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Challenges and Specificities for Project Management of Tall Buildings in South and Southeast Asia

南亚和东亚的高层民用建筑项目管理的挑战性和特殊性



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Co-founder, associate partner and General Director of Archetype Group, Pierre-Jean Malgouyres is the person responsible for Archetype Group's expansion since 2002, from its initial 8 to the current 1,100-person staff. He has more than 20 years' diverse design and project management experience across Southeast Asia and a strong expertise in design management, value engineering and project management services for hospitality and tall building projects. Under his leadership, Archetype Group has become one of the leading consultancy firms for tall buildings in Southeast Asia.

Pierre-Jean 先生是 Archetype Group 的创始人、合伙人和董事长，自 2002 年建立以来负责集团的发展，从最初的 8 位员工已经增长到现在的 1100 位员工。他有 20 多年贯穿东南亚的医院和高层建筑项目项目经理，有很强的设计管理、价值工程 and 项目管理服务经验。在他的带领下，Archetype 集团已经成为东南亚地区，在高层建筑项目领域的一个领先咨询公司。



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David Martin has 15 years of experience in four different countries in Europe and Asia. Throughout his career, David has worked for real estate developments as an in-house Project Director, and in the field of consultancy as Operations Director for Southeast Asia Region. He has extensive experience in structural design, tall buildings construction, business development and executive management.

David Martin 在欧洲和亚洲四个不同的国家有 15 年的工作经验。在他的职业生涯中，曾经担任过房地产开发内部项目总监。在东南亚地区的咨询领域，曾担任过运营总监。他有丰富的结构设计、高层建筑施工、业务发展和行政管理经验。

Abstract | 摘要

This paper is based on some of our best experiences in providing project management services for tall buildings in South and Southeast Asia. The procurement of these services differ quite a lot from the Western world considering the specific parameters of Asia combined with the particularities of fast growing emerging markets. We will present our project management methodology, which relies on more than 15 years' experience in these markets and that has allowed us to deliver world class high-rise buildings. The conclusions will highlight the key parameters and key factors for a successful project management that could then be used by any professional organization in Asia.

Keywords: Hands-on Attitude, Local Knowledge, Multi-Discipline Approach, Procurement Strategy, Value Engineering

这篇介绍是基于我们对于南亚和东亚的高层建筑提供最好的项目管理服务的经验。这些采购的服务考虑到亚洲特殊的参数和快速增长的新兴市场的特殊性，十分不同于西方国家。在这些市场，我们的项目管理方法基于 15 多年的经验，能够使我们这些国家交付世界级水平的高层建筑。结论将强调成功的项目管理的关键参数和关键因素，然后才能被亚洲任何专业组织使用。

关键词：亲身实践的精神、地方性知识、多专业的方法、采购战略、价值工程

Even for low complexity buildings, and in mature, highly regulated markets, the role of steering, coordinating and providing interface among authorities, clients, designers, consultants, suppliers and contractors can be a difficult task. This is enhanced when the interests of the different parties conflict, heterogeneous levels of skills are set to work together, or external factors pose additional complications that alter the sensitive balance of a development process.

Additional difficulties enter the picture when the asset to develop is a tall Building: the design steps out of the conventional for most disciplines (especially on foundations, structural and MEP systems), the Method of Statement may not be at the reach of most of the local contractors, and the materials to use will likely require a complex procurement strategy.

If we add to this already intricate task the additional hurdles coming from markets inflated by almost uncontrolled growth – the difficulties to find high quality skills and particular considerations like the lack of self-protection culture or mindsets that do not always appreciate the importance of quality products – it results in an extremely difficult environment to manage. These situations will only be driven towards success if handled by organizations with very specific skills, experience and attitude.

即使是对于低复杂性的建筑，在成熟、高规格市场，统筹、协调和提供当地政府、客户、设计师、顾问、供应商和承包商之间的界面是一项困难的工作。这在各方利益有所冲突时更为困难，不同能力的人在一起工作，或者来自外部的因素带来额外的复杂性，改变发展过程中的平衡。

建设一座高层建筑，有额外的困难：在设计阶段，大多数专业跳出常规（特别是基层结构和机械设备系统），所陈述的方法可能不再大部分当地供应商的能力范围内，所使用的材料很可能需要一个复杂的采购战略。

如果我们来自市场的额外障碍加注到已有的困难任务上，将会不可控制的膨胀，寻找高技术水平的困难，特别是缺乏自我保护文化的考虑或者不重视产品质量重要性的思维，将会导致一个相当难以管理的环境。如果由有相当专业技能、经验及态度的机构来处理的话，这些情况都会走向成功。

如下内容是基于 Archetype 在南亚及东南亚市场广泛的项目经验，基于在建筑、设计、项目/施工管理中提供成功的服务，特别致力于酒店及高层建筑服务（图 1）。



archetype



Project Management

MAHANAKHON TOWER
THAILAND
Tallest Building in Bangkok
77 stories
313 m

Figure 1. MahaNakhon Tower, Bangkok (Source: Archetype Group)
图1. 大京都大厦，曼谷（来源：Archetype Group）

The below notes are based on Archetype Group's extensive experience in South and Southeast Asia markets, where it has successfully developed its activities into architecture, engineering and project/construction management services with a strong focus on hospitality and tall buildings projects (Figure 1).

The Challenges

Project Owners' Knowledge and Experience in Real Estate Development

Often in Asia, project owners (our clients) do not have a long track record in the real estate development business. Some may lack a sophisticated structure, and the decision making process is in many occasions centralized to one person. In some cases, multimillion dollar developments are run on a small-scale family business model.

