application of the theory of constraints (TOC) to planning and managing projects, and is designed to deal with the uncertainties inherent in managing projects, while taking into consideration limited availability of resources (physical, human skills, as well as management & support capacity) needed to execute projects.

The goal is to increase the flow of projects in an organization (throughput). Applying the first three of the five focusing steps of TOC, the system constraint for all projects, as well as the resources, are identified. To exploit the constraint, tasks on the critical chain are given priority over all other activities. Finally, projects are planned and managed to ensure that the resources are ready when the critical chain tasks must start, subordinating all other resources to the critical chain.

Earned value management

Earned value management (EVM) extends project management with techniques to improve project monitoring. It illustrates project progress towards completion in terms of work and value (cost). Earned Schedule is an extension to the theory and practice of EVM.

Iterative and incremental project management

In critical studies of project management, it has been noted that phased approaches are not well suited for projects which are large-scale and multi-company,^[23] with undefined, ambiguous, or fast-changing requirements,^[24] or those with high degrees of risk, dependency, and fast-changing technologies.^[25] The cone of uncertainty explains some of this as the planning made on the initial phase of the project suffers from a high degree of uncertainty. This becomes especially true as software development is often the realization of a new or novel product.

These complexities are better handled with a more exploratory or iterative and incremental approach.^[26] Several models of iterative and incremental project management have evolved, including agile project management, dynamic systems development method, extreme project management, and Innovation Engineering®.^[27]

Lean project management

Lean project management uses the principles from lean manufacturing to focus on delivering value with less waste and reduced time.

Phased approach

The phased (or staged) approach breaks down and manages the work through a series of distinct steps to be completed, and is often referred to as "traditional"^[28] or "waterfall".^[29] Although it can vary, it typically consists of five process areas, four phases plus control:

1. initiation.
2. planning and design.
3. construction.
4. monitoring and controlling.
5. completion or closing.

Many industries use variations of these project stages and it is not uncommon for the stages to be renamed to better suit the organization. For example, when working on a brick-and-mortar design and construction, projects will typically progress through stages like pre-planning, conceptual design, schematic design, design development, construction drawings (or contract documents), and construction administration.

While the phased approach works well for small, well-defined projects, it often results in challenge or failure on larger projects, or those that are more complex or have more ambiguities, issues and risk.^[30]

Process-based management

The incorporation of process-based management has been driven by the use of maturity models such as the OPM3 and the CMMI (capability maturity model integration; see this example of a predecessor) and ISO/IEC 15504 (SPICE – software process improvement and capability estimation). Unlike SEI's CMM, the OPM3 maturity model describes how to make project management processes capable of performing successfully, consistently, and predictably to enact the strategies of an organization.

Project production management

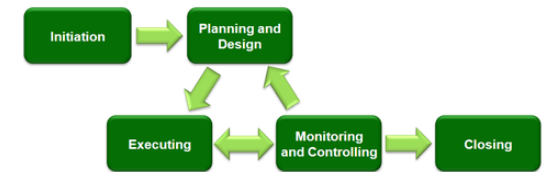
Project production management is the application of operations management to the delivery of capital projects. The Project production management framework is based on a project as a production system view, in which a project transforms inputs (raw materials, information, labor, plant & machinery) into outputs (goods and services).^[31]

Product-based planning

Product-based planning is a structured approach to project management, based on identifying all of the products (project deliverables) that contribute to achieving the project objectives. As such, it defines a successful project as output-oriented rather than activity- or task-oriented.^[32] The most common implementation of this approach is PRINCE2.^[33]

Process groups

Traditionally (depending on what project management methodology is being used), project management includes a number of elements: four to five project management process groups, and a control system. Regardless of the methodology or terminology used, the same basic project management processes or stages of development will be used. Major process groups generally include:^[35]

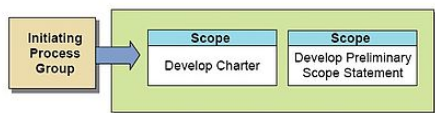


Typical development phases of an engineering project

- Initiation
- Planning
- Production or execution
- Monitoring and controlling
- Closing

In project environments with a significant exploratory element (e.g., research and development), these stages may be supplemented with decision points (go/no go decisions) at which the project's continuation is debated and decided. An example is the Phase-gate model.

Initiating



Initiating process group processes^[34]

The initiating processes determine the nature and scope of the project.^[36] If this stage is not performed well, it is unlikely that the project will be successful in meeting the business' needs. The key project controls needed here are an understanding of the business environment and making sure that all necessary controls are incorporated into the project. Any deficiencies should be reported and a recommendation should be made to fix them.

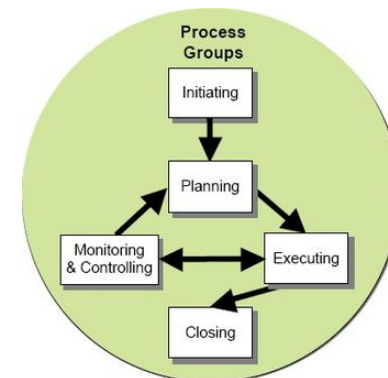
The initiating stage should include a plan that encompasses the following areas. These areas can be recorded in a series of documents called Project Initiation documents. Project Initiation documents are a series of planned documents used to create order for the duration of the project. These tend to include:

- project proposal (idea behind project, overall goal, duration)
- project scope (project direction and track)
- product breakdown structure (PBS) (a hierarchy of deliverables / outcomes and components thereof)
- work breakdown structure (WBS) (a hierarchy of the work to be done, down to daily tasks)
- responsibility assignment matrix (RACI) (roles and responsibilities aligned to deliverables / outcomes)
- tentative project schedule (milestones, important dates, deadlines)
- analysis of business needs and requirements against measurable goals
- review of the current operations
- financial analysis of the costs and benefits, including a budget
- stakeholder analysis, including users and support personnel for the project
- project charter including costs, tasks, deliverables, and schedules
- SWOT analysis: strengths, weaknesses, opportunities, and threats to the business

Planning

After the initiation stage, the project is planned to an appropriate level of detail (see example of a flow-chart).^[34] The main purpose is to plan time, cost, and resources adequately to estimate the work needed and to effectively manage risk during project execution. As with the Initiation process group, a failure to adequately plan greatly reduces the project's chances of successfully accomplishing its goals.

Project planning generally consists of^[37]



The project development stages^[34]

- determining the project management methodology to follow (e.g. whether the plan will be defined wholly up front, iteratively, or in rolling waves);
- developing the scope statement;
- selecting the planning team;
- identifying deliverables and creating the product and work breakdown structures;
- identifying the activities needed to complete those deliverables and networking the activities in their logical sequence;
- estimating the resource requirements for the activities;
- estimating time and cost for activities;
- developing the schedule;
- developing the budget;
- risk planning;
- developing quality assurance measures;
- gaining formal approval to begin work.

Additional processes, such as planning for communications and for scope management, identifying roles and responsibilities, determining what to purchase for the project and holding a kick-off meeting are also generally advisable.

For new product development projects, conceptual design of the operation of the final product may be performed concurrent with the project planning activities, and may help to inform the planning team when identifying deliverables and planning activities.

Executing

While executing we must know what are the planned terms that need to be executed. The execution/implementation phase ensures that the project management plan's deliverables are executed accordingly. This phase involves proper allocation, co-ordination and management of human resources and any other resources such as material and budgets. The output of this phase is the project deliverables.

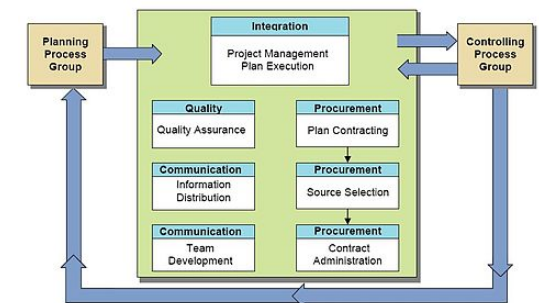
Project Documentation

Documenting everything within a project is key to being successful. To maintain budget, scope, effectiveness and pace a project must have physical documents pertaining to each specific task. With correct documentation, it is easy to see whether or not a project's requirement has been met. To go along with that, documentation provides information regarding what has already been completed for that project. Documentation throughout a project provides a paper trail for anyone who needs to go back and reference the work in the past. In most cases, documentation is the most successful way to monitor and control the specific phases of a project. With the correct documentation, a project's success can be tracked and observed as the project goes on. If performed correctly documentation can be the backbone to a project's success

Monitoring and controlling

Monitoring and controlling consists of those processes performed to observe project execution so that potential problems can be identified in a timely manner and corrective action can be taken, when necessary, to control the execution of the project. The key benefit is that project performance is observed and measured regularly to identify variances from the project management plan.

