VELOSITY
Accelerating Innovative Solutions

WHITE PAPER

Technology Transfer

In this white paper we explore the process, including what makes it work and the lessons learned that have contributed to the many successful transfer programs we have complete.

Technology Transfer: A Proven Process

Overview:

According to Merriam Webster, the words “technology” and “transfer” take two relatively simple concepts that were born at very different times and when combined, provide a basis for a new application in nearly all aspects of business and industry.

tech·nol·o·gy | \ tek-ˈnä-lə-jē (noun); origin 1894 - A capability given by the practical application of knowledge

trans·fer | \ tran(t)s-ˈfər (verb); origin 14th century - To convey from one person, place, or situation to another

Since the industrial revolution, people have been looking for ways to get their product to market faster. While “technology” enables this to happen, “transfer” is the vehicle that many businesses have turned to in order to achieve that objective. The need for speed and efficiency has driven this concept in directions that have not traditionally been considered, such as injection molding. Hence, the seed for a new way of thinking was planted.

AT A GLANCE

Teaching customers and competitors how to injection mold has become part of the DNA at Velosity. How many custom injection molders do you know that do that?

Read on to learn more…

Companies have been contracting others to bring in new technologies for a very long time, even in the injection molding industry. But the landscape has changed dramatically over the last few years in how technology transfer is applied. The reasons to bring injection molding in-house have not changed, for reasons such as controlling the supply chain or for cost reduction purposes, but most found that it is not as simple as just adding equipment and technical talent. Historically, those who have decided to bring in a new technology found that startup and efficiency could be mutually exclusive and flattening the learning curve was not always as simple as they envisioned. As the need to reduce lead times increased and technical resources became harder to find, a new way of thinking led customers and a few competitors to request help in this area.

And technology transfer was born at Teamvantage, LLC, d.b.a Velosity.

You may be asking why we would teach someone, let alone a competitor, how to do what we do? The modest answer is, as our company name implies, Velosity values working together in collaboration. While we get compensated for the work we do, we believe that mutual success builds confidence, and with confidence comes partnership and with partnership comes future opportunity. The real benefit, however, is the strength of the relationship gained through collaboration. In addition, we like to have some fun along the way.

The simple fact is those best to advise and teach are the ones that do this workday in and day out, whether it be in specifying and procuring injection molding machines, advising on injection molding tooling, or developing and troubleshooting molding processes. Would you want an intern performing open heart surgery? Of course not. You want an expert in their field to tackle the problem. But let us take it one step further. As is true in any process, there will be challenges that arise along the way, and you will want an experienced team leading the charge.

In this white paper, we will explore this process, including what makes it work and the lessons learned that have contributed to the many successful transfer outcomes that we have experienced. We will also explore common hazards and situations that can cause a transfer to take an unsuspecting turn.

Now that we have discussed the why, let us do a deeper dive into the details and explore what it is we are actually transferring…knowledge and a bit more.

Technology Transfer: A Velosity Proven Process

What makes a technology transfer program successful? The following steps are the building blocks to developing a solid plan, and each of them must be considered carefully.

EXPECTATIONS

Do you know what you want?

What resources are available?

Who will lead the charge?

What does success look like?

Define and document a complete Statement of Work (SOW). The first and most crucial step is knowing what you want and formally documenting the specifications before a proposal can be created. Solid proposals can only be generated when a complete list of the deliverables and boundaries are defined. As the age-old adage goes, garbage in equals garbage out. The degree of success depends on how well we define the requirements and align expectations. Solid definition at this stage means fewer assumptions and less interpretation will be required. Ambiguity at this step, at a minimum, will require multiple iterations of the SOW in future phases, which could set the stage for added cost and lead time further down the road. You would be surprised how often the team refers back to the SOW.

Agree on roles and responsibilities and document them. There will be many players involved in the process and each person must know their role and responsibilities. Understanding who is responsible for certain tasks will help avoid missed milestones and prevent the team from asking the inevitable question, “I thought you were going to do that?” This simple question can lead to timeline and cost impacts, as well as disrupt the flow of an otherwise successful program.

Assign a champion to oversee the process. While all positions are important, the one that stands out most is the role of the champion. Ideally, this person is the final decision maker or at a minimum has close access to the decision maker, since there will be a multitude of questions throughout the course of the transfer that will need to be answered. The most successful programs have come from partners that have assigned a strong champion, versus a committee. In our observation, decisions by committee tend to languish in approval loops, since the more opinions you have, the more time it will take to vet them out prior to making a decision. The decision will ultimately be made, but our experience has shown it takes longer and costs more in the long run with this method.

