

- **Knowledge**
- **Certification**
- **Networking**



www.iacpe.com

The International Association of Certified Practicing Engineers is a partnership of academics, practical engineers and those striving to increase their knowledge and boost their career.

The goal is to build an organization that would validate a candidates' engineering fundamentals, prove their individual skills, and enhance their networking ability.

Project Management

Some Definitions of Project Management

- 1. A temporary endeavor undertaken to create a unique product or service**
- 2. An undertaking with an established starting point and defined objectives - the achievement of which signifies the conclusion of the project**
- 3. The application of knowledge, skills, tools, and techniques to a broad range of activities in order to initiate, plan, execute, monitor and close down a project in a controlled manner**

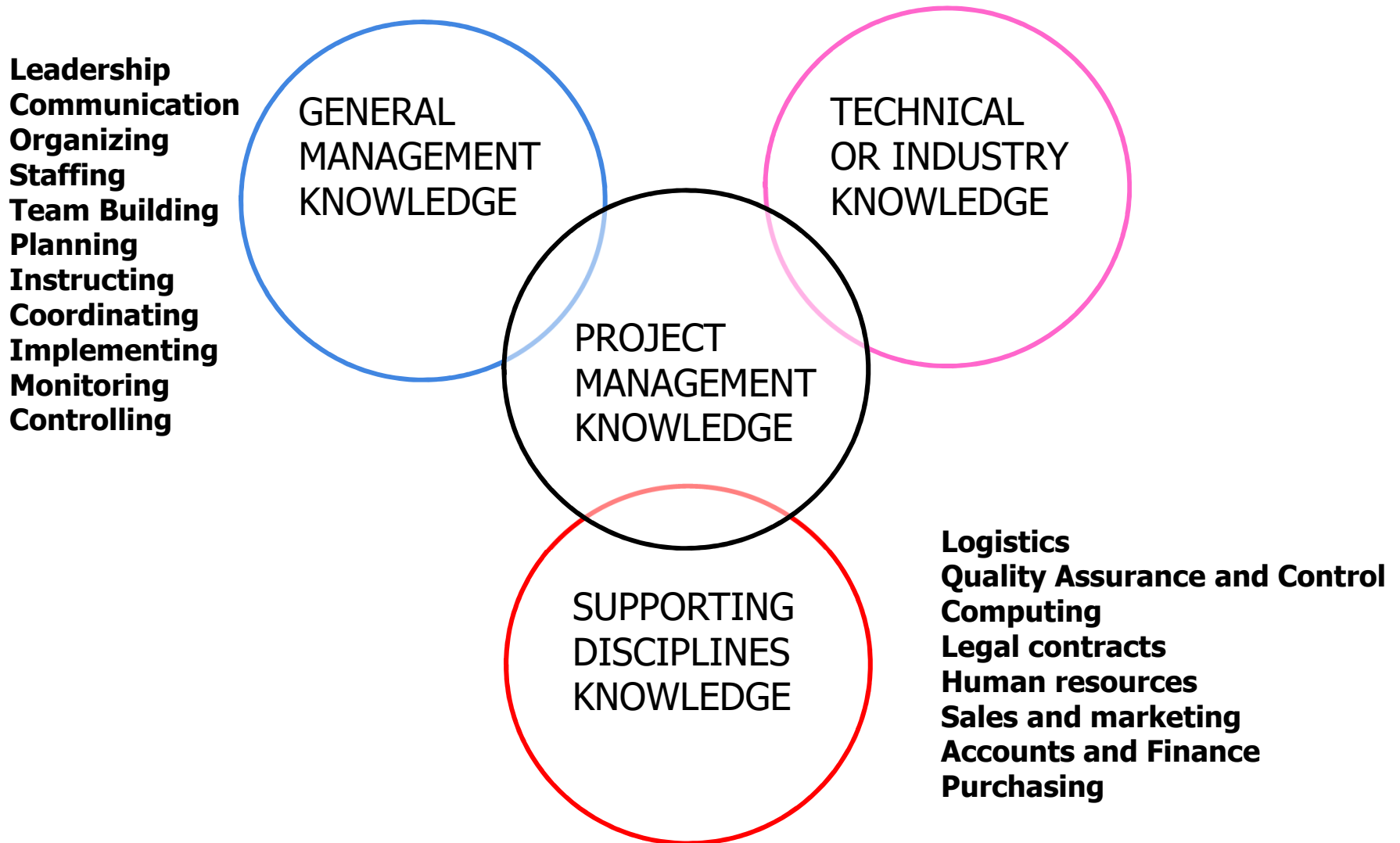
Project Management

PROJECTS VERSUS OPERATIONS

PROJECTS	OPERATIONS
<p>Unique Finite Revolutionary change Unbalanced objectives Transient resources Flexibility Risk and uncertainty EPC Contract</p>	<p>Repetitive Ongoing Evolutionary change Balanced objectives Stable resources Stability Experience Maintenance Contract</p>