Monitoring and controlling includes:^[38]



Executing process group processes^[34]

- Measuring the ongoing project activities ('where we are');
- Monitoring the project variables (cost, effort, scope, etc.) against the project management plan and the project performance baseline (*where we should be*);
- Identifying corrective actions to address issues and risks properly (*How can we get on track again*);
- Influencing the factors that could circumvent integrated change control so only approved changes are implemented.

Two main mechanisms support monitoring and controlling in projects. On the one hand, contracts offer a set of rules and incentives often supported by potential penalties and sanctions.^[39] On the other hand, scholars in business and management have paid attention to the role of integrators (also called project barons) to achieve a project's objectives.^{[40][41]} In turn, recent research in project management has questioned the type of interplay between contracts and integrators. Some have argued that these two monitoring mechanisms operate as substitutes^[42] as one type of organization would decrease the advantages of using the other one, while others have suggested that they can complement each other.^[43]

In multi-phase projects, the monitoring and control process also provides feedback between project phases, to implement corrective or preventive actions to bring the project into compliance with the project management plan.

Project maintenance is an ongoing process, and it includes:^[35]

- Continuing support of end-users
- Correction of errors
- Updates to the product over time

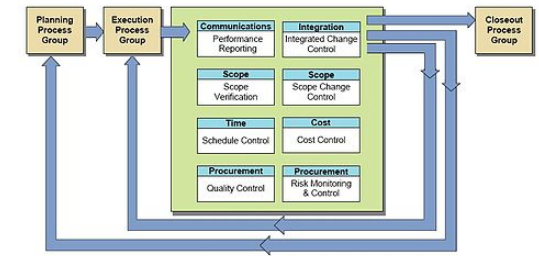
In this stage, auditors should pay attention to how effectively and quickly user problems are resolved.

Over the course of any construction project, the work scope may change. Change is a normal and expected part of the construction process. Changes can be the result of necessary design modifications, differing site conditions, material availability, contractor-requested changes, value engineering, and impacts from third parties, to name a few. Beyond executing the change in the field, the change normally needs to be documented to show what was actually constructed. This is referred to as change management. Hence, the owner usually requires a final record to show all changes or, more specifically, any change that modifies the tangible portions of the finished work. The record is made on the contract documents – usually, but not necessarily limited to, the design drawings. The end product of this effort is what the industry terms as-built drawings, or more simply, "as built." The requirement for providing them is a norm in construction contracts. Construction document management is a highly important task undertaken with the aid of an online or desktop software system, or maintained through physical documentation. The increasing legality pertaining to the construction industry's maintenance of correct documentation has caused the increase in the need for document management systems.

When changes are introduced to the project, the viability of the project has to be re-assessed. It is important not to lose sight of the initial goals and targets of the projects. When the changes accumulate, the forecasted result may not justify the original proposed investment in the project. Successful project management identifies these components, and tracks and monitors progress, so as to stay within time and budget frames already outlined at the commencement of the project. Exact methods were suggested to identify the most informative monitoring points along the project life-cycle regarding its progress and expected duration.^[44]

Closing

Closing includes the formal acceptance of the project and the ending thereof. Administrative activities include the archiving of the files and documenting lessons learned.



Monitoring and controlling process group processes^[34]



Monitoring and controlling cycle

This phase consists of:^[35]

- **Contract closure:** Complete and settle each contract (including the resolution of any open items) and close each contract applicable to the project or project phase.
- **Project close:** Finalize all activities across all of the process groups to formally close the project or a project phase



Closing process group processes.^[34]

Also included in this phase is the Post Implementation Review. This is a vital phase of the project for the project team to learn from experiences and apply to future projects. Normally a Post Implementation Review consists of looking at things that went well and analyzing things that went badly on the project to come up with lessons learned.

Project controlling and project control systems

Project controlling (also known as Cost Engineering) should be established as an independent function in project management. It implements verification and controlling function during the processing of a project to reinforce the defined performance and formal goals.^[45] The tasks of project controlling are also:

- the creation of infrastructure for the supply of the right information and its update
- the establishment of a way to communicate disparities of project parameters
- the development of project information technology based on an intranet or the determination of a project key performance indicator system (KPI)
- divergence analyses and generation of proposals for potential project regulations^[46]
- the establishment of methods to accomplish an appropriate project structure, project workflow organization, project control and governance
- creation of transparency among the project parameters^[47]

Fulfillment and implementation of these tasks can be achieved by applying specific methods and instruments of project controlling. The following methods of project controlling can be applied:

- investment analysis
- cost–benefit analysis
- value benefit analysis
- expert surveys
- simulation calculations
- risk-profile analysis
- surcharge calculations
- milestone trend analysis
- cost trend analysis
- target/actual-comparison^[48]

Project control is that element of a project that keeps it on track, on-time and within budget.^[38] Project control begins early in the project with planning and ends late in the project with post-implementation review, having a thorough involvement of each step in the process. Projects may be audited or reviewed while the project is in progress. Formal audits are generally risk or compliance-based and management will direct the objectives of the audit. An examination may include a comparison of approved project management processes with how the project is actually being managed.^[49] Each project should be assessed for the appropriate level of control needed: too much control is too time-consuming, too little control is very risky. If project control is not implemented correctly, the cost to the business should be clarified in terms of errors and fixes.

Control systems are needed for cost, risk, quality, communication, time, change, procurement, and human resources. In addition, auditors should consider how important the projects are to the financial statements, how reliant the stakeholders are on controls, and how many controls exist. Auditors should review the development process and procedures for how they are implemented. The process of development and the quality of the final product may also be assessed if needed or requested. A business may want the auditing firm to be involved throughout the process to catch problems earlier on so that they can be fixed more easily. An auditor can serve as a controls consultant as part of the development team or as an independent auditor as part of an audit.

Businesses sometimes use formal systems development processes. These help assure systems are developed successfully. A formal process is more effective in creating strong controls, and auditors should review this process to confirm that it is well designed and is followed in practice. A good formal systems development plan outlines:

- A strategy to align development with the organization's broader objectives
- Standards for new systems
- Project management policies for timing and budgeting
- Procedures describing the process
- Evaluation of quality of change

Characteristics of projects

There are five important characteristics of a project. (i) It should always have a specific start and end dates. (ii) They are performed and completed by a group of people. (iii) The output is delivery on unique product or service. (iv) They are temporary in nature. (v) It is progressively elaborated. example: Designing a new car, writing a book.

Project Complexity

Complexity and its nature plays an important role in the area of project management. Despite having number of debates on this subject matter, studies suggest lack of definition and reasonable understanding of complexity in relation to management of complex projects.^[50] As it is considered that project complexity and project performance are closely related, it is important to define and measure complexity of the project for project management to be effective.^[51]

By applying the discovery in measuring work complexity described in Requisite Organization and Stratified Systems Theory, Dr Elliott Jaques classifies projects and project work (stages, tasks) into basic 7 levels of project complexity based on such criteria as time-span of discretion and complexity of a project's output:^{[52][53]}

- Level 1 Project – improve the direct output of an activity (quantity, quality, time) within a business process with targeted completion time up to 3 months.
- Level 2 Project – develop and improve compliance to a business process with targeted completion time from 3 months to 1 year.
- Level 3 Project – develop, change, and improve a business process with targeted completion time from 1 to 2 years.
- Level 4 Project – develop, change, and improve a functional system with targeted completion time from 2 to 5 years.
- Level 5 Project – develop, change, and improve a group of functional systems / business function with targeted completion time from 5 to 10 years.
- Level 6 Project – develop, change, and improve a whole single value chain of a company with targeted completion time from 10 to 20 years.
- Level 7 Project – develop, change, and improve multiple value chains of a company with target completion time from 20 to 50 years.^[54]

Benefits from measuring Project Complexity is to improve project people feasibility by:^[55]

- Match the level of a project's complexity with effective targeted completion time of a project
- Match the level of a project's complexity with the respective capability level of the project manager
- Match the level of a project task's complexity with the respective capability of the project members

Project managers

A **project manager** is a professional in the field of project management. Project managers are in charge of the people in a project. People are the key to any successful project. Without the correct people in the right place and at the right time a project cannot be successful. Project managers can have the responsibility of the planning, execution, controlling, and closing of any project typically relating to the construction industry, engineering, architecture, computing, and telecommunications. Many other fields of production engineering, design engineering, and heavy industrial have project managers.