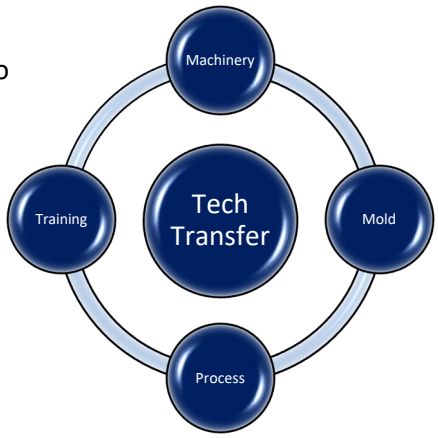
Set realistic expectations and watch for unplanned changes. Let’s face it, a perfect transfer is the goal, but reality always keeps us grounded as you can and should expect problems along the way. What keeps us on track? Strong project management as well as defined guardrails (i.e. boundaries), like the SOW. But every once in a while a deviation from the plan occurs, whether we anticipate it or not. We call that scope creep! When this happens, the best course of action is for the team to refer back to the SOW to evaluate the impact (which is why the SOW is so important). Be critical of the change, be objective when assessing the next steps, and finally be flexible when you can. The key is to acknowledge when you are off track, make the decision to make a change, update the plan (SOW), and reset the boundaries. Missing any one of these steps and allowing scope creep to go

unchecked will derail the program more quickly than anything else, causing costly time delays and budget overruns.

Define clear lines of communication. Sounds simple, and it is, but it takes work. A lot of work. There are many moving pieces and simply trusting that communication is clear can be a dangerous assumption. Too often, the best intentions are overshadowed by a lack of clarity. Get used to the phrase, "to be clear, what I heard you say is…" We have never been insulted by those asking us to clarify or repeat the plan, process, or comment. Measure twice, cut once.

Have fun. The work is difficult as is the pressure to reach the finish line, especially as the timeline narrows. Do not forget to lighten the mood along the way, and every once in a while, celebrate the small successes. Creating something from nothing is a big job, and that should be recognized.

What to Consider



There are four main aspects to a successful technology transfer, and all transfers, to some degree, have elements that fall into each of these categories from the simple sample to the more complex turnkey solution. Within each of the categories, there are considerations that need to be made, and while this is not a comprehensive list, these questions become the starting point for the statement of work (SOW). Keep in mind that all the relevant questions that will need to be asked (and documented) must support the definition of what a successful technology transfer will look like. Here are a few of the most common.

Equipment / Machinery

- ✓ What are all of the machinery requirements for the project? What brands are most familiar?
- ✓ What equipment needs to be procured versus that which is already on site?
- ✓ What level of assistance will be needed in the procurement process?
- ✓ Who will be responsible for the ordering process?
- ✓ Will the equipment fit in the work cell at the destination site?
- ✓ What are the destination power and utility requirements? Do they need to be exactly replicated?
- ✓ Will the equipment have adequate support and maintenance service options at the destination site?
- ✓ Should equipment spares be considered for critical components?
- ✓ For custom equipment, what level of documentation (IFU) will be required?
- ✓ Is there adequate delivery and rigging support at the intended destination?

Molds

- ✓ How many cycles will be needed from the molds?
- ✓ What is the mold design acceptance criteria?
- ✓ What level of assistance is needed in defining the mold specifications?
- ✓ What tooling support is available at the destination? Should spares be considered?
- ✓ What format for the mold design is most appropriate based on the CAD platform at the destination site?
- ✓ Will a mold preventative maintenance (PM) procedure need to be detailed or provided (based on support services available)?

Sampling / Process Development / Work Cell

- ✓ What are the requirements for equipment and mold acceptance?
- ✓ How much process development will be needed pre-transfer versus what will be done at final destination?
- ✓ Are there adequate metrology resources at the destination site (people expertise as well as equipment)?
- ✓ What type of analysis tools will be needed (moisture analyzer, pyrometer, flow meter, etc.)?
- ✓ What level of detail will be required in the process manual (set up sheet vs entire process development history)?
- ✓ What throughput / cycle time is needed to meet cost targets?
- ✓ Are there specific safety requirements that need to be fulfilled?
- ✓ Who will procure resin for the development process?

