Spring Awakening 2019: UNCSA
Technical Director's Summary

Crew

- ATD: Kevin Douglass
- Draftsperson: Ashley Harsanyi
- Lead Carp: Skylar Wostak
- Assistant LC: Luke Martinson
- Staff Carp: Olivia Miller
- Build Crew: Jami Brooks, Alejandra Campos, Lauren Eckard, Camille Everett, McKenna Farlow, Malcolm Foster, Patrick Hearn, Dustin Kirby

Money

Overall Budget:	$12,000	Final Estimate:	$10,340
Initial Estimate:	$12,285	Actual Spent:	$10,739

Labor Hours

Build	**Load In**
Estimate: 1138 (925)	Estimate: 870
Actual: 871	Actual: 886

Pre-Production / Planning

- Started looking at design ideas with Scenic Designer (SD) at the end of the previous academic year. Continued the conversation throughout the summer between SD and Lighting Designer (LD), and developed a rough 3D model to aid the discussion. Found this to be particularly useful when it came to the subject of sightlines.

- Due to the show's position in the overall schedule, the greenlight and technical design phase is extremely short. Because of this limitation on specific planning time there were several errors that created a snowball effect that required constant attention throughout the rest of the production. Possibly the largest was that I failed to properly estimate the work hours that would be required for load in. While we fully anticipated to continue building during the initial week of load in, and intended to run a split crew, the amount of extra build was significantly more than anticipated. This led to some moral issues, as well as constant scheduling challenges.

- Microsoft Teams: Before starting this production, I made the decision with the support of my faculty advisors, to utilize MS Teams as a tool to help with interdepartmental communications. Overall functionality was good, and quite often many members of the production staff found it quite useful. Unfortunately, I didn't have the requisite time or bandwidth to provide the support necessary for full implementation and training. Moving forward I believe it would be beneficial to have a dedicated individual who is not a department head managing the information handling aspect of MS Teams, and providing training and support as needed.

General Notes

- Incredible number of parts.
    - There were many small pieces on this show, and I knew that carefully tracking all of them was going to be a difficult challenge. My original plan was to have a specific labeling system in place before the build process started, so that we could easily mark each component of each unit. This system wasn't fully realized by the time build started, and became increasingly difficult to maintain as the build progressed. The large crew made this particularly challenging as it didn't take many small mistakes to cause larger issues. In retrospect it would have been more effective to assign one individual to implement a labeling and tracking system, and then oversee and ensure that the system was being maintained.
    - Overall, we were able to track the specific larger elements effectively, and the smaller pieces quickly became standardized so their exact designation and tracking was less necessary.

- Having an early understanding of the design, and where it came from, was extremely useful. Since the designer and I had been in ongoing conversations about the show from its earliest conceptions I was able to maintain a clear understanding of what his artistic needs and visions were. This regularly led to more productive conversations about what the show needed, and how we would be able creatively to fulfil those needs. The other side of this was that I would often forget that my staff had not had this same luxury, and because of this I found myself running ahead of them and unfairly assuming they knew about aspects of the design that the SD and I had talked about months previously.

- I spent a lot of time and energy searching for the best and cheapest option early in the technical design phase. While this did pay off well in the form of keeping the show well within budget, it also likely cost more of my time than was necessary or ideal. Moving forward I feel that as long as I have an acceptable option that is within the estimate range my time is better spent solidifying as many variables as possible, rather than focusing on making each option the absolute best/cheapest, specifically when time is as limited a resource as it was for this production. That is not to say it's not worth revisiting options for potentially better solutions as time allows.

- Working with an all student team is a unique challenge. Each staff member was new to the position they were in, and therefor actively learning how best to function in their roles. Additionally, our entire build crew consisted of first year undergraduates, many of whom had never used a power tool before. It was constantly impressive how fast everyone on the team was learning, this often caused me to forget how inexperienced many of them were.

Units

Main Deck:

- **Floor:**
  - Knowing that the main floor would be a very rough and textured visual look we chose to use older Masonite from storage, with the intention of purchasing new sheets to replace any that were cut to fit. This was largely to reduce costs.
  - Given the poor overall state of the sheets that were used, the choice was made at the end of the production to send the entire floor to the dumpster.

