MODULE 11

# Scoping, Quoting and Presenting Solutions

*Conveyor Solutions Engineering | Professional Training Program*

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## SECTION 1: INTRODUCTION

Engineering a conveyor system correctly is one skill. Converting that engineering work into a proposal a customer can understand, trust, and sign is a different skill entirely. Most engineers are trained in the first. Very few are trained in the second. Those who develop both are the ones who close projects.

A proposal is not a sales document. It is an engineering communication. Its purpose is to give the customer enough accurate information to make an informed decision. That means showing the solution clearly, documenting what it does well, and being explicit about what it does not do. It also means calling out assumptions, flagging cost drivers, taking exceptions where necessary, and organizing the material so the right information reaches the right person.

This module explains how to scope a system without losing margin, how to build a proposal that earns customer confidence, how to present to both technical and business buyers, and how to maintain a project folder that protects the integrity of the work after the proposal is delivered. The CSE Quoting Standards Guide and the CSE Pre-Quote Checklist should be used alongside this material.

## SECTION 2: LEARNING OBJECTIVES

By the end of this module you will be able to:

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|---|---|
| 1 | Scope a conveyor system proposal that includes all required deliverables and identifies system limitations clearly. |
| 2 | Identify and communicate cost drivers, product outliers, and input parameter exceptions before they become customer surprises. |
| 3 | Recognize where margin is most commonly lost during scoping and apply habits that protect it. |
| 4 | Structure a proposal that serves both a technical buyer and a business decision maker from the same document. |
| 5 | Build and maintain a project folder that supports handoff, future reference, and engineering continuity. |
| 6 | Apply the CSE Quoting Standards Guide and Pre-Quote Checklist to every proposal before delivery. |

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|---|---|
| 7 | Respond to both technical and business buyer questions from a single proposal and presentation. |

## SECTION 3: PREREQUISITES

**Required Prior Knowledge**

All prior modules in this program. This module assumes you can already do the engineering work. The focus here is on how to package, communicate, and protect that work.

Module 2: Product and Package Analysis. The MTBH analysis is a required deliverable in every proposal.

Module 5: System Design and Flow Layout. The layout is a required proposal deliverable.

Module 6: Rate, Speed and Capacity Calculations. Calculations from the tools used to size the system belong in the proposal and the project folder.

Module 10: Safety, Guarding and Code Compliance. System limitations related to safety must be documented in the proposal.

## SECTION 4: THE THREE W'S

The scoping and quoting discipline in this module applies the same framework used throughout the program. Why this work matters, when to apply it, and where it fits in the project timeline.

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|---|---|
| WHY | A technically correct system that is poorly scoped, incompletely documented, or badly presented will lose to a lesser system that is clearly explained and confidently delivered. Customers cannot evaluate what they cannot understand. The proposal is the bridge between the engineering work and the customer's decision. If that bridge is weak, the project does not close or it closes with problems baked in. |
| WHEN | Scoping disciplines apply from the first customer conversation. The way you gather input parameters, document assumptions, and flag outliers in early discovery conversations determines whether the proposal you deliver is clean or full of risk. By the time you are writing the proposal, the hard conversations about limitations and cost drivers should already have happened. |
| WHERE | The scoping and quoting skills in this module apply to every project regardless of size. A small system with a thin margin and an unclear scope fails the same way a large system does. The habits are the same. The documents are the same. The discipline is the same. |

## SECTION 5: CORE CONTENT

### 5.1 What a Complete Proposal Contains

A proposal must give the customer enough information to make an informed decision. That is the standard. Not enough information to feel good about the system. Enough to make a real decision. Every proposal includes the following deliverables.