This characteristic makes the client's decision-making more complicated, as they may lack the resources to understand the implications of the different actions. In this point, they are vulnerable to the extent that they must leave key decisions in other hands.

We can also face clients who, in light of previous successes in smaller-scale projects, do not understand the need of a project management consultant (PMC) and approach the idea only when realizing the large volume of work, often engaging the PMC when the process is already impacted by several threats.

Regulations Landscape

Regulations are frequently not fully defined or continuously modified to be adapted to the

fast changing environment. Some countries are starting to introduce compulsory 3rd party Quality Control Schemes and structural and fire safety insurance. This, at the same time being an additional guarantee for the end user, introduces additional players and factors to be considered during the pre-construction stage.

The speed at which some countries change their regulations facilitates a high risk of non-compliance unless a specialist is on board.

Limited Design Capabilities

Though evolving at a remarkable speed, local design skills are usually not able to deal with high caliber projects. Also, the nature of some of the developments – whole new cities – makes necessary the intervention of very different disciplines for the design (infrastructure, building, environmental facilities, etc.). This, together with the selection of different firms to carry out the architectural and engineering design, results in multinational teams facing important coordination issues (time zones, language, adaptation to local regulations, etc.).

We can add to this the likely imbalance of capabilities and tools, with project consultants used to different techniques or standards.

For complex tall buildings, the achievement of efficient design management can only be targeted with a highly experienced and strong team mixing local and foreign expertise.

Another undesirable effect of the presence of fragmented design teams is the delegation of authorship supervision – which in some countries is not even compulsory – and the consequent disconnection between the design

挑战

在房地产开发领域，项目所有人的知识和经验

通常在亚洲，项目所有人（我们的业主）对于房地产开发没有长期的业绩记录。其中有些可能缺乏一个复杂的结构，决策是根据战略的变化，在许多场合集中一个人或者缩减董事会而制定的。在某些情况下，数百万美元的发展都是按照以家族的小型商务模式运行的。

这些特性使得客户在做决定时非常复杂，也许他们会缺乏能够理解不同行为所带来的暗示的资源。因为这点，使得他们容易认识到，必须留下关键决定让别人解决。

鉴于先前小型项目，我们也经常面对业主，他们不明白项目管理咨询的需求，只有当他们意识到大量的工作，并且当项目经常从事PMC活动，在运行过程中已经受到多方困难的时候，才会想到。

法规形式

法规通常不能完全定义或者根据经验持续改进来适应这个快速变化的环境。一些国家开始引进强制的第三方质量控制计划和结构以及消防安全保险。在施工前阶段引进额外的人员和元素，这与此同时也成为终端使用者的额外保障。

除非引用专家，一些国家变更他们法规的速度将会带来不合规的高风险。

有限的设计能力

尽管展开了显著的发展，当地的设计能力通常不能够处理高能力的项目。同时，一些发展的本质主要存在于一个全新的城市——需要参与不同专业的设计（基础设施、建筑、环境设施，等）连同选择不同的公司进行概念、建筑和工程设计，导致跨国公司团队面临重要的协调问题（时区、语言、适应当地法规等）。

我们可以添加这个可能不平衡的能力和工具，对于不同的技术或标准适用项目咨询。

对于复杂的高层建筑物，有效的设计管理的成就只能针对经验丰富和强大的团队结合当地和国外的专业知识。

分散的设计团队的存在的一个不良影响是监督的代表团——在一些国家甚至不是强制的，以及随之而来的设计阶段和执行之间不相连。在施工的过程中当设计发生了变更，就会产生额外的困难，目前存在的适合的设计管理团队就必须避免延误（图2）。

投标和采购策略

一旦项目获得许可，最大的决定是根据预算和承包商新员工培训的其他影响。在西方国家选择主要承包商，或乃至设计采



Figure 2. Sunrise City, Ho Chi Minh City (Source: Archetype Group)
图2 Sunrise City, 胡志明市 (来源: Archetype Group)

and execution stages. This brings along extra difficulties when design changes are generated during construction, and the presence of sound design management becomes indispensable to avoiding delays (Figure 2).

Tendering and Procurement Strategy

Once the project gets the green light, the biggest decision in terms of budget and other implications is the onboarding of contractors. In contrast to the extended practice in Western countries of selecting a main contractor or even EPCs, in certain developing markets, the solution of engaging several different contractors to avoid subcontracting margins and save costs is very extended. This, without proper project and construction management, is akin to choosing between meeting the schedule or reducing the costs, given the enormous efforts of coordination required by the option of contracting independent firms to execute different packages.

The above scheme is promoted by the ability of certain main contractors on the field of the variation orders claims, as part of the clients' attempts to reduce the occurrence of extra cost. Clients without a sophisticated structure and a sound in-house technical team can easily see the bill increasing periodically if they do not engage a body with enough technical strength and contractual understanding to analyze, filter and control variation orders from the contractor.

During the tendering stage, the selection of the right parties involves many considerations: assessment of skills, experience, solvency, pricing evaluation and provision of the adequate legal context through adequate contractual terms.

Another factor that makes this stage very sensitive is integrity. As the amounts handled are very high, the personnel in charge of the engagement of consultants, contractors and suppliers must be experienced. Any misconduct or wrong calculation of the figures can produce budget deviations.

Therefore, wise advice on the procurement strategy and the selection of adequate staff to manage tenders and contracts is highly relevant for the following stages of the process; the assistance on these decisions has to be made by highly qualified and professional experts (Figure 3).