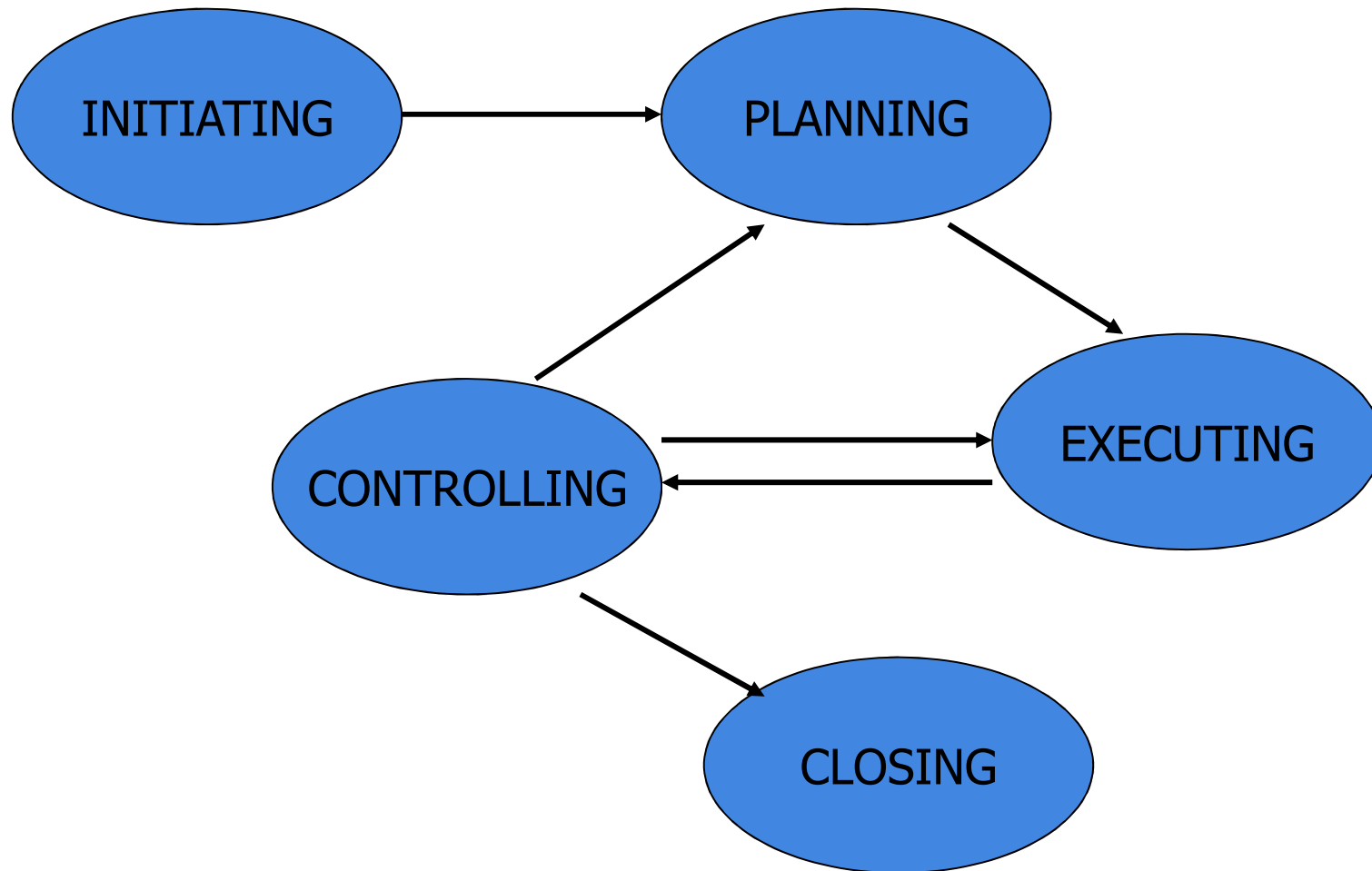
Project Management

Project Management Knowledge



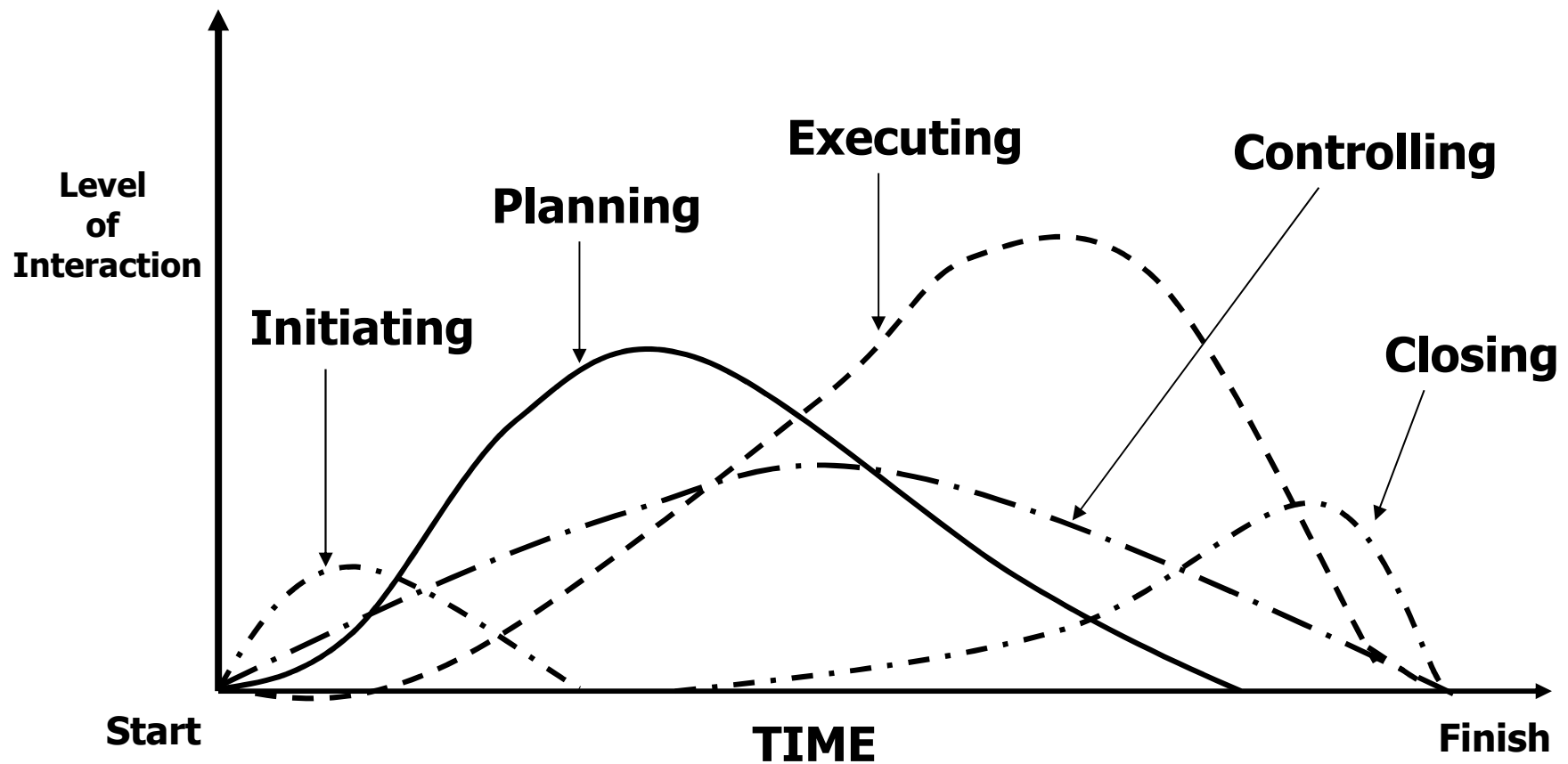
Project Management