A project manager needs to understand the order of execution of a project to schedule the project correctly as well as the time necessary to accomplish each individual task within the project. A project manager is the person accountable for accomplishing the stated project objectives on the behalf of the client. Project Managers tend to have multiple years' experience in their field. A project manager is required to know the project in and out while supervising the workers along with the project. Typically in most construction, engineering, architecture, and industrial projects, a project manager has another manager working alongside of them who is typically responsible for the execution of task on a daily basis. This position in some cases is known as a superintendent. A superintendent and project manager work hand in hand in completing daily project task. Key project management responsibilities include creating clear and attainable project objectives, building the project requirements, and managing the triple constraint (now including more constraints and calling it competing constraints) for projects, which is cost, time, quality and scope for the first three but about three additional ones in current project management. A typical project is composed of a team of workers who work under the project manager to complete the assignment within the time and budget targets. A project manager normally reports directly to someone of higher stature on the completion and success of the project.

A project manager is often a client representative and has to determine and implement the exact needs of the client, based on knowledge of the firm they are representing. The ability to adapt to the various internal procedures of the contracting party, and to form close links with the nominated representatives, is essential in ensuring that the key issues of cost, time, quality and above all, client satisfaction, can be realized.

A complete project manager, a term first coined by Dr. Robert J. Graham in his simulation, has been expanded upon by Randall L. Englund and Alfonso Bucero. They describe a complete project manager as a person who embraces multiple disciplines, such as leadership, influence, negotiations, politics, change and conflict management, and humor. These are all "soft" people skills that enable project leaders to be more effective and achieve optimized, consistent results.

Multilevel success framework and criteria

There is a tendency to confuse the project success with project management success. They are two different things. Project management success criteria is different from project success criteria. The project management is said to be successful if the given project is completed within the agreed upon time, met the agreed upon scope and within the agreed upon budget. Subsequent to the triple constraints, multiple constraints have been considered to ensure project success. However, the triple or multiple constraints indicate only the efficiency measures of the project, which are indeed the project management success criteria during the project lifecycle.

The priori criteria leave out the more important after-completion results of the project which comprise four levels i.e. the output (product) success, outcome (benefits) success and impact (strategic) success during the product lifecycle. These posterior success criteria indicate the effectiveness measures of the project product, service or result, after the project completion and handover. This overarching multilevel success framework of projects, programs and portfolios has been developed by Paul Bannerman in 2008.^[56] In other words, a project is said to be successful, when it succeeds in achieving the expected business case which needs to be clearly identified and defined during the project inception and selection before starting the development phase. This multilevel success framework conforms to the theory of project as a transformation depicted as the input-process / activity-output-outcome-impact in order to generate whatever value intended. Emanuel Camilleri in 2011 classifies all the critical success and failure factors into groups and matches each of them with the multilevel success criteria in order to deliver business value.^[57]

Risk management

The United States Department of Defense states; "Cost, Schedule, Performance, and Risk" are the four elements through which Department of Defense acquisition professionals make trade-offs and track program status.^[58] There are also international standards. Risk management applies proactive identification (see tools) of future problems and understanding of their consequences allowing predictive decisions about projects.

Work breakdown structure

The work breakdown structure (WBS) is a tree structure that shows a subdivision of the activities required to achieve an objective – for example a portfolio, program, project, and contract. The WBS may be hardware-, product-, service-, or process-oriented (see an example in a [NASA reporting structure \(2001\)](#)).^[59] Beside WBS for project scope management, there are organizational breakdown structure (chart), cost breakdown structure and risk breakdown structure.

A WBS can be developed by starting with the end objective and successively subdividing it into manageable components in terms of size, duration, and responsibility (e.g., systems, subsystems, components, tasks, sub-tasks, and work packages), which include all steps necessary to achieve the objective.^[30]

The work breakdown structure provides a common framework for the natural development of the overall planning and control of a contract and is the basis for dividing work into definable increments from which the statement of work can be developed and technical, schedule, cost, and labor hour reporting can be established.^[59] The work breakdown structure can be displayed in two forms, as a table with subdivision of tasks or as an organisational chart whose lowest nodes are referred to as "work packages".

It is an essential element in assessing the quality of a plan, and an initial element used during the planning of the project. For example, a WBS is used when the project is scheduled, so that the use of work packages can be recorded and tracked.

International standards

There are several project management standards, including:

- The ISO standards ISO 9000, a family of standards for quality management systems, and the [ISO 10006:2003](#), for Quality management systems and guidelines for quality management in projects.
- [ISO 21500:2012 – *Guidance on project management*](#). This is the first International Standard related to project management published by ISO. Other standards in the 21500 family include [21503:2017 *Guidance on programme management*](#); [21504:2015 *Guidance on portfolio management*](#); [21505:2017 *Guidance on governance*](#); [21506:2018 *Vocabulary*](#); [21508:2018 *Earned value management in project and programme management*](#); and [21511:2018 *Work breakdown structures for project and programme management*](#).
- [ISO 31000:2009 – Risk management](#).
- [ISO/IEC/IEEE 16326:2009 – Systems and Software Engineering—Life Cycle Processes—Project Management](#)^[60]
- Individual Competence Baseline (ICB) from the International Project Management Association (IPMA).^[61]
- [Capability Maturity Model \(CMM\)](#) from the [Software Engineering Institute](#).
- [GAPPS, Global Alliance for Project Performance Standards](#) – an open source standard describing COMPETENCIES for project and program managers.
- [HERMES method](#), Swiss general project management method, selected for use in Luxembourg and international organizations.
- The [logical framework approach \(LFA\)](#), which is popular in international development organizations.
- [PMBOK Guide](#) from the [Project Management Institute \(PMI\)](#).
- [PRINCE2](#) from [AXELOS](#).
- [Team Software Process \(TSP\)](#) from the [Software Engineering Institute](#).
- [Total Cost Management Framework](#), AACE International's Methodology for Integrated Portfolio, Program and Project Management.
- [V-Model](#), an original systems development method.

Program management

Some projects, either identical or different, can be managed as program management so that a program manager is in charge of project managers. Hence, a program manager is also known as a project director.

Project portfolio management

An increasing number of organizations are using what is referred to as project portfolio management (PPM) as a means of selecting the right projects and then using project management techniques^[62] as the means for delivering the outcomes in the form of benefits to the performing public, private or not-for-profit organization. PPM is usually performed by a dedicated team of managers organized within an Enterprise Project Management Office (PMO) headed by a PMO director, usually based within the organization. Thus, the position in charge of PPM can also be designated as the chief project officer or the chief technology officer. In cases where strategic initiatives of an organization form the bulk of the PPM, the head of the PPM is titled as the chief initiative officer.

Project management software

Project management software is software used to help plan, organize, and manage resource pools, develop resource estimates and implement plans. Depending on the sophistication of the software, functionality may include estimation and planning, scheduling, cost control and budget management, resource allocation, collaboration software, communication, decision-making, workflow, risk, quality, documentation, and/or administration systems.^{[63][64]}

Virtual project management

Virtual program management (VPM) is management of a project done by a virtual team, though it rarely may refer to a project implementing a virtual environment^[65] It is noted that managing a virtual project is fundamentally different from managing traditional projects,^[66] combining concerns of telecommuting and global collaboration (culture, time zones, language).^[67]

See also

Related fields

- [Agile Construction](#)
- [Architectural engineering](#)
- [Construction management](#)
- [Cost engineering](#)
- [Facilitation \(business\)](#)
- [Industrial engineering](#)
- [Project Production Management](#)
- [Project management software](#)
- [Project portfolio management](#)
- [Project workforce management](#)
- [Software project management](#)
- [Systems engineering](#)

Related subjects

- [Collaborative project management](#)
- [Decision-making](#)
- [Game theory](#)
- [Earned value management](#)
- [Human factors](#)
- [Kanban \(development\)](#)
- [Operations research](#)
- [Process architecture](#)
- [Program management](#)
- [Project accounting](#)
- [Project governance](#)
- [Project management simulation](#)
- [Small-scale project management](#)
- [Software development process](#)
- [Systems Development Life Cycle \(SDLC\)](#)