Construction. Quality, Safety, Cost and Schedule at Stake

It is true that although the presence of foreign contractors has been strong in several

购施工管理, 某些深化领域的延伸服务形成对比。参与的几个不同承包商的解决方案, 用来避免分包商利润的积累以最大程度节约费用。没有一个合适的项目和施工管理, 这是接近于会议日程和减少成本之间的选择, 给予巨大的努力, 协调所需选择独立的公司来执行不同的分包。

上述方案是由某些主要承包商的能力对于各种订单要求, 作为客户的一部分去试图减少额外发生的费用, 和承包商的力量, 去整体发生瘫痪。客户没有一个复杂的结构和一个良好的内部技术小组, 如果他们没用足够的技术力量来增强自己以及契约性理解用以分析, 过滤和控制承包商的变更订单, 就会很容易地看见费用定期增长。

在投标阶段, 选择正确的合作伙伴需要进行如下考虑: 技能的评估, 经验和偿付能



Figure 3. Capital Place Tower, Jakarta (Source: Archetype Group)
图3 Capital Place大厦, 雅加达 (来源: Archetype Group)

emerging markets, the price competition has moved them aside in favor of local players. Some of these have reached a high level of expertise during the last years. This has forced foreign players to go more local in their teams, facing the issue of manning themselves with adequate local resources.

The qualified local manpower is scarce, especially during peaks in the market when the volume of projects overrun the availability of individuals. This forces contractors to engage personnel without the minimum required skills. The overload on the site supervision teams then becomes notable, as the ratio of site supervisors per worker is quite high.

With a high volume of tasks and an unprepared work force, safety becomes a major issue, since the limited expertise leads to a low awareness of the importance of self-protection and hazard identification. Exhaustive awareness training must be conducted and safety coordination and inspection must be applied diligently.

In this context, and with possible changes in the client's strategy, low quality manpower, and safety on-site, disruptions are likely to occur. In those moments, the crossroads between recovery or further delays goes through having the right construction management on-site or not.

Design imperfections are a quite dangerous source of cost deviations, schedule delay and litigations with the end customer. They have to be minimized through the selection of adequate design teams and, as previously stated, through high level design management. The reactivity to receive, analyze, approve or reject requests for design changes has to be present if the extra costs and the timing impact are to be reduced.

The construction manager in developing countries is a figure without equal in other, more developed markets. There is a need to be able to interact with the local workers on one side and the project management on the other; to be ready to stop work due to safety threats or quality issues, while at the same time pushing the work to meet the schedule. This mission requires a hands-on and proactive attitude to avoid being delayed by site incidents. Gathering the project and construction management scopes under one company requires a special importance to sustain a quick, accurate and firm flow of actions.

A calculated balance of nationalities, exposure to difficult environments, and a high

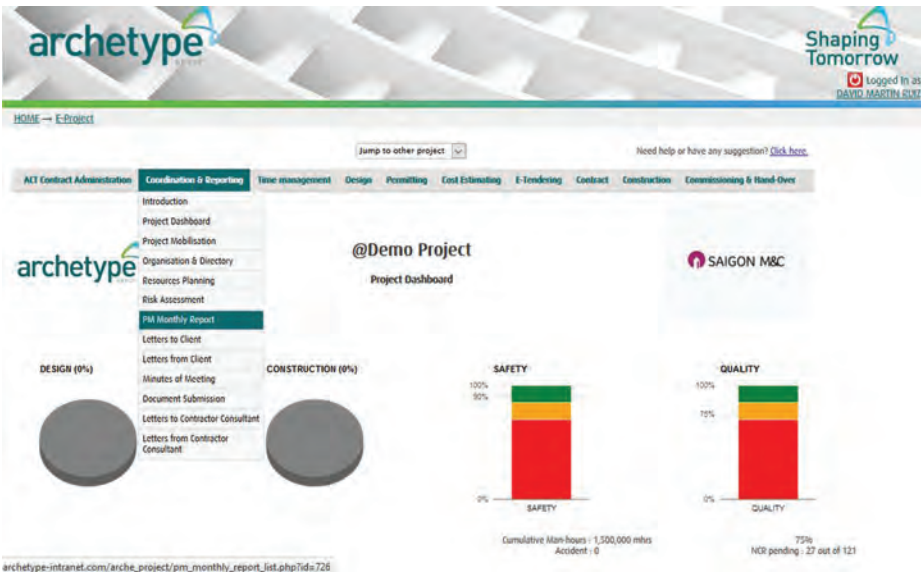


Figure 4. Sample Archetype's dashboard e-project (Source: Archetype Group)
图4. 样品Archetype的仪表板电子项目（来源：Archetype Group）