| Deliverable | What It Must Show |
|---|---|
| System Layout | Conveyor flow, equipment placement, dimensions, operator access points, and overall footprint. The layout is not optional. |
| MTBH Table | The product analysis that drove the design. Dimensions, weights, types, and any outlier products called out explicitly. |
| Conveyor BOM | Equipment list with quantities, models, and descriptions sufficient for the customer to understand what they are buying. |
| System Limitations | Speed limits, weight limits, throughput limits, product size limits. Anything the system cannot do must be documented. |
| Assumptions and Exceptions | Every assumption made during design and every exception taken to the customer's specification, documented explicitly. |
| Cost Drivers | Any input parameter from the customer that is driving system size, speed, or cost above what the base case would require. |
| Calculations | Supporting calculations from the tools used to size the system, included in the proposal package and the project folder. |

**FIELD INSIGHT | MICHAEL COLLINS**

You need to provide enough information to allow the customer to make an informed decision. A layout, an MTBH table, and a Conveyor BOM are the minimum. Calculations from any tools used to size the system should be added to the proposal and the project folder for future reference. The customer is trusting you to tell them what the system does and what it does not do. Both matter.

### 5.2 System Limitations Are Not Optional

New engineers want to show the good side of everything. That instinct is understandable and not entirely wrong. You do want to highlight what the solution does well. But system limitations must be in the proposal. Weight limits. Speed limits. Throughput limits. Product size boundaries. Anything the system cannot do.

The reason is simple: if a limitation is not in the proposal, the customer assumes the system handles it. When they find out it does not, you have a problem. The limitation was always there. The only thing that changed is when the customer found out about it. Finding out after installation is significantly worse than finding out during the proposal review.

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Anything that you feel is a limitation of the system should not be a surprise to the customer. Show them the good side, highlight the strengths of the solution, but include the limits. Weight, speed, throughput, product size. All of it. A customer who understands the system they are buying is a customer who stays your customer.

## 5.3 Calling Out Cost Drivers and Product Outliers

Every project has input parameters from the customer. Most of them are reasonable. Some of them are unusual, and the unusual ones drive cost in ways the customer may not be aware of. A very small product or a very large product that represents a small fraction of the total volume can force the entire system to be designed to handle it. That single outlier may be driving the size, speed, and cost of the system.

Call it out. Explicitly. Show the customer what that product outlier is doing to the design and what the system would look like without it. Give them the information to make a decision. In some cases they will say the outlier is critical and the design stays as is. In other cases they will say the outlier is not worth the cost and remove it from scope. Either way, they made an informed decision. That is the job.

## 5.4 Taking Exceptions to the Customer Spec

When a customer provides a specification, they assume you followed it unless you tell them otherwise. If you took an exception to any part of the spec, you must call it out explicitly in the proposal. An exception that is not documented is not an exception. It is a gap that surfaces later as a dispute.

The same logic applies to assumptions. If you assumed something during design because the customer did not provide that information, document the assumption. If the assumption turns out to be wrong, you want a record that you disclosed it. If the assumption turns out to be right, you want the customer to see that you were thorough.

## 5.5 Where Margin Gets Lost

Margin is not lost when a project is priced. It is usually lost earlier, when information is missing during scoping.

One of the most common sources of margin loss is unsafe assumptions. A frequent example is sizing a system without a complete MTBH analysis. When key operational information is missing, decisions are made based on assumptions rather than verified requirements.

Another common source of margin loss is incomplete information provided to vendors. Electrical installers, mechanical installers, and controls companies price their work based on what they are told. If the controls contractor is not informed that pull cord E stops are required throughout the facility, they will not include them in their price. If the scope does not specify that every motor requires a VFD, that cost will not appear in their estimate.

Time also plays a role. Both you and your vendors need enough time to review the scope and build accurate pricing. When schedules are compressed, details are more likely to be missed and assumptions increase.

In the end, the gap between what was scoped and what vendors actually priced comes out of project margin.

**FIELD INSIGHT | MICHAEL COLLINS**

Margin gets lost with unsafe assumptions. Not knowing the product MTBH. Not giving vendors enough information, causing them to make bad assumptions. Your electrical installer, mechanical installer, and controls company are all pricing based on what you tell them. If you did not tell them about pull cord E-stops everywhere, or that every motor needs a VFD, they did not price it. That gap is your problem, not theirs.