Lists

- [Comparison of project management software](#)
- [Glossary of project management](#)
- [List of collaborative software](#)
- [List of project management topics](#)
- [Timeline of project management](#)


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External links

- [Guidelines for Managing Projects](http://webarchive.nationalarchives.gov.uk/20090609003228/http://www.berr.gov.uk/files/file40647.pdf) (<http://webarchive.nationalarchives.gov.uk/20090609003228/http://www.berr.gov.uk/files/file40647.pdf>) from the UK Department for Business, Enterprise and Regulatory Reform (BERR)
- [PM Foundation](https://www.fotorio.in/2020/09/project-management.html) (<https://www.fotorio.in/2020/09/project-management.html>) PM BLOG
-  [Media related to Project management](#) at Wikimedia Commons

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EXHIBIT C



Meaning of **professional** in English



professional

adjective

US /prəˈfeʃ.ən.əl/ UK /prəˈfeʃ.ən.əl/



B2

relating to work that needs special training or education:

- *Chris, you're a nurse, so can I ask your professional **opinion** on bandaging ankles?*
- *Both doctors have been charged with professional **misconduct** (= bad or unacceptable behavior in their work).*

Compare

amateur adjective



B1 approving

having the qualities that you connect with trained and skilled people, such as effectiveness, skill, organization, and seriousness of manner:

- *It would look more professional if the letter was typed.*
- *She always looks very professional in her smart suits.*
- *You've done a very professional job stripping that floor!*



B1

used to describe someone who does a job that people usually do as a hobby:

Contents

To top



having the type of job that is respected because it involves a high level of education and training:

- *Room for rent in shared house - would suit professional person.*
- *a bar full of young professional types in suits*

— More examples

- *We're engaging the services of a professional administrator.*
- *He's one of the highest-earning professional golfers in the world.*
- *These two books will be especially useful for editors, journalists, and other professional users of the language.*
- *He was an amateur singer until the age of 40, when he turned professional.*
- *This was her final professional match, and she wanted to end her career in a blaze of glory.*

+ SMART Vocabulary: related words and phrases

Want to learn more?

Improve your vocabulary with **English Vocabulary in Use** from Cambridge.
Learn the words you need to communicate with confidence.



professional

noun [C]

US /prəˈfeʃ.ən.əl/ UK /prəˈfeʃ.ən.əl/



C1

a person who has the type of job that needs a high level of education and training:





Compare

amateur adjective

informal

someone who has worked hard in the same type of job for a long time and has become skilled at dealing with any problem that might happen:

- *I thought the whole meeting was going to fall apart but you rescued it like a true professional!*
- *the consummate professional*

B2

a person who does a job that people usually do as a hobby:

- *He's only been playing football as a professional for two years.*

a person who plays a sport, especially a golf or tennis player, who is employed by a club to train its members in a particular sport

+ More examples

+ SMART Vocabulary: related words and phrases

(Definition of **professional** from the [Cambridge Advanced Learner's Dictionary & Thesaurus](#) © Cambridge University Press)

professional | INTERMEDIATE ENGLISH

professional

noun [C]

US /prəˈfeʃ·ə·nəl/

a person who has a job that needs skill, education, or training:



professional

adjective

US /prəˈfeɪ·ə·nəl/

done as a job, or relating to a skilled type of work:

- *a professional athlete*
- *professional sports*
- *He spent his professional career at the University of Pennsylvania.*

Professional also means having the qualities of skilled and educated people, such as effectiveness and seriousness of manner:

- *Wearing jeans to work is not looked upon as being professional.*

professionally

adverb US /prəˈfeɪ·ə·nəl·i/

- *I always wanted to sing professionally.*

*(Definition of **professional** from the [Cambridge Academic Content Dictionary](#) © Cambridge University Press)*

professional | BUSINESS ENGLISH

professional

adjective

UK /prəˈfeɪʃnəl/ US



related to work that needs a high level of education or special training:

- **professional advice/judgments/opinions** *You should seek professional advice before doing this.*
- **a professional background/career/life** *She has spent the bulk of her professional life working in the public sector.*
- **professional experience/qualifications/training** *The importance of professional qualifications varies enormously between different industries.*
- **a professional association/body/organization**
- **professional services/skills/standards**



having the type of job that is respected because it involves a high level of education and training:

- *Many of those who want to rent are single, **professional people** who do not want to share.*



having the qualities that you connect with trained people, such as being organized and showing a high standard of work:

- *It would look more professional if the letter were typed.*
- *He has behaved **in a very professional way**.*
- **a professional environment/relationship**





- **professional accountability/conduct/misconduct** *He is now facing charges of serious professional misconduct.*

(also informal **pro**)

doing an activity or a job to earn money, rather than as a hobby:

- *a professional athlete*
- *pro football/sports*

Compare

amateur *adjective*



professional

noun [C]

UK /prəˈfeʃənəl/ US

(informal **pro**)

a person who has the type of job that needs a high level of education and special training:

- *It's important to gather a **team of professionals** such as a lawyer, an accountant, and a financial planner to help draw up a plan.*
- ***health/health care/medical professionals***
- ***IT/finance/marketing professionals***
- ***dedicated/skilled/trained professionals***





someone who has worked hard in the same type of job for a long time, and has a lot of skill and knowledge:

- *a true/consummate professional*
- *He's a real pro.*
- *If you have a large amount of money to invest, it's better to leave it to the pros.*

someone who does an activity or a job to earn money, rather than as a hobby:

- *This will be his first game as a professional.*

Compare

[amateur](#) adjective

See also

[health professional](#)

(Definition of **professional** from the [Cambridge Business English Dictionary](#) © Cambridge University Press)

EXAMPLES of **professional**



As is true of other professionals, some teachers are better than others.

From [New York Times](#)



The program offers grants for students, scholars and professionals.

From [Voice of America](#)



More examples

These examples are from corpora and from sources on the web. Any opinions in the examples do not represent the opinion of the Cambridge Dictionary editors or of Cambridge University Press or its licensors.

Translations of **professional**

in Chinese (Traditional)

職業的, 專業的, 非常內行的...

[See more](#)

in Chinese (Simplified)

职业的, 专业的, 非常内行的...

[See more](#)

in Spanish

profesional, profesional [masculine-feminine, singular]...

[See more](#)

in Portuguese

profissional...

[See more](#)

in more languages



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WORD OF THE DAY

current affairs

political news about events happening now

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EXHIBIT D

Professional

A **professional** is a member of a profession or any person who earns a living from a specified professional activity. The term also describes the standards of education and training that prepare members of the profession with the particular knowledge and skills necessary to perform their specific role within that profession. In addition, most professionals are subject to strict codes of conduct, enshrining rigorous ethical and moral obligations.^[1] Professional standards of practice and ethics for a particular field are typically agreed upon and maintained through widely recognized professional associations, such as the IEEE.^[2] Some definitions of "professional" limit this term to those professions that serve some important aspect of public interest^[3] and the general good of society.^{[4][5]}

In some cultures, the term is used as shorthand to describe a particular social stratum of well-educated workers who enjoy considerable work autonomy and who are commonly engaged in creative and intellectually challenging work.^{[6][7][8][9]}



Doctor explains x-ray to patient

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Trades

In narrow usage, not all expertise is considered a profession. Occupations such as skilled construction and maintenance work are more generally thought of as trades or crafts. The completion of an apprenticeship is generally associated with skilled labour, or trades such as carpenter, electrician, mason, painter, plumber and other similar occupations.