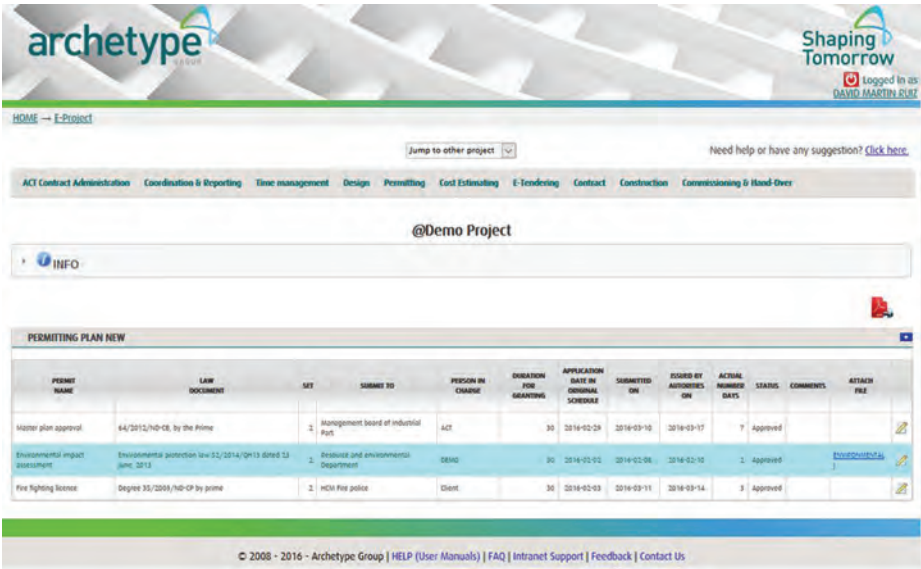


Figure 5. Sample Archetype's e-project permitting planning follow-up (Source: Archetype Group)
图5. 样品Archetype的电子项目许可规划后续（来源：Archetype Group）

number of individuals is key to providing the construction management consultant with the needed means to perform their duty without overestimating fees.

Documentation

Commonly, proper documentation is not a concern, and clients are often reluctant to spend money on teams and software dedicated to documenting administration. However, as countries condition to the submission of stamped drawings and quality documents, the release of occupancy licenses, and the need for registering and filing of documents, the use of ad hoc software tools is strongly recommended (Figures 4, 5, & 6).

力，价格评估和提供合适的法律文本通过足够的合约条款。

还有另外的因素使得该阶段非常敏感：完整性。处理的金额非常高，参与咨询的人员、承包商和供应商必须有经验以及是严谨的。任何不当的行为或者错误的数据计算，会导致强大的现金流或者预算偏差。

因此，对于采购策略的明智的建议和选择合适的员工管理招标和合同，与下列阶段的过程高度相关：这些建议需要高资质人员和专家的帮助（图3）。

处于紧要关头的施工，质量，安全，成本和进度

尽管在一些新兴市场存在外资承包商，价格竞争使得他们支持本土企业。在过去几年，以极大的经验和增长其中一些已经达到高水平的专业知识。这就迫使外国队员

The Project & Construction Management Solution

In summary, in contrast to the Western models – where the figure of the construction manager may be less needed thanks to the sophistication of the different parties involved, the existing regulations and the compulsory figure of the authorship supervision or the 3rd party QAQC – in emerging economies a strong, reputable, multidisciplinary and multicultural organization with knowledge of both local and international standards, able to handle projects from conception to hand-over, becomes very important to efficiently manage, control, coordinate and support the process.

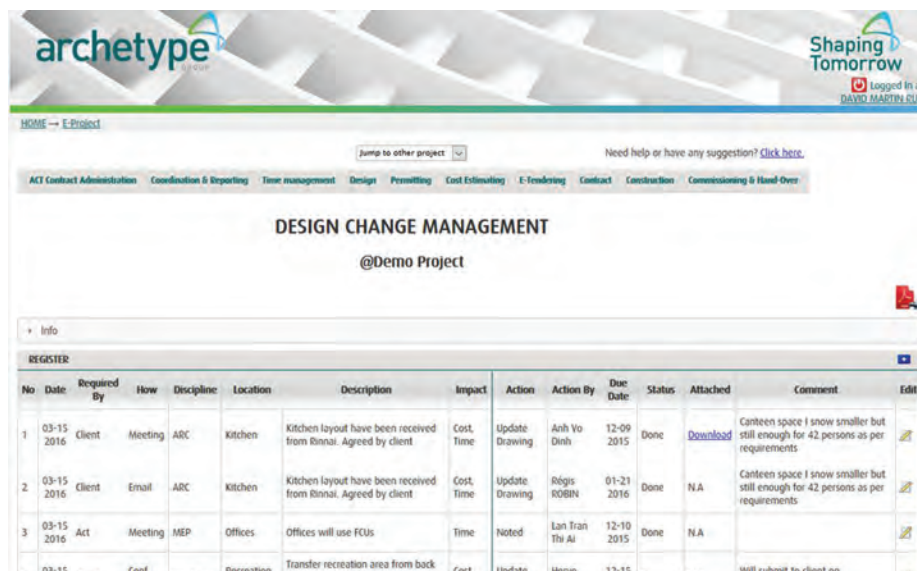
A Multidisciplinary Approach

As explained, the consultants managing tall building projects on behalf of the client are likely to face specific challenges such as multiple parties in charge of the design, contractors ready to use any weakness around them to claim for additional sums or extra time, a work force with very limited skills, and very particular clients who are not always aware of the implications of changes to strategy during the execution. All of this must be viewed under the umbrella of constantly changing state or city regulations, while handling multi-million-dollar high-rise and high end buildings.

In this context, the importance of a PCM able to understand and perform each phase of the development (feasibility study, concept design, full architectural and engineering design, Project and Construction Management and Quantity Survey) cannot be argued, which leads us to the next conclusion: To reach the highest efficiency, the tasks of project and construction management should be the duty of one company.

The amounts of information exchanged among the different parties can be huge. Documents for approval for tender and for construction, site instructions, contract related exchanges, payments, safety records and statutory documents submission are only a part of the hundreds of communications to be produced, registered and followed-up. There is an obvious advantage when the same entity governs the whole process, facilitating the flow of information across all stages (feasibility to design, design to construction, construction to licensing, the intermediate back and forth during design changes, payment requests, and client's counseling on disagreements).