- **Footlight Troughs:**
  - The original design for the light troughs was for the actors to be able to walk on them. I went through many different material options to try and find a solution that would be both effective, affordable, and within the scope of what our crew could handle. Ultimately I never found a solution that satisfied all three criteria. Early in the scenic build process it was discovered that the

intended lighting effect would not work in the way the scenic and lighting designers had envisioned. This led to a redesign of the troughs to accommodate direct foot-lighting, and allowed me to pursue a much lighter and more fragile construction method.

- **Thrust:**
    - One of the early hurdles I encountered was the planned thrust platform requiring the removal of the first row of seating. My examination of the seats led me to believe this would be an easy task, however I was informed that the anchors for those seats were extremely worn. While removal would not be difficult reinstallation was likely going to be quite problematic, if it was possible at all. Ultimately the director requested a smaller thrust platform for staging purposes, which allowed the use a single stock platform for the thrust that didn't interfere with any of the seating.

Stairs:

- **Main stairs:**
    - The large span of the primary stair cases required some detailed technical design work to ensure several actors could safely occupy them at the same time. The calculations I made showed that the construction method that was planned would be safe, but may be uncomfortably springy. Knowing this we prepared multiple contingencies to alleviate any excessive deflection if it became and issue.
        - Plan #1 was to add additional framing to the inside of the stringers.
        - Plan #2 involved adding a compression leg to the center stringer ~1/3 of the way up the staircase. This did end up being the solution, and worked well to alleviate the deflection.
    - Cutting the quatrefoil details into the risers was expected to be a very time-consuming process. While the CNC router table was considered I chose to not use it, in favor of cutting the risers to size more efficiently on conventional saws and adding the detail to them individually. I looked at the possibility of using a single template and a pattern bit for a hand router, but ultimately chose to use a 2" Forster bit. This method proved effective, and also provided a learning opportunity for the first-year students in the form of discovering

that it's possible to trip a circuit breaker if a tool is overloaded too much for too long. In retrospect, and with a little more experience with the CNC router, cutting the risers with the conventional saws and setting up an alignment jig on the CNC table would likely have been the most efficient way to create these parts.

- **Escape stairs:**
    - Knowing the height of the 2nd level was similar to that of the one in the production of Company from two years ago I expected we would be able to utilize the same escape stairs with minimal modification. This proved true, and was a relatively clean and quick solution.

Second Story:

- **Steel legs:**
    - 3"x3" box tube is a known solution. The math checked out, and they provided a solid top surface for the rest of the structure.
- **Steel super structure:**
    - The large unsupported spans of the 2nd level over the band area required beams that were sufficiently strong. Steel was the immediate choice, but the specific profile changed multiple times.
    - Initially I had planned to use 3"x6" rectangular steel tube. This was largely because it is a type of material that I'm comfortable with, and felt I had a fairly good idea of how to work with it. Due to supply issues we were forced to look at alternative options.
    - I was able to locate suppliers who could deliver appropriate c-channel and I-beams in the timeline I was working with. While these were going to be significantly heavier, they would support the span well.
    - In order to secure the beams to the legs I devised a clip system, such that the need to weld tabs to the beams was minimal. This allowed for a much-needed fast track through the metal shop as we approached load in.
    - For safely installing the heavy beams we bolted them together on the ground and then affixed them the fly system. We were then able to add weight to the arbor until the battens were balanced and we could easily raise the beams to their proper position.

- **Stock Platforms:**
    - Used as many stock platforms as possible in an attempt to keep cost and timeline under control. There was ongoing discussion between myself and two other TDs who also needed a large number of stock platforms at the same time. The solution was for me to use only 5/4 framed platforms. This allowed me to utilize the coffin locks of the 5/4 platforms when securing them together.
    - One of the expected advantages of the 5/4 platforms was to use the built-in coffin locks to secure them together. This was only partially successful, as a significant number of the coffin locks failed to fully engage. The tight timeline of load in necessitated that we bolt through the framing on many seams to ensure a solid and safe connection.