Theory

Although professional training appears to be ideologically neutral, it may be biased towards those with higher class backgrounds and a formal education. In his 2000 book, *Disciplined Minds: A Critical Look at Salaried Professionals and the Soul-Battering System that Shapes Their Lives*, Jeff Schmidt observes that qualified professionals are less creative and diverse in their opinions and habits than non-professionals, which he attributes to the subtle indoctrination and filtering which accompanies the process of professional training. His evidence is both qualitative and quantitative, including professional examinations, industry statistics and personal accounts of trainees and professionals.^[10]

A key theoretical dispute arises from the observation that established professions (e.g. lawyers, medical doctors, architects, civil engineers, surveyors) are subject to strict codes of conduct. Some have thus argued that these codes of conduct, agreed upon and maintained through widely recognized professional associations, are a key element of what constitutes any profession.^[11] Others have argued that strict codes of conduct and the professional associations that maintain them are merely a

consequence of 'successful' professionalization, rather than an intrinsic element of the definition of professional(ism); this implies that a profession arises from the alignment between a shared purpose (connected to a 'greater good'), a body of knowledge, actual behavior in terms of actions and decisions, and expectations held by societal stakeholders.^[12]

Etymology

The etymology and historical meaning of the term professional is from Middle English, from *profes*, adjective, having professed one's vows, from Anglo-French, from Late Latin *professus*, from Latin, past participle of *profitēri* to profess, confess, from pro- before + *fatēri* to acknowledge; in other senses, from Latin *professus*, past participle. Thus, as people became more and more specialized in their trade, they began to 'profess' their skill to others, and 'vow' to perform their trade to the highest known standard. With a reputation to uphold, trusted workers of a society who have a specific trade are considered professionals. Ironically, the usage of the word 'profess' declined from the late 1800s to the 1950s, just as the term 'professional' was gaining popularity from 1900–2010.^{[13][14]} Notably, in American English the rise in popularity of the term 'professional' started at the beginning of the 20th century^[15] whereas in British English it started in the 1930s and grew fastest in the 1960s and 70s.^[16]

See also

- Amateur
- Centre for the Study of Professions
- Organizational culture
- Professional boundaries
- Professional services
- Professional sports
- Semi-professional

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EXHIBIT E

April 14, 2020

Rule 1.5: Fees

Share:



Client-Lawyer Relationship

(a) A lawyer shall not make an agreement for, charge, or collect an unreasonable fee or an unreasonable amount for expenses. The factors to be considered in determining the reasonableness of a fee include the following:

- (1) the time and labor required, the novelty and difficulty of the questions involved, and the skill requisite to perform the legal service properly;
- (2) the likelihood, if apparent to the client, that the acceptance of the particular employment will preclude other employment by the lawyer;
- (3) the fee customarily charged in the locality for similar legal services;
- (4) the amount involved and the results obtained;
- (5) the time limitations imposed by the client or by the circumstances;
- (6) the nature and length of the professional relationship with the client;
- (7) the experience, reputation, and ability of the lawyer or lawyers performing the services; and
- (8) whether the fee is fixed or contingent.

(b) The scope of the representation and the basis or rate of the fee and expenses for which the client will be responsible shall be communicated to the client, preferably in writing, before or within a reasonable time after commencing the representation, except when the lawyer will charge a regularly represented client on the same basis or rate. Any changes in the basis or rate of the fee or expenses shall also be communicated to the client.

(c) A fee may be contingent on the outcome of the matter for which the service is rendered, except in a matter in which a contingent fee is prohibited by paragraph (d) or other law. A contingent fee agreement shall be in a writing signed by the client and shall state the method by which the fee is to be determined, including the percentage or percentages that shall accrue to the lawyer in the event of settlement, trial or appeal; litigation and other expenses to be deducted from the recovery; and whether such expenses are to be deducted before or after the contingent fee is calculated. The agreement must clearly notify the client of any expenses for which the client will be liable whether or not the client is the prevailing party. Upon conclusion of a contingent fee matter, the lawyer shall provide the client with a written statement stating the outcome of the matter and, if there is a recovery, showing the remittance to the client and the method of its determination.

(d) A lawyer shall not enter into an arrangement for, charge, or collect:

- (1) any fee in a domestic relations matter, the payment or amount of which is contingent upon the securing of a divorce or upon the amount of alimony or support, or property settlement in lieu thereof; or
- (2) a contingent fee for representing a defendant in a criminal case.

(e) A division of a fee between lawyers who are not in the same firm may be made only if:

- (1) the division is in proportion to the services performed by each lawyer or each lawyer assumes joint responsibility for the representation;
- (2) the client agrees to the arrangement, including the share each lawyer will receive, and the agreement is confirmed in writing; and
- (3) the total fee is reasonable.

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EXHIBIT F

Rule 1.4: Communications

Share:



Client-Lawyer Relationship

(a) A lawyer shall:

- (1) promptly inform the client of any decision or circumstance with respect to which the client's informed consent, as defined in Rule 1.0(e), is required by these Rules;
- (2) reasonably consult with the client about the means by which the client's objectives are to be accomplished;
- (3) keep the client reasonably informed about the status of the matter;
- (4) promptly comply with reasonable requests for information; and
- (5) consult with the client about any relevant limitation on the lawyer's conduct when the lawyer knows that the client expects assistance not permitted by the Rules of Professional Conduct or other law.

(b) A lawyer shall explain a matter to the extent reasonably necessary to permit the client to make informed decisions regarding the representation.

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EXHIBIT G

Rule 1.3 Diligence - Comment

Share:



Client-Lawyer Relationship

[1] A lawyer should pursue a matter on behalf of a client despite opposition, obstruction or personal inconvenience to the lawyer, and take whatever lawful and ethical measures are required to vindicate a client's cause or endeavor. A lawyer must also act with commitment and dedication to the interests of the client and with zeal in advocacy upon the client's behalf. A lawyer is not bound, however, to press for every advantage that might be realized for a client. For example, a lawyer may have authority to exercise professional discretion in determining the means by which a matter should be pursued. See Rule 1.2. The lawyer's duty to act with reasonable diligence does not require the use of offensive tactics or preclude the treating of all persons involved in the legal process with courtesy and respect.

[2] A lawyer's work load must be controlled so that each matter can be handled competently.

[3] Perhaps no professional shortcoming is more widely resented than procrastination. A client's interests often can be adversely affected by the passage of time or the change of conditions; in extreme instances, as when a lawyer overlooks a statute of limitations, the client's legal position may be destroyed. Even when the client's interests are not affected in substance, however, unreasonable delay can cause a client needless anxiety and undermine confidence in the lawyer's trustworthiness. A lawyer's duty to act with reasonable promptness, however, does not preclude the lawyer from agreeing to a reasonable request for a postponement that will not prejudice the lawyer's client.

[4] Unless the relationship is terminated as provided in Rule 1.16, a lawyer should carry through to conclusion all matters undertaken for a client. If a lawyer's employment is limited to a specific matter, the relationship terminates when the matter has been resolved. If a lawyer has served a client over a substantial period in a variety of matters, the client sometimes may assume that the lawyer will continue to serve on a continuing basis unless the lawyer gives notice of withdrawal. Doubt about whether a client-lawyer relationship still exists should be clarified by the lawyer, preferably in writing, so that the client will not mistakenly suppose the lawyer is looking after the client's affairs when the lawyer has ceased to do so. For example, if a lawyer has handled a judicial or administrative proceeding that produced a result adverse to the client and the lawyer and the client have not agreed that the lawyer will handle the matter on appeal, the lawyer must consult with the client about the possibility of appeal before relinquishing

responsibility for the matter. See Rule 1.4(a)(2). Whether the lawyer is obligated to prosecute the appeal for the client depends on the scope of the representation the lawyer has agreed to provide to the client. See Rule 1.2.

[5] To prevent neglect of client matters in the event of a sole practitioner's death or disability, the duty of diligence may require that each sole practitioner prepare a plan, in conformity with applicable rules, that designates another competent lawyer to review client files, notify each client of the lawyer's death or disability, and determine whether there is a need for immediate protective action. Cf. Rule 28 of the American Bar Association Model Rules for Lawyer Disciplinary Enforcement (providing for court appointment of a lawyer to inventory files and take other protective action in absence of a plan providing for another lawyer to protect the interests of the clients of a deceased or disabled lawyer).

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EXHIBIT H

Construction management

Construction management (CM) is a professional service that uses specialized, project management techniques to oversee the planning, design, and construction of a project, from its beginning to its end. The purpose of Construction management is to control a project's time / delivery, cost and quality—sometimes referred to as a project management triangle or "triple constraints."^[1] CM is compatible with all project delivery systems, including design-bid-build, design-build, CM At-Risk and Public Private Partnerships. Professional construction managers may be reserved for lengthy, large-scale, high budget undertakings (commercial real estate, transportation infrastructure, industrial facilities, and military infrastructure), called capital projects.

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See also

References

Further reading

The role of a contractor

Contractors are assigned to a [construction project](#) during the design or once the design has been completed by a licensed architect or a licensed civil engineer. This is done by going through a [bidding process](#) with different contractors. The contractor is selected by using one of three common selection methods: low-bid selection, best-value selection, or qualifications-based selection.