Important: The CSE Pre-Quote Checklist exists specifically to prevent this. Before any proposal leaves the building, the checklist should be complete. It forces the engineer to confirm that every vendor received complete scope information, that the MTBH analysis is documented, and that no assumptions were left undisclosed.

## 5.6 Presenting to Technical vs. Business Buyers

The person who evaluates your engineering and the person who approves the budget are often not the same person. A solutions engineer needs to be able to communicate effectively with both from the same set of documents.

With a technical buyer, you go deeper. They want to see the layout, understand the equipment selection, review the calculations, and discuss the controls architecture. They are evaluating whether the engineering is sound. With a business buyer, you lead with outcomes. Throughput improvement, labor reduction, error rate reduction, payback period. They are evaluating whether the investment is justified.

The professional standard is to have both technical detail and high-level summary in the same proposal, with the backup knowledge to support either type of buyer in the same room.

**FIELD INSIGHT | MICHAEL COLLINS**

We typically go into more technical detail with a technical buyer, but proposals and drawings need to contain both technical detail and high-level summary. You need the backup knowledge to support either type of buyer. You should be able to walk into any meeting and go as deep or as high as the room requires without missing a beat.

| Buyer Type | What They Are Evaluating | What to Lead With |
|---|---|---|
| Technical Buyer | Is the engineering sound? Will this system actually work? | Layout, equipment selection, calculations, controls logic, MTBH analysis |
| Business Buyer | Is this investment justified? What does it return? | Throughput improvement, labor impact, error reduction, system uptime, payback |
| Both in the Same Room | Technical credibility and business case simultaneously | Lead with outcomes, be ready to go deep on engineering when challenged |

## 5.7 The Project Folder and Engineering Continuity

Every project generates notes, calculations, layouts, vendor quotes, and reference documents. All of it should be stored in a project folder organized so another engineer can review the work and understand what was done, why it was done, and what questions remain.

This is not administrative overhead. It is part of engineering discipline. If information matters to the project, it needs to be documented. If you are the only person who knows why a design decision was made, the project now has a single point of failure.

**FIELD INSIGHT | MICHAEL COLLINS**

All notes, calculators, and items used to get this far on a project belong in a project folder for reference. It is hard to remember everything. If another engineer needs to take over, they should be able to reference your notes and calculations and understand where the design came from. The CSE Project Notes Template is the standard format for organizing that work.

The CSE Project Notes Template defines how project folders are organized and what belongs in them. Every active project should have one in place from the beginning of discovery, not assembled after the fact when something goes wrong.

| Project Folder Contents | Purpose |
|---|---|
| CSE Building Process Flows | Think back to the first part of this program, how important was the flow chart. Be sure to include that too |
| CSE Project Notes Template | Running log of decisions, assumptions, open questions, and customer communications |
| System Layout | Current and all prior revisions with revision notes |
| MTBH Analysis | Complete product analysis with all inputs documented |
| Sizing Calculations | All calculator outputs used to size the system, saved and labeled |
| Vendor Quotes | Complete scope received from every vendor, with any scope gaps flagged |
| Customer Spec and RFQ | Original customer inputs with exceptions and assumptions noted |
| Proposal Package | Final proposal as delivered to the customer |
| CSE Pre-Quote Checklist | Completed checklist confirming all scope items were reviewed before proposal delivery |

## 5.8 The CSE Quoting Standards Guide and Pre-Quote Checklist

The CSE Quoting Standards Guide defines the format, content requirements, and professional standards for every proposal produced in this program. It covers how proposals are structured, how equipment is described, how assumptions and exceptions are documented, and how deliverables are organized for different buyer types.

The CSE Pre-Quote Checklist is the gate that every proposal passes through before it is delivered. It confirms that the MTBH analysis is complete, that all vendors received full scope information, that system limitations are documented, that exceptions to the customer spec are called out, and that the project folder is in order.