- **Stress Skins:**
    - To safely span the necessary distance over the band area I looked at many options. Including steel framed platforms, larger than standard wood framing, and eventually decided on stress skin platforms.
    - I utilized my own custom-built Excel calculator to aid in the specific and complicated calculations to ensure the structural integrity of the stress skin platforms would be sufficient. Given the inexperience of the first-year students that made up the majority of my crew, I intentionally overdesigned these platforms to offset any minor errors that may not be caught and corrected properly during construction. I also made sure that my staff members were all helping me keeping a close eye on how the construction proceeded.
    - One of the few downsides to the stress skin platforms was their significant weight, made worse by the lack of open framing to act as an easy grip. Special care had to be taken at every stage when transporting these platforms, and raising them onto the steel framing during load in became an exercise in closely coordinated teamwork.
    - Even with the hurdles we experienced I found the stress skin platforms to be an ideal construction method for this application. While they certainly aren't the solution for every set, I'm far more likely to consider them in the future after seeing how well the performed in this situation.

Columns & arches:

- **Arches:**
    - Due to the intricate details designed into the decorative arches, as well as the large number of pieces needed, using the CNC router table was a clear choice for fabricated the base parts.
    - Creating the toolpath files for these parts was something I ended up undertaking myself, rather than delegating. There are a limited number of students who are versed in the correct use of the CNC machine, with my small prior experience it made the most sense at the time for me to continue learning that system rather than trying to teach someone new.

- **Columns:**
    - The overall shape of the columns was originally conceived to be a wrap around the structural steel legs. My inclination was to use foam, for its light weight and ease of working. The scenic artists made a strong request that we not use foam as it would increase their process time, and they were already going to be short on available labor.
    - The final design included a specific and complex profile cut from a 2x4 on the table saw, built upon with simpler shapes to create the finished piece. This build up was such that it could easily be fit around the structural legs for the lower columns.
    - The addition of molding at the top and bottom took an unexpected amount of labor to complete. Each column was simple enough in concept, but the shear number of them meant that every step took far longer than I anticipated. The other challenge was the small size of each piece of molding, making the cutting process both tricky and potentially quite dangerous. To mitigate the danger I built a specific table saw sled, and enlisted the aid of a 2nd year graduate TD to do the bulk of the cutting, as I knew he could do it safely and efficiently.
    - As with the arches, these were always intended to arrive at the paint deck near the beginning of load in, and be one of the last parts to be installed.

Railings:

- Initial designs had me searching for vintage railing parts. These proved to be either too expensive or simply not available, which lead to a lengthy discussion with the scenic designer about what our realistic options were. This resulted in an eventual change from round to square railings.
- Early in the rehearsal process the director requested that an actor be able to climb over and across the railings. This presented me with an unexpected technical challenge that was solved by adding framing to the custom-built stress skin platforms. Each of the railing uprights could fit precisely in the additional framing, and would then be secured in place via cast iron flanges. Because of the exact nature of this fit the construction of the stress skin platforms was slowed to allow multiple people to check each step and ensure proper alignment. Because of this care the majority of the railings fit into the framing cleanly and quickly during load in. The ones that required adjustment only needed minor adjustments before the associated railings could be slotted into placed.

Walls:

- The largest technical design challenge for the rear walls was their height coupled with a lack of room for conventional support. I delegated the majority of this unit to my ATD, who came up with a plan to utilize mostly stock flats with a few custom-made flats to finish out the wall. His support plan was to use scenery jacks on the extreme edges, and suspend the middle of the wall from the overhead fly lines.
- The surface of these walls was largely a brick finish. We were able to use sheets of PulpArts pressed paper brick that the scene shop had kept in storage for several years. These panels gave an extremely good brick look once the scenic artists were done with them, however they did have a tendency to curl and warp badly with the application of paint. The solution was to add many more screws to hold them in place as they dried.

Sliding Windows:

- The choice to automate the movement of the large back wall windows was made to ensure they would move at a consistent and smooth pace.
    - This also provided me with the opportunity to interface with the Stage Automation department through the planning, build, and install phases.

    - Our choice to install the automation rig on standard truss was motivated by the ability to set up the whole system in the scene shop for testing, and then transport to the theatre with very little dismantling needed.