A construction manager should have the ability to handle [public safety](#), [time management](#), [cost management](#), [quality management](#), [decision making](#), [mathematics](#), [working drawings](#), and [human resources](#).^[2]

Function

The functions of construction management typically include the following:

1. Specifying project objectives and plans including delineation of scope, budgeting, scheduling, setting performance requirements, and selecting project participants.
2. Maximizing the resource efficiency through [procurement](#) of labor, materials and equipment.
3. Implementing various operations through proper coordination and control of planning, design, estimating, contracting and construction in the entire process.
4. Developing effective [communications](#) and mechanisms for resolving conflicts.^[3]

The [Construction Management Association of America](#) (CMAA) states the most common responsibilities of a Construction Manager fall into the following 7 categories: Project Management Planning, Cost Management, Time Management, Quality Management, Contract Administration, Safety Management, and CM Professional Practice. CM professional practice includes specific activities, such as defining the responsibilities and management structure of the project management team, organizing and leading by implementing project controls, defining roles and responsibilities, developing communication protocols, and identifying elements of project design and construction likely to give rise to disputes and claims.^[4]

Seven types of construction

- **Agricultural:** Typically economical buildings, and other improvements, for agricultural purposes. Examples include barns, equipment and animal sheds, specialized fencing, storage silos and elevators, and water supply and drains such as wells, tanks, and ditches.
- **Residential:** Residential construction includes houses, apartments, townhouses, and other smaller, low-rise housing, small office types.^[2]
- **Commercial:** This refers to construction for the needs of private commerce, trade, and services. Examples include office buildings, "big box" stores, shopping centers and malls, warehouses, banks, theaters, casinos, resorts, golf courses, and larger residential structures such as high-rise hotels and condominiums.

- **Institutional:** This category is for the needs of government and other public organizations. Examples include schools, fire and police stations, libraries, museums, dormitories, research buildings, hospitals, transportation terminals, some military facilities, and governmental buildings.
- **Industrial:** Buildings and other constructed items used for storage and product production, including chemical and power plants, steel mills, oil refineries and platforms, manufacturing plants, pipelines, and seaports.
- **Heavy civil:** The construction of transportation infrastructure such as roads, bridges, railroads, tunnels, airports, and fortified military facilities.^[2] Dams are also included, but most other water-related infrastructure is considered environmental.
- **Environmental:** Environmental construction was part of heavy civil, but is now separate, dealing with projects that improve the environment. Some examples are water and wastewater treatment plants, sanitary and storm sewers, solid waste management, and air pollution control.^[2]

Obtaining the project

Bids

A bid is given to the owner by construction managers that are willing to complete their construction project. A bid tells the owner how much money they should expect to pay the construction management company in order for them to complete the project.^[2]

- **Open bid:** An open bid is used for public projects. Any and all contractors are allowed to submit their bid due to public advertising.
- **Closed bid:** A closed bid is used for private projects. A selection of contractors are sent an invitation for bid so only they can submit a bid for the specified project.^[2]

Selection methods

- **Low-bid selection:** This selection focuses on the price of a project. Multiple construction management companies submit a bid to the owner that is the lowest amount they are willing to do the job for. Then the owner usually chooses the company with the lowest bid to complete the job for them.^[2]
- **Best-value selection:** This selection focuses on both the price and qualifications of the contractors submitting bids. This means that the owner chooses the contractor with the best price and the best qualifications. The owner decides by using a request for proposal (RFP), which provides the owner with the contractor's exact form of scheduling and budgeting that the contractor expects to use for the project.^[2]
- **Qualifications-based selection:** This selection is used when the owner decides to choose the contractor only on the basis of their qualifications. The owner then uses a request for qualifications (RFQ), which provides the owner with the contractor's experience, management plans, project organization, and budget and schedule performance. The owner may also ask for safety records and individual credentials of their members.^[2] This method is most often used when the contractor is hired early during the design process so that the contractor can provide input and cost estimates as the design develops.

Payment contracts

- **Lump sum:** This is the most common type of contract. The construction manager and the owner agree on the overall cost of the construction project and the owner is responsible for paying that amount whether the construction project exceeds or falls below the agreed price of payment.^[2]
- **Cost plus fee:** This contract provides payment for the contractor including the total cost of the project as well as a fixed fee or percentage of the total cost. This contract is beneficial to the contractor since any additional costs will be paid for, even though they were unexpected for the owner.^[2]
- **Guaranteed maximum price:** This contract is the same as the cost-plus-fee contract although there is a set price that the overall cost and fee do not go above.^[2]
- **Unitprice:** This contract is used when the cost cannot be determined ahead of time. The owner provides materials with a specific unit price to limit spending.^[2]

Project stages

The stages of a typical construction project have been defined as **feasibility, design, construction and operation**,^[5] each stage relating to the project life cycle.

Feasibility and design

Feasibility and design involves four steps: programming and feasibility, schematic design, design development, and contract documents. It is the responsibility of the design team to ensure that the design meets all building codes and regulations. It is during the design stage that the bidding process takes place.^[2]

	Feasibility	Design	Construction	Operation			
What	Assess project feasibility	Plan and produce construction documents	Execute the project	Operate the facility			
Why	Identify a solution	Design the project	Execute the project	Operate the facility			
When	Before design	Before construction	During construction	After project completion			
Who	Client, design architect, building professional	After project approval	Executing an approved plan	After project completion			
How	Business operation	Developing an approved plan	Executing the plan and design	Business operation			
How much							
PM/DC	Initiation	Concept	Logical design	Physical	Development	Installation	Operations
APM/ADM	Plan	Feasibility	Design	Contract	Construction	Hand-over	Operations
Building level	Initial	Full	Development	Implementation	Completion		Operations
CD contract	Concept	Design	Design	Contract	Design	Design	Operations
Software development	Concept	Development	Design	Design	Design	Design	Operations
Contract	Definition	Analysis	Design	Implementation	Installation	Operations	
Client	Define and formal approval	Functional analysis	System development	System	Operations		Operations
Contractor	Analysis	Design	Design	Planning	Action	Installation	Operations
Management	Initiation	Preparation	Production	Production	Execution		Operation
Manager	Initiation	Concept	Design	Design	Design	Design	Operations

Characteristics of construction project stages of various project management approaches^[5]

- **Conceptual/programming and feasibility:** The needs, goals, and objectives must be determined for the building. Decisions must be made on the building size, number of rooms, how the space will be used, and who will be using the space. This must all be considered to begin the actual designing of the building. This phase is normally a written list of each room or space, the critical information about those spaces, and the approximate square footage of each area.
- **Schematic design:** Schematic designs are sketches used to identify spaces, shapes, and patterns. Materials, sizes, colors, and textures must be considered in the sketches.^[2] This phase usually involves developing the floor plan, elevations, a site plan, and possibly a few details.
- **Design development (DD):** This step requires research and investigation into what materials and equipment will be used as well as their cost. During this phase, the drawings are refined with information from structural, plumbing, mechanical, and electrical engineers. It also involves a more rigorous evaluation how the applicable building codes will impact the project.
- **Contract documents (CDs):** Contract documents are the final drawings and specifications of the construction project. They are used by contractors to determine their bid while builders use them for the construction process. Contract documents can also be called working drawings.^[2]

Pre-construction

The pre-construction stage begins when the owner gives a notice to proceed to the contractor that they have chosen through the bidding process. A notice to proceed is when the owner gives permission to the contractor to begin their work on the project. The first step is to assign the project team which includes the project manager (PM), contract administrator, superintendent, and field engineer.^[2]

- **Project manager:** The project manager is in charge of the project team.
- **Contract administrator:** The contract administrator assists the project manager as well as the superintendent with the details of the construction contract.
- **Superintendent:** It is the superintendent's job to make sure everything is on schedule including flow of materials, deliveries, and equipment. They are also in charge of coordinating on-site construction activities.^[2]
- **Field engineer:** A field engineer is considered an entry-level position and is responsible for paperwork.