The PCM consultant must therefore control the documentation process, explaining and following-up on disciplined adherence to



No	Date	Required By	How	Discipline	Location	Description	Impact	Action	Action By	Due Date	Status	Attached	Comment	Edit
1	03-15 2016	Client	Meeting	ARC	Kitchen	Kitchen layout have been received from Rinnai. Agreed by client.	Cost, Time	Update Drawing	Arif Yo Dink	12-09 2015	Done	Download	Canteen space I snow smaller but still enough for 42 persons as per requirements	
2	03-15 2016	Client	Email	ARC	Kitchen	Kitchen layout have been received from Rinnai. Agreed by client.	Cost, Time	Update Drawing	Régis ROBIN	01-21 2016	Done	N.A	Canteen space I snow smaller but still enough for 42 persons as per requirements	
3	03-15 2016	Act	Meeting	MEP	Offices	Offices will use FCUs	Time	Noted	Ion Tran Thi Ai	12-10 2015	Done	N.A		
	03-15		Conf		Recreation	Transfer recreation area from back	Cost,	Update	Herve	12-15			Will submit to client on	

Figure 6. Sample Archetype's e-project design change management (Source: Archetype Group)

图6. 样品Archetype的电子项目设计变化管理 (来源: Archetype Group)

comprehensive procedures that do not leave any gaps uncovered. The use of commercial or proprietary software to systematize the process becomes vital in keeping the flow under control, and real-time traceability has proved a unique advantage.

The ability to be part of a whole process also plays an important role in the decision of employing a PCM consultant. Teams sitting under the same roof will be involved in the project from the initial stages to hand-over, bringing consciousness to the importance of the maximum quality achievement in each step in order to facilitate the following ones.

The problem-solving capacity of the construction manager is also enhanced when merging his team with that of the project manager, without the need of information exchange, fast access to the needed disciplines and the advantages for the client of keeping the responsibility under a unique entity. If the PCM does have in-house design capabilities, leveraging these to produce or study alternatives and thus eliminating or minimizing disruptions, becomes a distinctive feature.

Design Management: A Long Lasting Discipline

Since preconstruction will contain the peak of works for design management, it is important to ensure a strong link between the design and construction phases to avoid the usual trend of certain designers who reduce their presence dramatically after design is completed.

The PCM should mobilize a project director during the design phase who would drive the design works consistently to ensure that all designers adhere to the same project brief

吸纳更多的本土人员进入小组, 采用适当的本土资源进行人员配备。

当项目的体量超过个体的实用性, 特别是在市场高峰期, 合格的本土资源匮乏。这就迫使承包商参与的人员没有最低的技能, 他们不熟悉设备、技术和在复杂的施工过程中所使用的技术说明。工地监管小组的过度工作是显著的, 每个工人的现场监督比例是非常高的。

因为有限的专业知识驱动自我保护的重要性的低意识和危害识别, 高容量的工作以及没有准备的劳动力, 安全成为主要问题。必须进行彻底的意识培训和安全协调以及检查工作。

由此而论, 根据客户战略突然变化的可能性, 低质量的人力和现场安全, 破坏工程节奏的事情更加有可能发生。在那些时刻, 恢复或者进一步的延误之间的交叉点, 通过是否在现场采用正确的施工管理而定。

设计缺陷对于成本偏差、进度延误是一个相当危险的来源, 终端用户可能会诉讼。他们必须通过选择合适的设计团队, 以及如前所述, 通过高水平的设计管理以减少。

发展中国家的施工管理经理与发达国家是不一样的。有必要能够一边与当地工人, 一边与项目管理相互沟通, 由于安全危害或者质量问题而准备停工, 于此同时, 推进工作以满足进度。这个任务需要实践和积极的态度, 以避免现场延误的发生率。一个公司承担项目和施工管理, 显得特别重要, 能够取得快速、准确和坚固的行动方案。

民族的平衡计算, 暴露的艰难环境和个体的数量, 是提供施工管理咨询的关键, 需

and standards, and provide the client with the appropriate decision-making tools for the best arbitration between technical options, cost and time issues.

Two important elements appear in this role: the cost concern (practicing value engineering to choose the highest cost efficiency) and a vision comprehending the associated methods of statement and other construction and schedule constraints sensitive to the different design options.

Schedule Management

Anywhere in the world, anticipation is the first quality that should be looked at when choosing a schedule manager. The team engaged must possess previous experience in high-rise construction, being able to identify the critical paths, long lead items and potential threats to design, procurement or execution, and capable to interact with all involved parties.

What makes a schedule manager different in Asia is the ability to identify the specific threats and to produce ad hoc solutions. In regions like Southeast Asia, stepping from one country to a neighboring one can involve a whole change in the culture: the religious practices and associated holidays, the set of standards, the difficulties to import materials from certain geographies or the exposure of their technical man-power to foreign markets.

This framework is the one to put the PCM consultant to the test, as finding the right balance between local and international knowledge will make the difference when it is necessary to understand the real dangers inherent to the country and to produce the right master schedule, the adequate procurement strategy and the most suitable follow up and recovery plans.

The highest chances of success are therefore for the PCM with the strongest presence in the region and with the best allocation of local and international resources.

Again, the use of combined project and construction management disciplines allows for remarkable synergies when it comes to identifying problems and providing fast solutions involving design, construction, contractual obligations, and cost management.

Cost Management

Having made the above considerations about design management, identification of problems, schedule recovery skills, and general trouble shooting, many aspects of cost management have already been addressed.