- The size of the windows once again urged the use of a steel frame. While this did cause each window to have significant weight, it meant they were an extremely sturdy base for the screen and Crystal Gel window pains to be installed on. The end result was a wall that many audience members were unaware would be able to move until the final moment of the show.
    - The Crystal Gel itself presented issues in that it has a strong tendency to stick to itself. This meant that the window pains could not be stacked for a long time, or they would become permanently fixed together and any attempt to separate them would cause irreparable damage. The solution was to use parchment paper between each sheet for transport and storage, which worked extremely well.

False Pro & Truss:

- **Floating trusses.**
    - These units initially seemed quite simple to me. What I failed to take into account was how much my prior experience has colored my judgment of the complexity of a project. In this situation we had eight first year student crew members, many of which had never touched a power tool until the start of the semester. While they did a remarkable job of getting up to speed, they were still starting from a position of nearly no experience. The time required to properly train them on the safe and effective use of all the various tools in the shop was also an unplanned hurdle.
    - Starting with a project that was more challenging that I had intended had the benefit of giving the entire team a very strong starting point. By completing something that was both large and difficult the crew was able to clearly see the significant result of their efforts in a big way. This boosted their moral, and more importantly gave them a strong sense empowerment to know they can do something that is daunting, and do it well.

- **Header**:
    - The construction of the header generally followed the same principles we had employed earlier in the build on pieces like the Floating Trusses. This meant that while it was bigger and more complex the methods were already known to the crew. As a result, it came together quite quickly.
    - We did have some issues with warped lumber that I didn't catch until pieces were already finished. Rather than restarting those portions we were able to devise ways of compensating for the warp during load in.
    - Since this unit sat directly beneath the air handling pipe (the Worm) in front of the proscenium we knew it was going to be a rigging challenge to safely lift it into place. With no place to set motors above where it needed to be, and no easy way to set a direct hanging point over is final position we had to find a creative solution. By lifting it initially downstage of the Worm we were able to get it close enough to its final position to make solid connections through the catwalk to the high steel. Once those connections were made, we lowered it in on the lift motors and allowed it to gently set against the proscenium. With the addition of felt backing pads on the header we felt comfortable letting it rest in that position.

- **False Pro Side Towers:**
    - Initially I had intended the header to rest on the side towers, but later decided that the units should all be independently self-supporting.
    - Raising them into place by lifting on their top guidelines and rolling the base into position worked extremely well. The hurdle was then reaching the connection point in the air to attach them to the catwalk above, with the Worm in the way and the Genie lift not able to get within easy reach. The addition of trim chain inside the unit where it could be reached later on would have been an ideal solution.

General:

- **Wheat:**
    - The ground row of wheat was a point of discussion early in the production, specifically which department it fell under. The final decision was that Props

would provide the knowledge and research, while Scenery would supply the bulk of the necessary labor and purchase the required materials.
    - The project was pushed back several times, to accommodate more pressing items. This resulted in both departments putting extra time into finishing it at the very end of the tech rehearsals.

- **Rivets**:
    - The physical rivets on this set presented the challenge of not only attaching over 2400 hemispheres to the set, but also being able to do so quickly and properly aligned. This was one of the few theatrical applications of hot glue where I truly believe it was the best adhesive for the job. It has plenty of holding power for this application, it is also fast setting and easily portable.
    - The solution to speed up placement was to make several templates that could be used to quickly layout marks, or the rivets themselves, in the correct pattern. These templates ranged from carefully made lauan inserts made with 1:1 scale print outs, to simple cardboard pieces with hand cut holes at the proper spacing. Both methods worked quite well.

Freedman Theatre at UNCSA:

- This theatre is a complicated space with many quirks. I made several site survey trips to measure and examine as much as I was able to early in the process. This gave me a good understanding of the space before I was there with the scenery and a crew.
- Closing in the air wall was significantly easier than we had been led to understand. Once the correct platforms were removed it was a relatively simple matter of tracking each panel into place.
- Given that there is no consistent Center-Line the electricians and I made a decision at the beginning of load in as to what we would consider the official center. I was also able to mark the upstage edge of the proscenium overhead to use as an official plaster line by using a laser plumb. Having these agreed upon reference points was vital in a space that is neither straight nor square.