PROJECT MANAGEMENT PROCESS



Project Management

INTERACTION IN A PROJECT



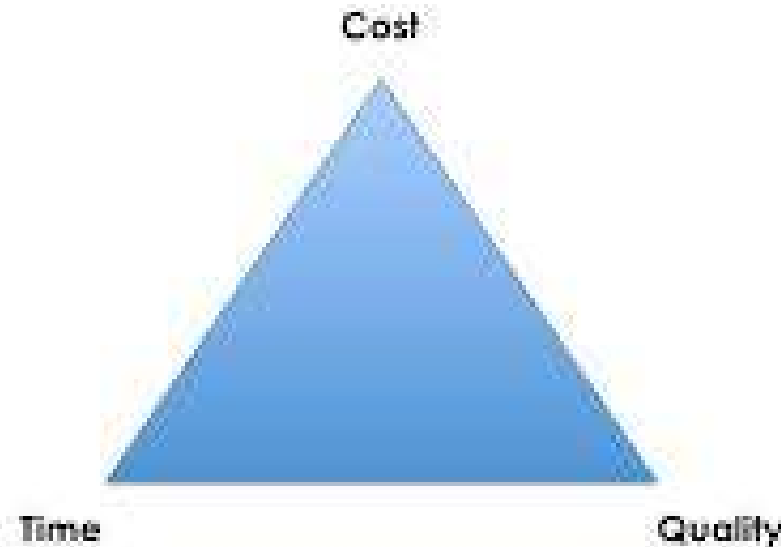
Project Management

There are several rules of Project Management

- 1. Iron Triangle**
- 2. Correct Team**
- 3. Is your Contractor your Friend?**
- 4. Correct Scope**
- 5. Change Order Management**