The most valued characteristic of the cost management consultant in Asia should be its capacity to understand the diversity of the region and its risks, including different currencies, different tax systems, highly different prices for similar materials, and important risks around sensitive tasks like the elaboration of a Bill of Quantities (BOQ), measurement of executed works, and payments approval.

There are no magic solutions for these challenges, but obviously, an early budget estimation based on local prices during preliminary design is to be done if possible in comparison with previous projects in the area, and paying attention at the ratios cost/GFA. A thorough check of the BOQ during design development, tight control of the design changes and variation orders claims, and rigorous analysis of the payment requests during construction will provide higher assurance of accuracy. We conclude once more that the integration of construction management and project management brings along desirable time and workload savings through team continuity, consistency and coordination.

On the field of high-rise buildings, its inherent complexity and the impact of design changes in the budget makes value engineering a key tool to produce alternatives on design and execution, leading to cost savings. A complete PCM consultant should integrate within its scope and team the exercise of value engineering, influencing cost as well as timing and quality (Figure 7).

Tender and Procurement

As previously outlined, contractor onboarding is probably the most important choice to make during the process, with serious implications in cost, quality and timing.

Additionally, it has to be considered that over certain thresholds floor count, only a reduced group of consultants and contractors will be able to execute the project. This will require stronger consideration at the negotiation stage and can give the supplier an upper-hand in the negotiations.

The first mission of the PCM consultant should be to advise the client on the best procurement strategy to follow, depending on the local context, the market and the available players. The big choice will be whether to use multiple contractors handled by the construction manager or a local Grade-A main contractor with nominated subcontractors in order to minimize sub-contracting margins and to facilitate quality control.

要有必要的方法来执行他的职责而不对其费用过高评估。

文档

通常来说，文档不是一个忧虑，客户通常不情愿在文档管理和控制团队或软件上花钱。然而，对每个国家来说，递交敲过章的图纸和获取占用许可需要的质量文件，对质量文件的注册和归档的要求是非常关键的，并强烈建议使用专案软件工具（图4-6）。

项目和施工管理作为一个方案

作为总结，对比与西方模式——施工经理也许在较少的情况下需要很多数据，这要感谢他曾经参与了很多不同项目的复杂性，这些项目都需要全面的法规和受当地政府监理或者第三方质量控制——在新兴经济中，一个强大且信誉良好的、跨多专业和多元化的公司，拥有本地和国际标准的知识，能够处理项目概念到移交整个阶段的工作，这样的公司对于有效的进行管理控制、协调和支持来说至关重要的。

个多专业的方法

就像所说的，代表客户管理项目的顾问很可能面对特殊的挑战，例如项目设计由多方参加、一个或几个承包商准备好利用他们的缺点来索要额外的费用或时间、能力非常有限的劳动力和个别客户不总能意识到项目执行过程中的战略变更。所有这些，在处理数百万高层建筑时，都受到国家或城市不断变化的政策的保护。

因此，对于PCM团队非常重要是要理解和执行项目的每个阶段（可行性研究、概念设计、全部建筑和工程设计、项目及施工管理、质量调查），不能有冲突，这使得我们得出了下一个结论：为了达到最高效率，项目任务和施工管理应该是一个公司的责任。

在项目过程中传递给项目参与者的信息量是巨大的。招标、施工、现场指示、合同相关变更、付款、安全记录和法定文件的批准及传递仅仅是数以百计的沟通环节中的一部分，每周登记和跟踪。当一个主体管理整个过程，这是显而易见的一个优势，有利于项目各个阶段信息的交换（可行性到设计阶段，设计阶段到施工阶段，施工阶段到报批阶段，以及所有的中间设计变更的传递、付款请求和客户的意见分歧）。

因此项目控制经理们需要控制文控流程，解释及跟踪各专业相关的总流程以避免任何误差。商业或专业软件的使用主要是使这些在文件中非常重要的流程系统化。实时跟踪已经被公认为具有独特优势。

Sample Value Engineering Cases 价值工程案例			
Project 项目	Item Studied 研究项目	Design Review / Value Engineering 设计审核/价值工程	Savings 节省
Mix use building in Thailand 泰国综合使用大楼 > 70 stories 层 > 300 m height 米高	Superstructure 上部结构 Foundations 基础 HVAC System 暖通系统	Slabs reinforcement and beams overdimensioned 板配筋和梁的尺寸过大 Under-dimensioned driving to settlements 开挖尺寸不足导致沉降 VRV into Water Chilled system VRV接入水冷系统 Re-calculation (reduction) of loads 重新计算（减少）负荷 Reduction of Transformers and cabling capacity 减小变压器和电缆的容量	20 MUSD
Mix use building in Indonesia 印度尼西亚综合使用大楼 > 45 stories 层 > 200 m height 米高	Foundations 基础 Superstructure 上部结构 HVAC System 暖通系统	Pilings overdesigned 桩基设计超标 Shear reinforcement overdesigned 抗剪钢筋设计超标 HVAC system overdesigned due to peak coefficients 暖通系统仅按峰值系数设计 Re-assignmtn of loads consistent with use 根据使用情况调整负荷 Reduction of Transformers and cabling capacity 减小变压器和电缆的容量	6 MUSD
Mix use buildings in Thailand 泰国综合使用大楼 > 70 stories 层 > 300 m height 米高	Superstructure 上部结构 HVAC System 暖通系统	Shear reinforcement overdesigned 抗剪钢筋设计超标 Each building had a different use and had been assigned an independent Cooling system 每座大楼都有不同功能，并配置独立冷却系统 A shared Cooling System was designed 设计一个共用的冷却系统 Reduction of Transformers and cabling capacity > 20% 减小变压器和电缆的容量>20%	8 MUSD
Office building Vietnam 越南办公大楼 40 stories 层 200 m height 米高	Foundations 地基 HVAC System 暖通系统 Method of statement 方案陈述	Barret piles were changed into deep bored piles 壁板桩改为深钻孔灌注桩 Re-assignment of loads consistent with use 根据使用情况重新调整负荷 Reduction of Transformers and cabling capacity 变压器和电缆的容量减少 Excavation re-visited to top-down method 开挖方式改成自上而下	5MUSD
Mix use buildings in Vietnam 越南综合使用大楼 > 35 stories 层 > 150 m height 米高	Superstructure 上部结构 HVAC System 暖通系统	Change from RC to post-tension slab 板钢筋改为后张预应力筋 Re-distribution of the system layout 重新设计系统布局 Re-calculation of the loads (optimizing use coefficients) 重新计算负荷（优化使用系数）	3 MUSD

