1. **Develop a more robust means to transport rotors & internal assemblies to/from Plant 2.**
   - Must be transportable by fork truck (either by lifting or towing)
   - Must be able to lock in place to prevent movement of the rotor or bundle in any plane. (Vee block similar to existing toter is ok but axial movement must be prevented)
   - Must include some sort of “cover” to protect from the environment (dust, dirt, rain, snow, etc.)
   - Adjustable (or multiple sizes) to accept different sizes / configurations. (existing toters allow shaft to extend beyond toter. New unit must fully protect shafts)
   - Suitable for outside transport between plants.
   - Must have “brakes” to prevent movement when required. (if towable toter is designed)
   - Must be able to place load on cart / remove from cart with overhead crane.

2. **Develop a mobile device on which a compressor case can be mounted upon receipt in Plant 2 (at hydro). The case would then be moved within Plant 2 while on this transport device, without the use of a crane.**
   - Must be transportable by fork truck with case installed.
   - Support at compressor feet. Lock in place to prevent movement of the case in any plane.
   - Able to rotate case 90 degrees (from horizontal to vertical) each way so that heads can be installed while case is in vertical position at hydro. (see note below)
   - Must allow access to nozzles & head piping so blanks can be installed at hydro and during case integrity testing.
   - Adjustable to accept different case sizes / configurations.
   - Device support feet adjustable to allow leveling of the case. Since this will presumably be a rubber tired vehicle we would need to a set of hydraulic jacks to level the toter to the floor
   - Suitable for outside transport between plants?
   - Suitable to be placed into blast booth when case is shot blasted? Requires some sort of protective device to prevent damage to cart during blast? (I’ve seen rubber coated devices used in blast booths before)
   - Suitable to be placed into paint booth when case is painted? Requires some sort of protective device to prevent painting of cart during case painting?
   - Must have “brakes or retractable hydraulic jacks to level and to prevent movement of case during bundle insertion.
   - Must allow access for bundle insertion tooling and to place bundle into case.
• Must be able to place case on cart / remove from cart with overhead crane.

3. Develop an adjustable bundle cradle support that can be used during laser concentricity verification (to isolate vibrations) and insertion / removal of the bundle into / out of the case.
   • Must dampen out vibrations from fork trucks, overhead crane movement, etc. so as not to upset laser alignment process.
   • Must be infinitely adjustable in the vertical plane.
   • Provide for leveling for bundle insertion into case.
   • Must allow access for special tooling required for bundle insertion into case.
   • Must be able to place bundle cradle on / off with overhead crane.

Note,

We may need two separate tools here. One to build the bundle in and possibly one to insert the bundle, unless the tool above is designed to accept existing type tooling. The laser repeatability issue will require the laser tripod to be affixed to the bundle build stand while being isolated from the floor. Depending on bundle size etc. This can just be a cantilevered bracket off the cradle tool and isolated from the ground with a spring and damper arrangement tuned to eliminate the low frequency vibrations from the crane.

Another idea for hydro where we have to tilt the cases would be to have the case cradle towable with a fork truck and the tilting done by a dedicated device installed in the hydro area. Pull the case toter on to the tilter, lock it in place and hydraulically tilt the case as needed to insert the heads. This would make the case toter much simpler and the tilting would be done only in the hydro area.