### FIELD INSIGHT | MICHAEL COLLINS

The quoting checklist exists because there are things that experienced engineers forget under time pressure. Use it every time without exception. The margin you protect by catching a missed scope item before the proposal goes out is worth far more than the five minutes the checklist takes.

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## SECTION 6: TIPS AND TRICKS

### TIPS AND TRICKS | MICHAEL COLLINS

Have the hard conversations about limitations and cost drivers early in discovery, not for the first time in the proposal review. A customer who is surprised by a limitation at proposal time is a customer who is harder to close.

If a product outlier is driving the entire system design in an expensive direction, put a number on it. Show the customer what the system costs with and without that outlier. Give them the information to decide.

Pro Tip: If needed you can give an estimated difference. For example, a per foot price difference between two different conveyor widths. The benefit of an early estimate is that it can prevent the need to draw the system multiple times.

When you get a spec from a customer, read every line and document every exception before you start designing. An exception you forget to call out is a dispute you will lose.

Save every calculator output to the project folder as you produce it. Do not plan to go back and reconstruct the work later. You will not have time, and you will not remember every input that went into it.

Before a proposal goes out, hand the CSE Pre-Quote Checklist to someone who was not involved in building the proposal and ask them to review it. A second set of eyes on the checklist catches things the author cannot see because they are too close to the work.

Structure your proposal so the executive summary and high-level outcome section comes first. The technical detail follows. A business buyer who stops reading after page two still gets the business case. A technical buyer who wants the detail can find it.

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## SECTION 7: NOTES AND INSIGHTS

### NOTES AND INSIGHTS

The proposal is not the place to introduce a limitation for the first time. If a limitation exists in the system, the customer should know about it before the proposal review. The proposal is where you document what was already discussed.

Vendor scope gaps are not the vendor's fault if you did not provide complete information. The solutions engineer owns the scope definition. If a vendor priced something incorrectly because the RFQ was incomplete, the gap belongs to the engineer who wrote the RFQ.

The MTBH analysis is the foundation of the proposal the same way it is the foundation of the design. A proposal without a complete MTBH table is a proposal built on an assumption. The customer deserves to see what drove the design.

A project folder that another engineer cannot navigate is not a project folder. It is a personal filing system. The CSE Project Notes Template exists to create a consistent standard so any engineer on the team can work from any project file.

Proposals vary in format depending on the customer and the project size. The CSE Quoting Standards Guide defines the baseline. Adjusting format for a specific customer or situation is acceptable. Omitting required content is not.

## SECTION 8: EXPERT CALLOUT

**EXPERT CALLOUT**

*[Expert callout placeholder. Peer review insight to be added here when peer review is completed.]*

*[Reviewer Name, Title, Company]*

## SECTION 9: PITFALLS

These are real mistakes engineers make. Every one of them has a project history behind it.

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| ! | **Omitting system limitations from the proposal**<br>A limitation that is not in the proposal is a guarantee that the customer will be surprised by it later. Surprised customers become difficult customers. Document every limit the system has and put it in the proposal. Weight, speed, throughput, product size. All of it. |
| ! | **Introducing surprises at proposal review**<br>If the customer is hearing about a cost driver, a product outlier, or a system limitation for the first time during the proposal review, something went wrong earlier in the process. Those conversations belong in discovery. The proposal confirms what was discussed. It does not introduce new problems. |
| ! | **Skipping the MTBH analysis**<br>A proposal built without a complete MTBH analysis is a proposal built on assumptions about the product. When those assumptions are wrong, the system is wrong. The MTBH table is not optional. It is the document that proves the design was driven by real product data. |
| ! | **Sending incomplete scope to vendors**<br>Vendors price what they are told. If your RFQ to the electrical contractor does not mention pull cord E-stops along every conveyor run, they did not price them. If you did not specify VFDs on every motor, that was not in their number. Review every vendor RFQ against the CSE Pre-Quote Checklist before it goes out. |
| ! | **Not building the project folder during the project**<br>A project folder assembled after the fact is missing half the information that would have been captured if it was built in real time. Start the CSE Project Notes Template at the beginning of discovery. Add to it throughout the project. By the time the proposal is delivered, the folder should be complete and ready for handoff if needed. |

**!** **Failing to call out exceptions to the customer spec**

Customers assume you followed their specification in full unless you tell them otherwise. Every exception must be documented explicitly in the proposal. An undocumented exception is a dispute waiting to happen.

