

| Description of component, subsystem, or function | Symptom (what?) | Effect (so what) | Failure mode (why?) | Probability of failure | Severity of effect | Risk priority |
|--------------------------------------------------|------------------------------|-------------------------------------------|--------------------------------------------------------------|------------------------|--------------------|---------------|
| Bandbeesten Piano Startup | Connecting the controller. | Piano wont function. | Arduino switch is left off on actual box. | 5 | 4 | 20 |
| | | | Not all positions are hit on the controller calibration. | 5 | 4 | 20 |
| | | | Arduino switch on piano is in the off position. | 5 | 4 | 20 |
| Bandbeesten Piano Maintence | Motor drivers are not tight. | Piano doesn't spin smoothly and is jerky. | The chain slips on the sproket causing the piano to jerk. | 3 | 3 | 9 |
| | | | Bolts on each driver are not tight. | 4 | 3 | 12 |
| | | | The bolts are not checked after each practice or performance | 4 | 4 | 16 |

| | | Very | | | | |
|---------------------|----------|----------|----------|------------|--------|------------|
| | | Probable | Probable | Occasional | Remote | Improbable |
| | | 5 | 4 | 3 | 2 | 1 |
| Catastrophic | 4 | 20 | 16 | 12 | 8 | 4 |
| Critical | 3 | 15 | 12 | 9 | 6 | 3 |
| Marginal | 2 | 10 | 8 | 6 | 4 | 2 |
| Negligible | 1 | 5 | 4 | 3 | 2 | 1 |

Severity of Effect

- Catastrophic** The failure causes substantial damage to the product itself or related items (including people), requiring repair.
- Critical** The failure causes significant damage to the product itself or related items, requiring repair.
- Marginal** The failure causes some damage to the product itself or related items, potentially requiring repair.
- Negligible** The failure causes no significant damage.

Probability of Failure

Very

- Probable** Every time
- Probable** Most times
- Occasional** Observed multiple times during the project.
- Remote** Might be possible during the project.
- Improbable** Maybe observed once during the project or predicted to happen after hand off.

| Remedial action | Probability of failure after action | Severity of effect after action | Risk Priority |
|-----------------------------------------------------------------------------------------------------------------|-------------------------------------|---------------------------------|---------------|
| Label the switch on the outside of box with off and on. | 1 | 4 | 4 |
| Make sure the joysticks on the controller hit every point by moving them as fast as possible in all directions. | 2 | 4 | 8 |
| Create a Piano startup checklist with all the steps in order to start the piano. | 1 | 2 | 2 |
| Check all the chains before each performance/practice and remove link if needed. | 2 | 3 | 6 |
| Tighten all bolts on each motor driver before each use. | 1 | 2 | 2 |
| Have a log to make sure that bolts are checked before and after every use. | 1 | 3 | 3 |