CONVEYOR SOLUTIONS ENGINEERING
Professional Training Program

Before You Begin

Michael Collins | Sr. Solutions Engineer

FOR THE STUDENT	FOR THE INSTRUCTOR
Read this before you open Module 1. It will tell you what this program is, how it is built, and what you are expected to do with it. The modules will make more sense when you understand the arc of the program before you start.	This document gives you the framing language for the first session. Hand it to the student before anything else. Then use it to open the conversation about what kind of engineer this program is trying to build.

WHO BUILT THIS PROGRAM

My name is Michael Collins. I have worked at every level of this industry. As a solutions engineer I have designed systems. As the owner of a controls and software company I built the technology that runs them. As a Director of Operations at a systems integrator I was responsible for delivering them at scale.

That combination is not common. Most training in this industry comes from one angle: a manufacturer teaching you about their product, or a classroom teaching you theory that has never been stress-tested on a real job site. This program comes from all of it. The field insights, the pitfalls, the frameworks, and the calculators are not theoretical. They come from projects where things went right and projects where things went wrong, and from years of watching engineers at every level make the same mistakes and develop the same blind spots.

One thing defines my approach: I look for the elegant simple solution to a complex problem. Not the most sophisticated solution. The minimum necessary solution that solves the real problem cleanly. That standard runs through every module in this program. The goal is not to sell the most complex system. It is to solve the customer's problem correctly.

WHAT THIS PROGRAM IS

The Conveyor Solutions Engineering program is a 12-module professional development course for solutions engineers working with Hytrol conveyor systems and integrated

material handling technology. It is designed for engineers at the 0 to 5 year experience level who need to build real engineering judgment, not just product knowledge.

This is not a certification course. It does not test whether you can recall specifications. It tests whether you can walk into a customer situation, understand what is actually needed, select the right technology, design a system that works, and communicate it clearly to people who make decisions. Those are the competencies this program builds.

Every module is built around three questions: Why would you use this technology? When is it the right choice and when is it the wrong one? Where does it fit within a system and where does it not belong? A student who can answer all three for every technology in this program is ready to engineer real systems.

THREE IDEAS THAT RUN THROUGH EVERYTHING

Before you open Module 1, understand these three ideas. They appear in every module. They are not concepts to memorize. They are ways of thinking that this program is trying to build in you.

Imagine You Are the Carton	Before you select any technology, before you draw any layout, you should be able to close your eyes and trace the journey of a package through the system you are designing. Where does it enter? Where does it exit? What does it experience at every transition? If you cannot narrate that journey, you are not ready to commit to the design. This is the most practical thinking tool in the program.
Forest Through the Trees	The ability to zoom out from the component in front of you and see the full system, the full customer operation, and the full problem being solved. Engineers who struggle in the field almost always struggle because they are in the weeds. They know the technology but they cannot connect it to what the customer actually needs. This is the most important competency this program develops. It is also the hardest.
Solutioning vs. Final Engineering	Solutioning is the phase where you confirm the approach is correct and the technology is capable. Final engineering is where precision matters and specifications are locked. A student who applies final engineering precision to a solutioning conversation slows down and adds cost. A student who applies solutioning tolerance to final engineering produces systems that miss their targets. Knowing which phase you are in is a professional judgment this program trains.

THE PROGRAM AT A GLANCE

Twelve modules. One Capstone. The modules build on each other in sequence. Do not skip ahead.

#	Module	What You Learn to Do
PHASE 1 | UNDERSTAND THE CUSTOMER AND THE PRODUCT		
1	**The Warehouse Ecosystem**	Conduct a structured customer discovery. Identify what the customer says they need and what the operation actually requires.
2	**Product and Package Analysis**	Run MTBH analysis. Build a design envelope from real customer data. Identify outliers and what they cost the design.
PHASE 2 | UNDERSTAND THE TECHNOLOGY		
3	**Conveyor Fundamentals**	Apply the think like the package methodology. Distinguish transportation from accumulation. Know what every major component does.
4	**Conveyor Types and Selection**	Select the right conveyor technology for the application. Understand EZLogic zone control and specify Aux I/O correctly.
PHASE 3 | DESIGN THE SYSTEM		
5	**System Design and Flow Layout**	Build a layered flow diagram before touching any drawing tool. Design for people and constraints, not just material flow.
6	**Rate, Speed and Capacity**	Calculate belt speeds, throughput, and gap requirements. Apply margin correctly. Know the difference between a solutioning number and a final engineering number.
7	**Curves, Inclines and Declines**	Run curve width and box tumbling calculations. Validate decline angles against product geometry. Account for inertial forces at incline transitions.
8	**Transfers, Merges and Sortation**	Design transfers with product orientation in mind. Identify merge control risks. Right-size a sorter using the product handling matrix.
PHASE 4 | CONTROL, PROTECT, AND COMMUNICATE IT		
9	**Controls Integration**	Map the five-layer controls topology. Design the data exchange handshake at every smart decision point. Specify machine-level setpoints for installation drawings.
10	**Safety and Guarding**	Design safety in from the site walk, not after the layout. Apply guarding rules for underside covers, pull cords, forklift crossings, and LOTO.
11	**Scoping and Quoting**	Scope accurately. Disclose limitations. Address cost drivers. Present to technical buyers and business buyers differently.
12	**Engineering Support During Execution**	Support the project through installation. Keep the drawing current. Evaluate change requests for downstream impact. Close the project correctly.
CAPSTONE | RIVERSIDE DISTRIBUTION CO.		
CAP	**First Project Simulation**	A complete outbound sortation project for a real fictional customer. You discover the problem through character conversations, design the system through eight structured deliverables, and present a proposal that has to work for the engineer, the finance lead, and the maintenance team.

HOW TO GET THE MOST OUT OF THIS PROGRAM

Do not just read it.

Run every calculator with real numbers before you move to the next module. A student who has watched a calculator run once does not know how to use it. A student who has run it three times with different inputs does.

Explain it back.

After each module, find someone and explain the key concept to them without looking at the material. Teaching requires deeper understanding than answering. If you cannot explain it, you do not own it yet.

Connect backward.

Every module builds on what came before it. When you learn something new, ask yourself where it connects to an earlier module. Those connections are what turn a collection of knowledge into a system of thinking.

Bring real questions.

If you have seen something in the field that this program explains, bring it up. If you have seen something the program does not explain, bring that up too. Real questions are how this material gets tested against reality, which is the only test that matters.

A WORD BEFORE YOU START

This program will ask more of you than recalling what you read. It will ask you to reason through situations you have not seen before, make decisions you cannot look up, and explain your thinking to people who will push back on it.

That is what the job actually requires.

The engineers I have seen develop fastest are not always the ones who come in knowing the most. They are the ones who are willing to say I do not know yet and then go figure it out. That disposition, more than any technical knowledge, is what separates engineers who grow from engineers who plateau.

Work through this honestly. The Capstone at the end is not graded. It is a mirror. What you see in it depends entirely on the work you did to get there.

Michael Collins