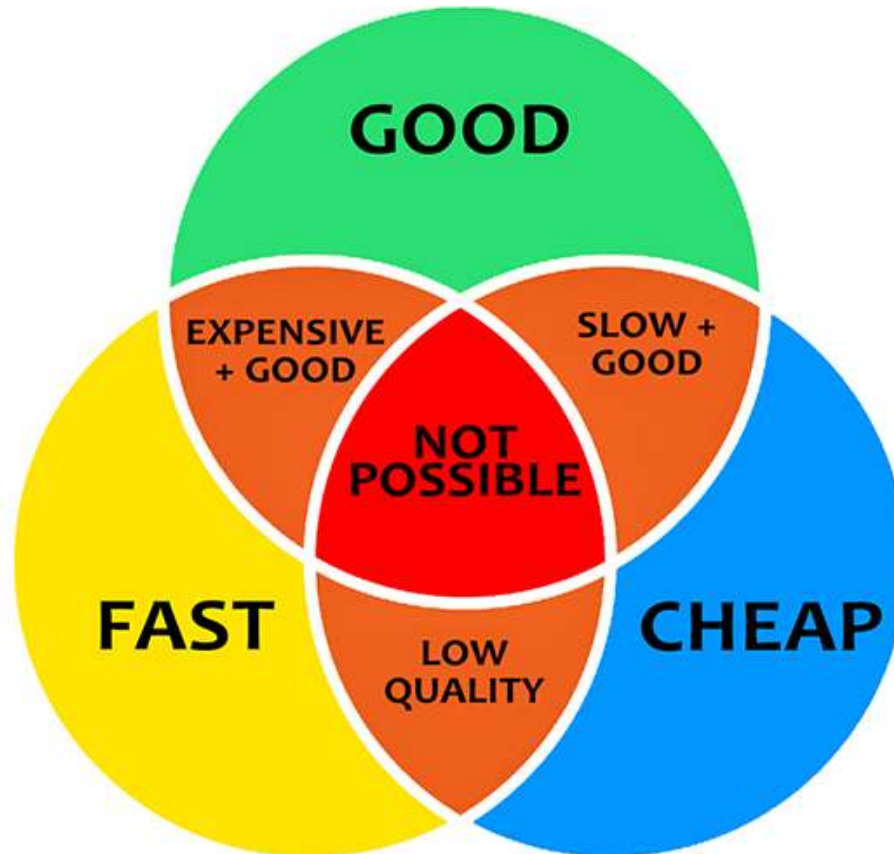
Project Management

- 1. Called the Iron Triangle because it cannot be broken You get to pick two sides, then the other side is fixed.**



Project Management

- 1. Low Cost + High Quality = Longer Time**
- 2. High Quality + Short Time = High Cost**
- 3. Low Cost + Short Time = Low Quality**



Project Management

2. Correct Team

Most people understand that to successfully manage an endeavor, one needs at least five to ten years of relevant experience.

The reservoir of knowledge one gains from five to ten years of relevant experience is huge.

Part of this is just life experience, what to expect from people, what is the normal amount of work to expect to be completed, and how to manage personnel.

Project Management

2. Correct Team

To manage a refinery, an ethylene plant or other chemical plant, if we choose a person with no relevant experience, we understand in advance that this people has a low probability of success.

We also understand that we will loss at least 10 to 30% of the potential plant profitability because of this lack of knowledge.

Project Management

2. Correct Team

Yet for some reason we loose this rule when it comes to project management. I have seen numerous managers and teams chosen to lead a project with no relevant project management experience.

Again, we should also understand that we will pay and extra 10, 30 to 50% for the cost of the project.

Project Management

2. Correct Team

PROJECTS VERSUS OPERATIONS

PROJECTS	OPERATIONS
<p>Unique Finite Revolutionary change Unbalanced objectives Transient resources Flexibility Risk and uncertainty EPC Contract</p>	<p>Repetitive Ongoing Evolutionary change Balanced objectives Stable resources Stability Experience Maintenance Contract</p>

Project Management

2. Correct Team

I am a Chemical Engineer, and it hurts me to say this. Mechanical Engineers may be better project managers than Chemical Engineers.

Chemical Engineers always want to improve things, even in the middle of the project, which hurts cost, scope and schedule.

Once the scope and budget is fixed - a good project manager stays with the approved scope and budget.