During the pre-construction stage, a site investigation must take place. A site investigation takes place to discover if any steps need to be implemented on the job site. This is in order to get the site ready before the actual construction begins. This also includes any unforeseen conditions such as historical artifacts or environment problems. A soil test must be done to determine if the soil is in good condition to be built upon.^[2]

Procurement

The procurement stage is when labor, materials and equipment needed to complete the project are purchased. This can be done by the general contractor if the company does all their own construction work. If the contractor does not do their own work, they obtain it through subcontractors. Subcontractors are contractors who specialize in one particular aspect of the construction work such as concrete, welding, glass, or carpentry. Subcontractors are hired the same way a general contractor would be, which is through the bidding process. Purchase orders are also part of the procurement stage.^[2]

- **Purchase orders:** A purchase order is used in various types of businesses. In this case, a purchase order is an agreement between a buyer and seller that the products purchased meet the required specifications for the agreed price.^[2]

Construction

The construction stage begins with a pre-construction meeting brought together by the superintendent (on an American project). The pre-construction meeting is meant to make decisions dealing with work hours, material storage, quality control, and site access. The next step is to move everything onto the construction site and set it all up.^[2]

A **contractor progress payment schedule** is a schedule of when (according to project milestones or specified dates) contractors and suppliers will be paid for the current progress of installed work.

Progress payments are partial payments for work completed during a portion, usually a month, during a construction period. Progress payments are made to general contractors, subcontractors, and suppliers as construction projects progress. Payments are typically made on a monthly basis but could be modified to meet certain milestones. Progress payments are an important part of contract administration for the contractor. Proper preparation of the information necessary for payment processing can help the contractor financially complete the project. ^[6]

Owner occupancy

Once the owner moves into the building, a warranty period begins. This is to ensure that all materials, equipment, and quality meet the expectations of the owner that are included within the contract.^[2]

Issues resulting from construction

Dust and mud

When construction vehicles are driving around a site or moving earth, a lot of dust is created, especially during the dryer months. This may cause disruption for surrounding businesses or homes. A popular method of dust control is to have a water truck driving through the site spraying water on the dry dirt to minimize the movement of dust within and out of the construction site. When water is introduced mud is created. This mud sticks to the tires of the construction vehicles and is often lead out to the surrounding roads. A street sweeper may clean the roads to reduce dirty road conditions.

Environmental protections

- **Storm water pollution:** As a result of construction, the soil is displaced from its original location which can possibly cause environmental problems in the future. Runoff can occur during storms which can possibly transfer harmful pollutants through the soil to rivers, lakes, wetlands, and coastal waters.
- **Endangered species:** If endangered species have been found on the construction site, the site must be shut down for some time. The construction site must be shut down for as long as it takes for authorities to make a decision on the situation. Once the situation has been assessed, the contractor makes the appropriate accommodations to not disturb the species.
- **Vegetation:** There may often be particular trees or other vegetation that must be protected on the job site. This may require fences or security tape to warn builders that they must not be harmed.
- **Wetlands:** The contractor must make accommodations so that erosion and water flow are not affected by construction. Any liquid spills must be maintained due to contaminants that may enter the wetland.

- **Historical or cultural artifacts:** Artifacts may include arrowheads, pottery shards, and bones. All work comes to a halt if any artifacts are found and will not resume until they can be properly examined and removed from the area.^[2]

Construction activity documentation

Project meetings take place at scheduled intervals to discuss the progress on the construction site and any concerns or issues. The discussion and any decisions made at the meeting must be documented.^[2]

Diaries, logs, and daily field reports keep track of the daily activities on a job site each day.

- **Diaries:** Each member of the project team is expected to keep a project diary. The diary contains summaries of the day's events in the member's own words. They are used to keep track of any daily work activity, conversations, observations, or any other relevant information regarding the construction activities. Diaries can be referred to when disputes arise and a diary happens to contain information connected with the disagreement. Diaries that are handwritten can be used as evidence in court.
- **Logs:** Logs keep track of the regular activities on the job site such as phone logs, transmittal logs, delivery logs, and RFI (Request for Information) logs.
- **Daily field reports:** Daily field reports are a more formal way of recording information on the job site. They contain information that includes the day's activities, temperature and weather conditions, delivered equipment or materials, visitors on the site, and equipment used that day.^[2]

Labor statements are required on a daily basis. Also list of Labor, PERT CPM are needed for labor planning to complete a project in time.

Resolving disputes

- **Mediation:** Mediation uses a third party mediator to resolve any disputes. The mediator helps both disputing parties to come to a mutual agreement. This process ensures that no attorneys become involved in the dispute and is less time-consuming.
- **Minitrial:** A minitrial takes more time and money than a mediation. The minitrial takes place in an informal setting and involves some type of advisor or attorney that must be paid. The disputing parties may come to an agreement or the third party advisor may offer their advice. The agreement is nonbinding and can be broken.
- **Arbitration:** Arbitration is the most costly and time-consuming way to resolve a dispute. Each party is represented by an attorney while witnesses and evidence are presented. Once all information is provided on the issue, the arbitrator makes a ruling which provides the final decision. The arbitrator provides the final decision on what must be done and it is a binding agreement between each of the disputing parties.^[2]

Study and practice

Construction Management education comes in a variety of formats: formal degree programs (two-year associate degree; four-year baccalaureate degree, masters degree, project management, operations management engineer degree, doctor of philosophy degree, postdoctoral researcher); on-the-job-training; and continuing education and professional development. Information on degree programs is available from ABET, the American Council for Construction Education (ACCE), the American Academy of Project Management (AAPM), the Construction Management Association of America (CMAA) or the Associated Schools of Construction (ASC).

According to the American Council for Construction Education (one of the academic accreditation agencies responsible for accrediting construction management programs in the U.S.), the academic field of construction management encompasses a wide range of topics. These range from general management skills, through management skills specifically related to construction, to technical knowledge of construction methods and practices. There are many schools offering Construction Management programs, including some offering a master's degree.^{[7][8]}

Software

Capital project management software (CPMS) refers to the systems that are currently available that help capital project owner/operators, program managers, and construction managers, control and manage the vast amount of information that capital construction projects create. A collection, or portfolio of projects only makes this a bigger challenge. These systems go by different names: capital project management software, computer construction software, construction management software, project management information systems. Usually construction management can be referred as subset of CPMS where the scope of CPMS is not limited to construction phases of project. Among main construction management software can be mentioned Procore and PlanGrid.

Required knowledge

- Construction and building
- Technology
- Public safety
- Customer service
- Human resources
- Mathematics
- Leadership

Business model

The construction industry typically includes three parties: an owner, a licensed designer (architect or engineer) and a builder (usually known as a general contractor). There are traditionally two contracts between these parties as they work together to plan, design and construct the project.^[9] The first contract is the owner-designer contract, which involves planning, design, and construction contract administration. The second contract is the owner-contractor contract, which involves construction. An indirect third-party relationship exists between the designer and the contractor, due to these two contracts.

An owner may also contract with a construction project management company as an adviser, creating a third contract relationship in the project. The construction manager's role is to provide construction advice to the designer, design advice to the constructor on the owner's behalf and other advice as necessary.

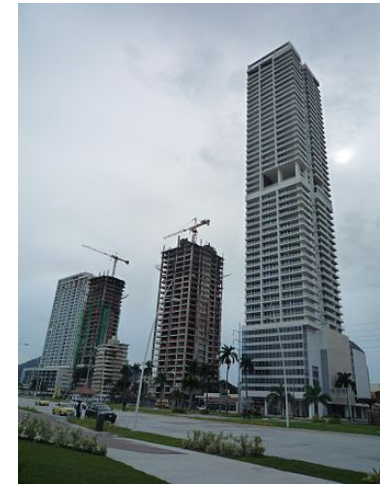
Design, bid, build contracts

The phrase "design, bid, build" describes the prevailing model of construction management, in which the general contractor is engaged through a tender process after designs have been completed by the architect or engineer.

Design-build contracts

Many owners – particularly government agencies – let out contracts known as *design-build contracts*. In this type of contract, the construction team (known as the design-builder) is responsible for taking the owner's concept and completing a detailed design before (following the owner's approval of the design) proceeding with construction. Virtual design and construction technology may be used by contractors to maintain a tight construction time.

There are three main advantages to a design-build contract. First, the construction team is motivated to work with the architect to develop a practical design. The team can find creative ways to reduce construction costs without reducing the function of the final product. The second major advantage involves the schedule. Many projects are commissioned within a tight time frame. Under a traditional contract, construction cannot begin until after the design is finished and the project has been awarded to a bidder. In a design-build contract the contractor is established at the outset, and construction activities can proceed concurrently with the design. The third major



Skyscrapers under construction in Panama City, Panama

advantage is that the design-build contractor has an incentive to keep the combined design and construction costs within the owner's budget. If speed is important, design and construction contracts can be awarded separately; bidding takes place on preliminary plans in a not-to-exceed contract instead of a single firm design-build contract.