Figure 7. Sample Value Engineering Cases (Source: Archetype Group)
图7：价值工程案例（来源：Archetype Group）

Negotiating the price on behalf of the client – with their final approval – and choosing the contractual frame with specific particular conditions adapted to the site and local requirements, will definitely be a strong support. But we cannot forget the overall complexity that the PCM consultant is facing: few players, changing conditions, and clients sometimes not knowledgeable about the process and its integral risks.

It is worth the effort to select strong and experienced individuals to lead this stage on the PCM consultant’s side.

Construction Quality Control

The root cause of most quality issues will be the lack of qualified personnel. This must be considered for the actions of the PCM

决定雇佣一名PCM顾问的重要因素是，他有能力成为整个过程中的一部分。与团队一起参与从项目伊始到移交的阶段，带来在每个阶段达成最优质量的重要性意识，以促进后面的阶段工作。

在与项目经理团队整合的过程中，施工经理解决问题的能力也会得到提升。如果项目控制经理没有内部设计知识，但他们利用这些去创造或是研究可种选择方案从而消除破坏或是使破坏最小化，最终变成一个杰出的经理。

设计管理，一个长期的原则

因为施工前的工作将会包含一个设计管理工作的顶峰，确保设计和施工阶段的强有力联系是至关重要，可以避免某些设计人员在设计完成时出现明显的偏向性。

因此，项目管理团队将在设计阶段指定一名项目总监，他将会驱动这些设计工作保持一贯，确保所有的设计人员遵从个项目信念和标准，提供客户在技术问题、成本和时间进度方面有合适的决策工具，做出最佳裁决。

在这个原则上有两个关键的因素：成本问题（有经验的价值工程师选择最高效的成本方案）和一个视觉理解，声明、其他施工和进度组成元素对不同设计方案的敏感性。

进度管理

在世界的任何地方，最首要的质量预期是选择一名进度管理者。在执行大型项目是，团队必须引进先前的经验，有能力鉴别设计关键方案、长期主要项目和潜在威胁，采购或者执行，以及所有涉及方的协调能力。

在亚洲，使得项目进度管理者不同的之处在于鉴别特殊威胁和提供临时解决方案的能力。在类似东南亚的地区，从一个国家到另一个临近国可以涉及文化的整个变化：地区惯例和相关节日、标准体系、从某些地区引进材料或者将它们的技术人力出口到海外市场的困难。

这个框架是将PCM咨询进行测试，寻找当地和国际知识之间的平衡，在理解该国真正的风险时必须找出不同点，并且制作正确的项目总计划、准确的采购方案和最佳的跟踪和恢复计划。

成功的最高几率是PCM将在地区有最强的存在和最佳的当地及国际资源配置。

再次强调的是，使用联合项目及施工管理制度在鉴别问题，提供设计、施工、分包和成本管理上有着显著的协同作用。

成本管理

对于设计管理、问题鉴别、进度恢复技能和一般问题解决作了上述考虑，成本管理的许多方面已经得到了解决。

在亚洲，成本管理顾问最有价值的特点是他能够理解地域性差别和其产生的风险。不同的货币、不同的税务系统、相同材料完全不同的价格和敏感任务的重要风险，例如工程量清单的制定、执行工作的测量和付款批准。

面对着写挑战没有魔法般的解决方案，基于当地价格，在初步设计阶段制定早期的预算估算，如果可能与先前该地区项目进行比较，注意定额成本/GFA。在发展设计阶段，整体检查BOQ，紧密的控制设计变更和各种订单需求，在施工阶段严格分析付款请求，这些都讲提供估算高准确率。我们再总结一次，施工管理和项目管理的整合将会通过团队的一致性、协同性和合作性带来时间和工作量的节省。

consultant. An adequate quality control system during construction should rely on three key processes:

- The first step is the issuing of very detailed Inspection and Test Plans (ITPs) for every work trade, involving a full documentation review (method statements in particular), approval of incoming materials, and inspections at every stage of the works. Adequate check lists indicating the tolerance levels for each works will facilitate the task of the quality supervisors.
- The PCM consultant must also implement constant training and assistance to the contractors' staff, assisting them in preparing methods of statement and understanding the project requirements.
- Thorough inspections and management involvement: A practice very appreciated by the clients, and with a positive impact over the own PCM consultant and the contractors' staff, is the regular involvement of the senior technical management of the consultant in the site inspections.

In a nutshell, the quality control process to follow is quite standard, but the training and supervision stages will need greater focus than in typical environments (Figure 8).