Project Management

2. Correct Team

Project Management Team Before Project Starts



Project Management

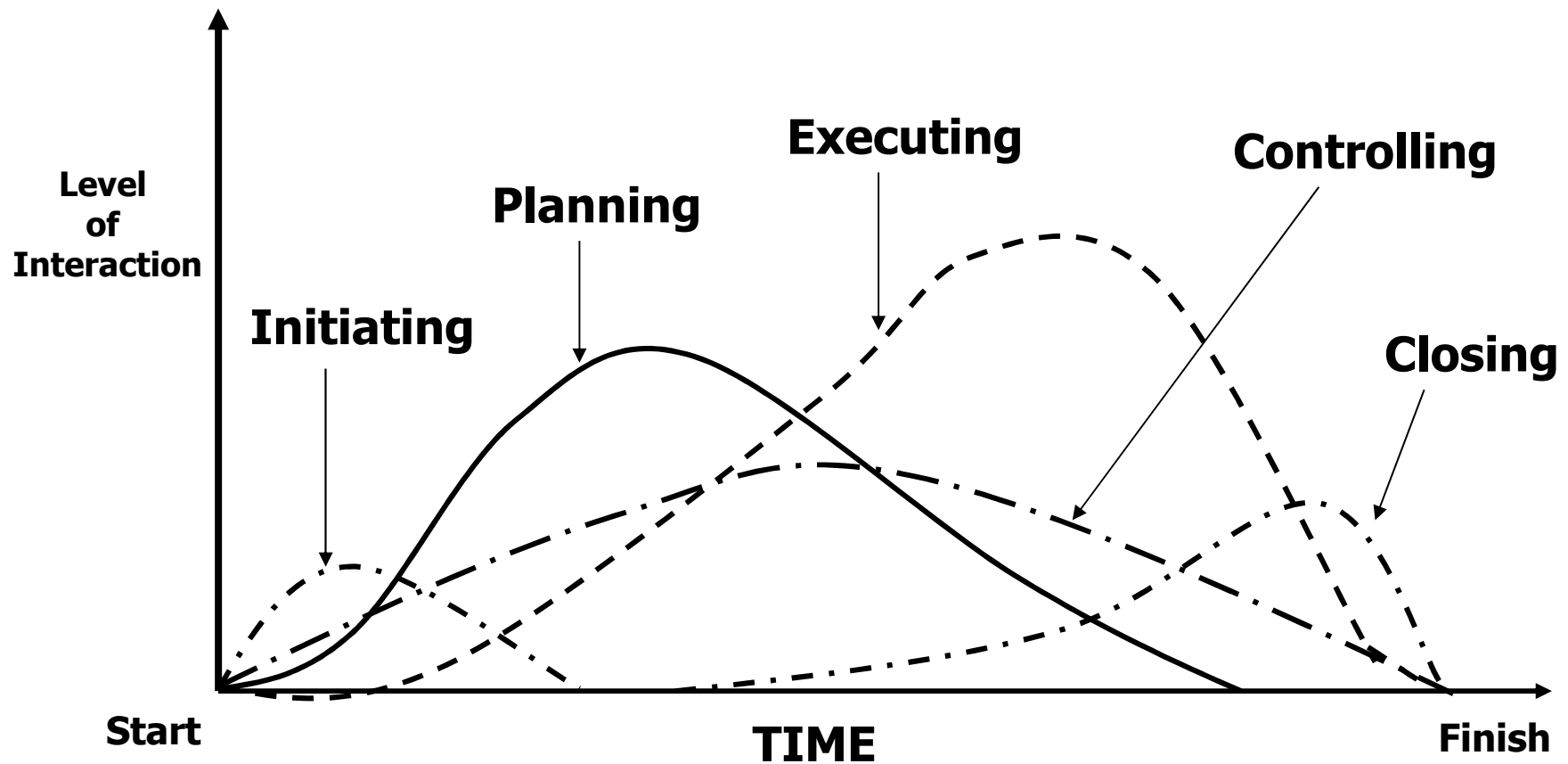
2. Correct Team

Project Management Team After Project Ends



Project Management

INTERACTION IN A PROJECT



3. Is your Contractor your Friend?

- 1. Typically an EPC Project Manager has 10+ years EPC experience.**
- 2. He has a large bonus based on the profitability of the project.**
- 3. He is not really your friend, not necessary your enemy either, but you need to understand his motivation**

Project Management

3. Is your Contractor your Friend?

4. He assures his large bonus by building the minimum required in the scope.

5. His boss would be unhappy with him if he did not do this.

6. If he is unethical he builds below the minimum required to increase his bonus.

Project Management

4. Correct Scope

There are steps that were developed on how to have a good project. They were developed based on previous bad projects.