The major problem^[10] with design-build contracts is an inherent conflict of interest. In a standard contract the architect works for the owner and is directly responsible to the owner. In design-build the architect works for the design-builder, not the owner, therefore the design-builder may make design and construction decisions that benefit the design-builder, but that do not benefit the owner. During construction, the architect normally acts as the owner's representative. This includes reviewing the builder's work and ensuring that the products and methods meet specifications and codes. The architect's role is compromised when the architect works for the design-builder and not for the owner directly. Thus, the owner may get a building that is over-designed to increase profits for the design-builder, or a building built with lesser-quality products to maximize profits.

Planning and scheduling

Project-management methodology is as follows:

- Work breakdown structure
- Project network of activities
 - Critical path method (CPM)
 - Resource management
 - Resource leveling
 - Risk assessment

Architecture–engineer

- Work inspection
- Change orders
- Review payments
- Materials and samples
- Shop drawings
- Three-dimensional image

Agency CM

Construction cost management is a fee-based service in which the construction manager (CM) is responsible exclusively to the owner, acting in the owner's interests at every stage of the project. The construction manager offers impartial advice on matters such as:

- Optimum use of available funds
- Control of the scope of the work
- Project scheduling
- Optimum use of design and construction firms' skills and talents
- Avoidance of delays, changes and disputes
- Enhancing project design and construction quality

- Optimum flexibility in contracting and procurement
- Cash-flow management

Comprehensive management of every stage of the project, beginning with the original concept and project definition, yields the greatest benefit to owners. As time progresses beyond the pre-design phase, the CM's ability to effect cost savings diminishes. The agency CM can represent the owner by helping select the design and construction teams and managing the design (preventing scope creep), helping the owner stay within a predetermined budget with value engineering, cost-benefit analysis and best-value comparisons. The software-application field of construction collaboration technology has been developed to apply information technology to construction management.

CM at-risk

CM at-risk is a delivery method which entails a commitment by the construction manager to deliver the project within a Guaranteed Maximum Price (GMP). The construction manager acts as a consultant to the owner in the development and design phases (preconstruction services), and as a general contractor during construction. When a construction manager is bound to a GMP, the fundamental character of the relationship is changed. In addition to acting in the owner's interest, the construction manager must control construction costs to stay within the GMP.

CM at-risk is a global term referring to the business relationship of a construction contractor, owner and architect (or designer). Typically, a CM at-risk arrangement eliminates a "low-bid" construction project. A GMP agreement is a typical part of the CM-and-owner agreement (comparable to a "low-bid" contract), but with adjustments in responsibility for the CM. The advantage of a CM at-risk arrangement is budget management. Before a project's design is completed (six to eighteen months of coordination between designer and owner), the CM is involved with estimating the cost of constructing a project based on the goals of the designer and owner (design concept) and the project's scope. In balancing the costs, schedule, quality and scope of the project, the design may be modified instead of redesigned; if the owner decides to expand the project, adjustments can be made before pricing. To manage the budget before design is complete and construction crews mobilized, the CM conducts site management and purchases major items to efficiently manage time and cost.^[11]

Advantages

- CM is working "at risk", therefore have incentive to act in the owner's interest, as well as to efficiently manage construction costs, considering they would be liable for any amount in excess of the GMP
- Ability to handle changes in design or scope^[12]

Drawbacks

- If a cost overrun occurred, it could cost the CM a great deal of money
- The CM is allowed some mistake-related contingency, therefore there is a possibility that they will compensate by reducing the scope of the work to fit the GMP
- Since the GMP is settled before design begins, it is difficult for owners to know whether they received the best possible bid^[11]

Bottom line

An at-risk delivery method is best for large projects—both complete construction and renovation—that are not easy to define, have a possibility of changing in scope, or have strict schedule deadlines. Additionally, it is an efficient method in projects containing technical complexity, multi-trade coordination, or multiple phases.^[12]

Accelerated construction techniques

Starting with its Accelerated Bridge Program in the late 2000s, the Massachusetts Department of Transportation began employing accelerated construction techniques, in which it signs contracts with incentives for early completion and penalties for late completion, and uses intense construction during longer periods of complete closure to shorten the overall project duration and reduce cost.^[13]

See also

- [Architectural engineering](#)
- [Building officials](#)
- [Civil engineering](#)
- [Construction engineering](#)
- [Construction estimating software](#)
- [Cost overrun](#)
- [Cost engineering](#)
- [Earthquake engineering](#)
- [EPC \(contract\)](#)
- [International Building Code](#)
- [Quality, cost, delivery - trilemma of project](#)
- [Site manager](#)
- [Structural engineering](#)
- [Work breakdown structure](#)
- [Index of construction articles](#)

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Further reading

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EXHIBIT I

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- Time Clock
- Client List
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- Phone Log

Time Entry

Sun	Mon (2/22)	Tue (2/23)	Wed (2/24)	Thu (2/25)	Fri (2/26)	Sat
0.00 (\$0) 0.0 Miles	9.00 (\$2,025) 0.0 Miles	6.50 (\$1,463) 0.0 Miles	3.10 (\$698) 0.0 Miles	8.20 (\$1,845) 0.0 Miles	7.20 (\$1,620) 0.0 Miles	0.00 (\$0) 0.0 Miles
Weekly Time: 34.00 Weekly Amount: \$7,650.00						

Tasks

- ✓ Frank, James - Revise Documents
- ✓ Hoover, Herbert - Follow up on property list.

Calendar

Upcoming Appointments

- 2/25/2018 3:00:00 PM
Frost, Jack - Mediation Conference

- ① See billing for an entire week in once glance
- ② Common tasks are a single click away.
- ③ Billing hour and amount totals
- ④ Daily Task Alerts
- ⑤ Upcoming Events

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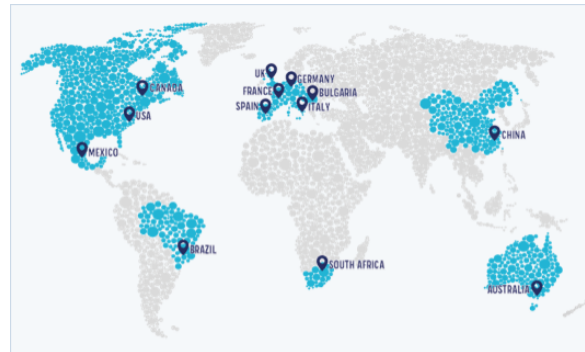
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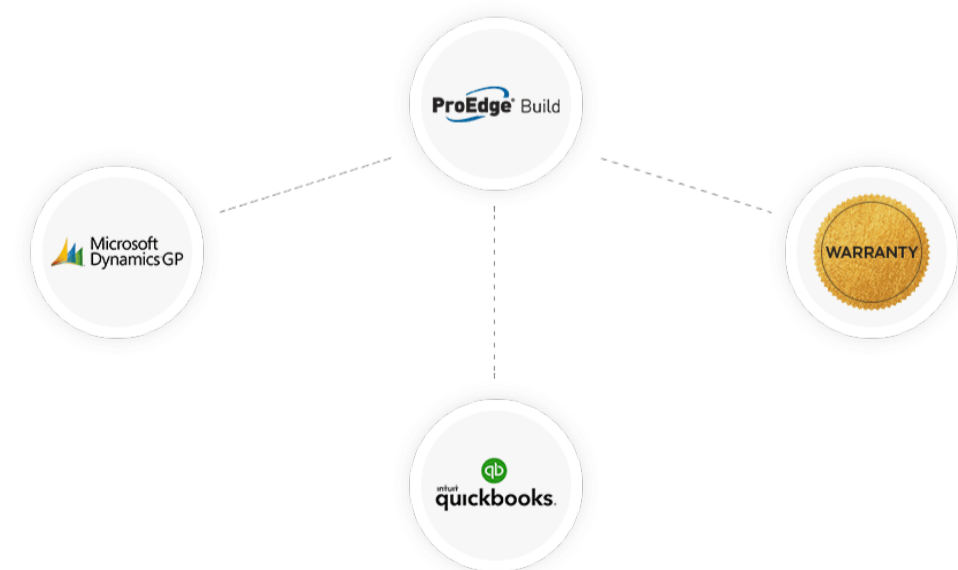
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