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## SECTION 10: FOREST THROUGH THE TREES

### How Scoping, Quoting, and Presenting Connects to Everything That Follows.

The engineering work in Modules 1 through 10 produces a system design. This module is about what you do with that design next. A technically correct system that is not clearly scoped, completely documented, and honestly presented does not serve the customer and does not protect the project.

The forest is this: the proposal is the point where engineering judgment and professional communication come together. Every skill from every prior module feeds into it. The product analysis determines the design. The design determines the layout. The layout determines the BOM. The calculations determine the system limits. The safety review determines what must be disclosed. All of it arrives in the proposal.

A solutions engineer who can do the engineering and communicate it clearly is the engineer customers call on the next project. That reputation is built one well-scoped, honestly documented, clearly presented proposal at a time.

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## SECTION 11: KEY TAKEAWAYS

**KEY TAKEAWAYS | MODULE 11**

Every proposal must include a system layout, MTBH table, Conveyor BOM, system limitations, documented assumptions and exceptions, cost drivers, and supporting calculations.

System limitations are not optional. Weight, speed, throughput, and product size limits must be in the proposal. A limitation the customer does not know about is a problem waiting to happen.

Call out product outliers that are driving system cost. Give the customer the information to decide whether that outlier is worth the design impact.

If you received a customer spec, document every exception you took. Silence means you agreed to everything.

Margin is lost through unsafe assumptions and incomplete vendor scope. Use the CSE Pre-Quote Checklist before any proposal is delivered.

Proposals must serve both technical and business buyers. Have the engineering depth and the business summary ready in the same document.

Build the project folder in real time using the CSE Project Notes Template. Do not plan to reconstruct it after the fact.

Calculations from every tool used to size the system belong in the proposal package and the project folder.

## SECTION 12: MODULE ASSESSMENT

Answer the following questions to test your understanding and applied judgment from Module 11.

### Knowledge Check

**Q1**

A customer provides a product range of 4 inches to 48 inches in length. During product analysis you determine that reliably conveying the 4 inch product requires tighter roller centers or a different conveyor type, which significantly increases system cost. The 4 inch product represents only 2 percent of daily volume. What should you do with this information and when should you communicate it?

**Q2**

You are preparing a proposal for a fulfillment center that will be reviewed by both the VP of Operations and the Director of Engineering. The VP wants to know what the system will do for labor and throughput. The Director wants to understand the equipment selection and controls architecture. How do you structure the proposal and the presentation to serve both buyers?

**Q3**

After a project is awarded, the controls contractor comes back and says pull cord E-stops were not in their scope and need to be added as a change order. The system requires pull cord E-stops on four conveyor runs totaling 800 linear feet. How did this happen and what process would have prevented it?

**Q4**

Six months after a project is completed, a colleague needs to revisit the design because the customer wants to expand the system. You were the engineer of record on the original project. What should be in your project folder, and what does it tell you about how you ran the project if those items are or are not there?

### Forest Through the Trees Exercise

A Jr Engineer tells you they prefer to keep proposals simple and not include too much detail because it overwhelms customers. How do you respond? What is the difference between a proposal that is clear and a proposal that is incomplete, and why does that distinction matter?

**END OF MODULE 11**

Next: Module 12 | Engineering Support During Execution. Module 12 completes the program by covering the solutions engineer's role once the project moves from proposal to active execution. The drawing is the golden plan. Owning it through commissioning, troubleshooting, and handoff is the final professional discipline this program builds.