Safety Management

Similar to quality challenges, health, safety and environment (HSE) issues originate in the shortage of a skilled labor force and in the cases of some local cultures; only a very tight control can reduce the likelihood of accidents. However, it is important to keep in mind that it is not possible to protect those that do not want to be protected, and that the dismissal of non-compliant workers and the stop-work orders must be used in order to keep minimum discipline on-site.

Detailed safety procedures based on the project execution plan of the contractors, intense training on site (with daily safety tool-box meetings), fully dedicated resources to perform safety inspections, together with contractual penalties and severe discipline on site are the only ways to minimize the risks.

The presence of a Group HSE Manager within the same organization as the PCM consultant, along with constant meetings about the different projects with the client and contractors, should facilitate the cascading of a health and safety culture that is still not necessarily an important process in most South and Southeast Asia countries.



Figure 8. Landmark Waterfront Tower, Bangkok (Source: Archetype Group)
图8. 地标滨水大厦, 曼谷 (来源: Archetype Group)

在高层建筑领域, 其固有的复杂性和设计变更的影响, 使得价值工程成为设计和执行多样化的重要工具, 带来成本的节省。一个完整的PCM顾问团队应该将其整合在内, 并且领导价值工程团队, 来影响成本、进度和质量(图7)。

采购和招标

前面列出的挑战是, 承包商的到职可能是在项目过程中最重要的一个选择, 对成本、质量和进度有着重要的影响。

此外, 值得考虑的是, 超过一定数量的楼层项目, 只有少量的顾问和承包商可以执行这个项目。这将需要在谈判过程中更加考虑充分, 在谈判过程中给供应商带来上风。

因此, PCM顾问的首要任务是建议客户最佳的采购策略, 采购策略取决于当地的情况、市场和可获得资源。就像以前说的, 最大的选择是施工经理所管理的承包商是否采用多样性的, 或者甲级当地总承包商和提名一些分包商(基地、上层结构、建筑外观、一个或两个机械和电气)来分包利润和便于控制质量。

代表客户协商价格——得到他们最终批准, 选择有适用当地和满足当地要求的特殊条款的合同框架, 这将对客户的有力支持。但是我们不能忘记PCM顾问面对的整体复杂性: 一些合作方、变化的条件和客户有时不太了解这些过程和内在风险。

从PCM顾问的角度来说, 选择和使用有资深经验的人来主导这个阶段是非常值得的。

施工质量控制

大多数质量问题的源头是由于缺少合格的人员配置。必须考虑这一点并且定义PCM顾问的行动方案, 来满足必要的施工标准。在施工阶段, 完整的质量控制体系基于三个关键过程。

第一步是向每个工作层级发布非常详细的检测及测试计划(ITPS), 涉及完整的文件审查(特别是方案称述)、进入材料的批准和每个阶段工作的检查。完整的检查列表指示了每项工作的等级, 这将有利于质量工程师的工作。

PCM顾问必须一贯的实施培训和协助承包商员工, 协助他们准备陈述方案和理解项目需求。

彻底的检查与管理参与: 高级技术管理人员参与现场检查, 这个惯例得到了客户的感谢, 并且对PCM顾问和承包商员工有着积极的影响。

简而言之, 质量控制程序的遵守是相当标准的, 但是培训和监管阶段将更得到重视(图8)。

安全管理

类似于质量的挑战, 健康、安全 and 环境(HSE)问题源于资深技术人员的缺失和文化的差异。只用严格的管控才能减少事件发生的概率。然后, 必须牢记的是, 想要保护那些不想被保护的工人是不可能的。在现场, 解雇不遵守纪律的员工和发布停止工作的命令是最低限度的纪律。

详细的安全程序基于承包商的项目执行计划、现场密集的培训(每日安全工具箱会议)、执行项目安全充分资源、同时包括合同罚款和严格的纪律, 这些是唯一减少风险的方法。

在配置PCM顾问的同时, 在一个组织架构内配置集团安全经理, 同时与客户和承包商参与不同项目不断的会议, 将会有利于营造安全和健康的环境, 但这始终不是一些南亚和东南亚国家的重要一环。

调试和移交

作为施工结果的最终评估, 调试将会解释



Figure 9. Grand Hyatt Colombo, Sri Lanka (Source: Archetype Group)
图9. 君悦科伦坡, 斯里兰卡 (来源: Archetype Group)



Figure 10. Four Seasons Residences, Bangkok (Source: Archetype Group)
图10. 四季住宅, 曼谷 (来源: Archetype Group)

Commissioning and Hand-Over

As a final assessment of the construction results, commissioning will reveal some of the weaknesses of the works done. For this reason, the commissioning must be done by an independent team, different to the project management individuals who have been handling the construction, and must include the operator's pre-opening team.

The hand-over process may have special difficulties given the requirements of many countries on documentation, and it must be prepared several months before the practical completion of the project. Having had a comprehensive document control will notably help this stage. The hand-over must include the necessary training sessions and proper detailed documentation based on the applicable law in the concerned country (Figures 9 & 10).

已完成工作的不足之处。因为这个原因，调试必须由一个独立的团队进行，该团队不同于处理施工的项目团队，必须包括作者的预开团队。

移交过程可能会遇到不同国家不同归档要求而产生的特殊困难，必须在项目真正完成前准备几个月。拥有一个全面的文档控制将会在这个阶段有显著帮助。基于有关国家的适用法律，移交必须包括必要的培训阶段和适当的详细文控（图9-10）。