We have them listed on our website as a typical distillation project.

<http://kolmetz.com/Distillation.html>

Project Management

4. Correct Scope

Steps of a Project

- 3.1 Feasibility Study**
- 3.2 Basic Design**
- 3.3 FEED Study**
- 3.4 Detailed Design**
- 3.5 Procurement / Construction**
- 3.6 Project Management**
- 3.7 Commissioning**

4. Correct Scope

3.1 Feasibility Study (0.5% of Total Project Cost)

A Feasibility Study should be the first step in any project. A Feasibility Study should determine the +/- 30% cost of the project, and the expected Return on Investment (ROI).

4. Correct Scope

3.2 Basic Design (3.0% of Total Project Cost)

The Basic Design is the Process Engineering Phase of the Project. It determines the Process Flow Diagrams, P&IDs and equipment sizes.

Project Management

4. Correct Scope

3.3 Front End Engineering Design (FEED) (1.0% of Total Project Cost)

After the Basic Design is completed a FEED Study should be conducted for a large project. The purpose of the FEED Study should be to develop a complete Invitation To Bid (ITB) for a Lump Sum Turn Key (LSTK) Quote from an Engineering, Procurement and Construction (EPC) Company.

Project Management

4. Correct Scope

3.3 Front End Engineering Design (FEED) (1.0% of Total Project Cost)

The FEED should not be conducted by one of the EPC firms bidding on the project. This is a large conflict of interest in that EPC firms favor.

This ITB is your scope document. A proper ITB document will save millions in the EPC phase of the project.

Project Management

4. Correct Scope

3.4 Detailed Engineering (7% for Grass Roots and 10% for Revamps)

The Detailed Engineering is the Civil, Electrical, and Mechanical Engineering Design for the project

Project Management

4. Correct Scope

3.5 Procurement and Construction

The next step is the procurement and construction by the EPC Firm.

The EPC Firm's profit is maximized by building the plant at the minimum cost.

Your project management team insures that the EPC Firm will build to the contract standards.

Project Management

4. Correct Scope

3.6. Project Management (3% of Project Cost for large projects)

On large project it is a good idea to have an independent firm to review the EPC Firms design, procurement, and construction.

The EPC Firm should always make decisions in their best interest (maximize profit = build cheap), it is naive to think otherwise.

Project Management

4. Correct Scope

3.7 Commissioning

The Pre-Commissioning is started when the equipment construction is completed. Pre-Commissioning involves the cleaning and preparation of the equipment for service.

The Commissioning is the actual placing of the equipment in service.

Project Management

4. Correct Scope

3.1 Feasibility Study

3.2 Basic Design

3.3 FEED Study

3.4 Detailed Design

3.5 Procurement / Construction

3.6 Project Management

3.7 Commissioning

5. Change Order Management

A Change Order is a change to the scope which affects cost and schedule. If there are many change orders, it means the scope was not defined well in the ITB.

For items in the ITB, there are typically three bidders, and the normal profit margin is about 15%.

5. Change Order Management

After awarding the bid, for changes not identified well in the ITB, there is only one bidder.

For these items, the profit margin is higher than 50%. Many times with a poor ITB document, an EPC Firm will bid very low to win the job, knowing they will make a large profit margin on the Change Orders.

4. Change Order Management

An experienced project manager will develop strategies to manage potential change orders. We discuss these strategies in our project management training course.

Project Management

Project Success Criteria

- 1. On time – Meeting Schedule**
- 2. Within budget – Meeting Cost**
- 3. Achieving Scope Specifications – Meeting Quality**
- 4. Clients and All other Stakeholders are happy**

Project Management



Project Management is complex endeavor with requires special skills and training.

