ASHED

SOUTH SIOUX CITY COMMUNITY ORCHARD FACILITY
ASHED is a showcase for South Sioux City’s Ash reclamation program and the first cross-laminated timber building in (name withheld). It was built in response to the growing concern of ash tree depletion by the Emerald Ash Borer beetle and a need to prepare students with knowledge of engineered lumber construction.

ASHED was conceived as a building that would compensate for the loss of ash trees in local parks. It was important that the timber reappeared within the community and that the building’s program would support the growth of new trees in the orchard.

In 2016 SSC Parks Director and City Administrators adopted a proactive policy to remove threatened trees and protect against further infestation.

In response to public reaction, the city agreed to mitigate the loss of trees by approaching various agencies for advice. This resulted in a collaboration between the (name withheld) Forestry Service, (name withheld) College of Architecture, and a community orchard program to create a small meeting hall and storage facility, using the felled trees as the basis of design.

ASHED is a symbol for community sharing and gathering: a place to harvest apples and honey for donation to the public and educate young community members on themes of food production. The building is a two-story structure with a main function of storing tools and supplies for orchard maintenance, while secondary functions include gathering spaces for education and harvest processing.

ASHED refers to a rural shed typology utilizing exterior awning doors for quick access to tools and to create shade for exterior gathering. At the end of each day, the doors fold back into the façade creating a seamless box.

ASHED was designed and built over a two-year period and incorporated several groups of students within the design-build program. From inception to completion students were involved in schematic design, construction drawings CLT shop drawings, site coordination and extensive hands on making. The Integration of local EAB Ash with advanced CLT construction presented students with a unique learning experience in design-build education.
Since the discovery of the Emerald Ash Borer near Detroit in 2002, the “jewel” beetle has caused extensive damage across the eastern portions of the United States. It is estimated that by 2020 these costs will reach $12.7 billion dollars nationally. To date the Ash Borer has been reported in 30 states with the Great Plains showing the most recent infestations.

ASHED was designed in response to the EAB and explores methods of localized milling, controlled transportaion, drying to provide solutions to cladding and interior furnishing.
Students worked in conjunction with local forestry organizations in the harvesting and preparing ash. Selected trees were site-milled, transported, stored, and dried under the USDA-APHIS EAB Quarantine Regulations. 2000 BF of rough sawn boards were transported to (name withheld) and planned, edged, lap cut, and treated with a protective sealant in preparation for installation.

Cladding was designed to maximize board feet usage from each reclaimed tree. Random width and length of each board were organized by a series of horizontal datum lines across the facade.
The integration of Ash with CLT presented students with the opportunity to develop detailing, fixtures, and openings which explored new opportunities afforded by through interfacing with engineered lumber construction.

The construction of the project was divided between elements made and installed by students (Students Fabricated Items) and the CLT primary structure which was designed and co-ordinated on site by students.

SFI items included cladding, awning/door/window mechanisms, dowel laminated stairs, handrials, seating, stack column and interior furniture.
B - dowel laminated staircase

D - bi-folding door wheelhouse
ASHED explores techniques of lamination in the fabrication of the steam bent double-curved handrail. Ash has unique flexibility that make it ideal for forming into both radial and torque twisted shapes. Students produced and installed the handrail through dowel balustrades inserted into the CLT slab on site.
Laminated ash handrail and stacked ply column
A major SFI included the design and fabrication of the dowel laminated stairs. Students produced each stair tread from parallel bonded dimension lumber with 3/4" dowels pierced at random angles (to prevent delamination). The treads spaned the stairwell bearing on the CLT walls either side.
Dowel-laminated staircase, Ash handrail and balustrade
C - SCREENED SHUTTER WINDOWS

The screened shutter windows allows users to operate the winter shutters from inside without allowing insects to enter the building.

issues:
Solutions:

second floor windows
Aubrey Wassung 12-07-17 ARCH610-004 Jason Griffiths

COMMUNITY ORCHARD EDUCATIONAL CENTER
South Sioux City, NE

2ND FLOOR WINDOWS
1/4" shim
3-ply clt
3/4" birch plywood
3/4" ash cladding
1x2 pine batten
2 1/4" deck screw

2" hex bolt
1x1 batten
1x1 steel tubing
1/8" steel plate

2" pneumatic nail
3" lag screw
1/8" steel plate
dowel latch
170 lb/force gas piston
2" hinge
sill plate

2ND FLOOR DOORS AND WINDOWS
Dayna Bartels 12-07-17 ARCH510-004 Jason Griffiths

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The screened shutter windows allows users to operate the winter shutters from inside without allowing insects to enter the building.
Ash awning stutters with screened openings
ASHED is constructed of prefabricated and site-assembled CLT panels. Working in conjunction with industry partners, like (name withheld), taught students about “design assist” agreements and how to work with “file-to-factory” fabrication procedures. Students coordinated delivery and negotiated site assembly processes with a local contractor.

CLT assembly drawing to meet suppliers notation, tolerance, panel size and connection requirements.
The bi-folding corner door required a unique design solution to allieviate the load placed on the primary structure. The weight of the Ash had to transfer to 3 hinges along the door frame and then to the stoop beneath the door. For this door system, students fabricated several custom made wheelhouses to distribute the load, streamline the door's movement, and to help balance the overall load of the door.
South west view
West elevation - tool storage access panels on hydraulic openers.
Ash table and dowelled benches.
Interior looking north west