Training and Transfer

- ✓ What level of injection molding knowledge is on site?
- ✓ What type of training will be required prior to equipment transfer, and once equipment is on site?
- ✓ What documentation is appropriate (operator instructions, inspection plans, etc.)?
- ✓ Does the timeline account for special shipping requirements (truck, ocean freight, customs, etc.)?
- ✓ What is the scope of the startup and acceptance testing? Will a process engineer need to be on site?
- ✓ What level of support is needed post transfer?

RECIPE FOR SUCCESS

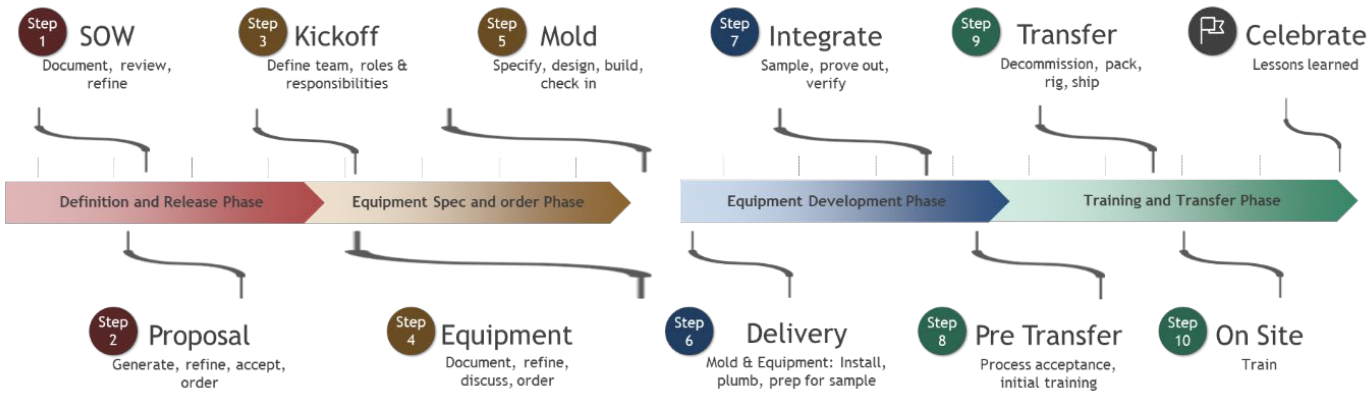
- ❖ Velosity's core equipment and processing expertise.
- ❖ Custom Mold & Design and Paradigme Engineering's best-in-class mold manufacturing.
- ❖ Highly skilled and motivated staff ready to help.

How Can We Help?

We have communicated why we perform technology transfers. We have explained how the process works and what should be considered along the way. Following is a summary checklist of the key process steps.

- ❖ Create your statement of work, and be as complete as possible. Include what support will be required so that a comprehensive proposal can be created.
  - ➢ In addition to the list of equipment and process needs, be specific on machine preferences, sampling plans, training and transfer requirements.
- ❖ Receive the Velosity proposal, and plan for a detailed review to ensure all requirements have been interpreted correctly.
  - ➢ For any areas that require some assumptions to be made, ensure those assumptions are correct.
- ❖ Start the proposal refining process to align expectations.
  - ➢ This is the time for a thorough review. Leave no stone unturned.
- ❖ Once the proposal, updated SOW, and expectations are aligned, kick off the project.
  - ➢ Assemble the teams, finalize the timeline, and execute the plan!

Typical Transfer Flow



Finally, we encourage our customers to get involved. Velosity has an open-door policy, literally. We invite our partners to not only visit, but to spend time on the floor, talking to those that are making it happen, to answer questions, collaborate and simply learn. We have found that the more interaction there is on a project, the more successful the outcome.

How do we know all of this? Experience. We have completed numerous successful transfer projects, in a wide-range of industries, all over the world. Some highlights include:

- Two molds and two injection molding machines transferred to Saudi Arabia for a major defense contractor
- Two vertical molding machines, several molds, and secondary processes transferred to Asia for a major sporting goods company
- Multiple LSR molds and injection molding machines transferred to the central United States for a major consumer/industrial products company
- Several molds transferred to Europe and South America for a major consumer/industrial products company

Still have questions? We are here to help! Velosity has experienced Program Managers and is vertically integrated with best-in-class mold manufacturing sister companies, Custom Mold & Design and Paradigme Engineering. There are many resources available to help with all stages of this process. Contact one of our business development team members to get started. We look forward to hearing from you soon!