We were ask by the IACPE Industrial Advisory Board to develop a Project Management Certification Program. To satisfy this request we developed the CPPM Program.

Certified Practicing Project Manager Program can be found here;

<http://www.iacpe.com/cppm-program.html>

Project Management



Certified Practicing Project Manager Program

The CPPM Program contains 8 training modules. Each module is about an 80 page document.

- 1. Ethics 1&2**
- 2. Inherently Safer Design**
- 3. Introduction to Project Management**
- 4. Managing Project Quality, Time and Cost**
- 5. Managing Project Scope, Risk and Schedule**
- 6. Managing Project Execution and Control**
- 7. Managing Project Teams**
- 8. Managing Stake Holders and Communications**

- **Knowledge**
- **Certification**
- **Networking**



www.iacpe.com

Starting / Building IACPE



- 1. We began writing the Kolmetz Handbook of Process Equipment Design in 2007. We are honored it has been well received all over the world.**
- 2. We would get emails from students asking for student discounts. The Handbook is mostly purchased by companies so the cost is high for students.**

<p>KLM Technology Group</p> <p>Practical Engineering Guidelines for Processing Plant Solutions</p>	 <p>SOLUTIONS, STANDARDS AND SOFTWARE</p> <p>www.klmtechgroup.com</p>	<p>Page : 1 of 58</p>
		<p>Rev: 04</p> <p>Rev 01 Jan 2007 Rev 02 May 2012 Rev 03 Sept 2012 Rev 04 Nov 2013</p>
<p>KLM Technology Group #03-12 Block Aronia, Jalan Sri Perkasa 2 Taman Tampoi Utama 81200 Johor Bahru Malaysia</p>	<p>Kolmetz Handbook of Process Equipment Design</p> <p>Piping Hydraulics Fluid Flow Line Sizing and Material Selection</p> <p>(ENGINEERING DESIGN GUIDELINE)</p>	<p>Co Author Rev 01 Ling Ai Li Rev 02 K Kolmetz Rev 03 Aprilia Jaya Rev 04 Aprilia Jaya</p> <p>Editor / Author Karl Kolmetz</p>

TABLE OF CONTENT

INTRODUCTION

Scope	5
General Design Consideration	6

Starting / Building IACPE



- 3. In June 2014, we developed an idea to start an Engineering Association and utilize the handbook to train and certify individuals at a student rate. We are now in our 5th year of the association.**
- 4. In April 2015, we started Engineering Practice Magazine.**

Engineering Practice Magazine



The first Issue of Engineering Practice Magazine was April 2015.

We are now in our 4th year and the readership is approaching 5,000 per issue.

You should consider publishing and advertising in Engineering Practice Magazine

www.iapce.com/magazine



Knowledge

Provides a standard of professional competence and ethics for engineering, maintenance and operations personnel through our training modules.

Encourages engineering, maintenance and operations personnel to participate in a continuing education program of personal and professional development.



Knowledge

The broad knowledge base that you will gain from the modules will make you perform much better in an interview.



Knowledge



We were honored to get a thank-you message from an engineer taking the

Certified Practicing Project Manager Program (CPPM)

He said he was able to answer every one of the interview questions and got hired, based on the knowledge he gained from studying the program.

Certification

Identifies and recognizes those individuals who meet the standard

As our network grows there will be people looking to hiring someone with this qualification

In five years it may be you that is hiring



Networking

The best jobs will come from a referral when one of your friends has recommended you

IACPE Conferences and seminars

IACPE Meetings in your area

Hiring someone with this qualification



Networking



- **In five years, our goal is to have 5000 members all over the world having knowledge of the benefits and value of IACPE.**
- **This network will be a great asset and resource for you and your career.**

- **Knowledge**
- **Certification**
- **Networking**



All the best for you, your family and your career.