Thomasson Industrial Services

Qualifications

with emphasis on
Food and Beverage

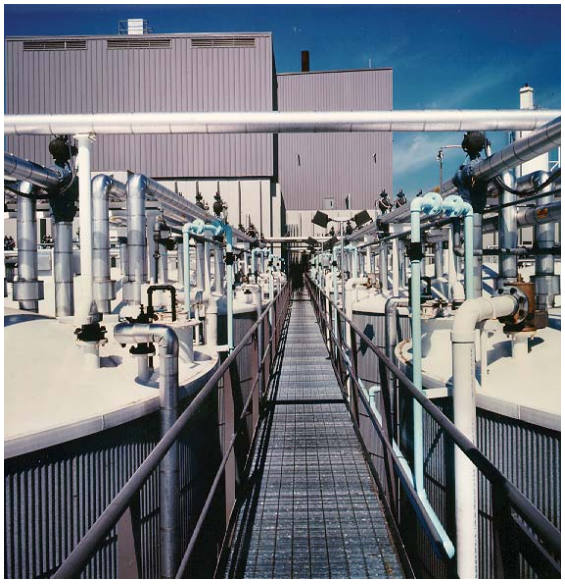

Table of Contents

Overview

TIS has senior professionals in key leadership roles in the major disciplines and has strategic alliance firms that provide additional capacity and specialized capabilities to suit the requirements of specific project types and localities.

Thomasson Industrial Services (TIS) is a full service professional planning, design and consulting firm that provides all disciplines required for planning and design of industrial site and facilities, manufacturing and industrial processes, and power generation and energy-related projects.

TIS is an alliance of I. C. Thomasson Associates, Inc. (ICT), a consulting engineering firm headquartered in Nashville, Tennessee, with prominent design firms Design Innovation Architects, Manous Design, and Carpenter Wright Engineers. ICT has provided consulting engineering services across the USA and abroad for decades in a wide range of market sectors. TIS offers planning, consulting, design, construction/start-up support and program/project management services to our clientele in the industrial, process and power generation and utilities market sectors:

- Master Site, Infrastructure and Facility Planning
- Facilities Assessments
- Building Information Modeling (BIM)/3D Design
- Site/Civil Surveying and Engineering/Landscape Architecture
- Architecture/Life Safety & Codes Analyses
- Sustainability Consulting Services/Renewable Engergy Design
- Structural Engineering/Integrated Steel Design
- Mechanical Engineering (HVAC, Plumbing, Piping)
- Fire Protection Engineering/Explusion Protection & Prevention
- Refrigeration Engineering (Central plants and split systems; distribution systems; cool rooms; cold storage)
- Electrical Engineering (Power, Lighting, Low Voltage/Specialty systems)
- Electrical Distribution Systems Engineering
- Process/Mechanical Engineering (Planning Studies, Equipment Layout, General Arragnement, Equipment Installation Packages, P&IDs, Utilities Capacity Analysis and Design)
- Industrial Systems Engineering/Layout and Workflow Optimization
- Material Handling Systems
- Lean/Continuous Improvement Strategies and Impementation
- Controls & Instrumentation Engineering (Real-time Automation, Data Acquisition, Custom Controls/ Operator interface, Analytical Instrumentation and Environmental Monitoring)
- Energy Engineering and Consulting/Energy Assessments
- Environmental Engineering, Permitting and Consulting Services
- Water/Waste Water Treatment and Distribution Systems Engineering
- Intelligent Transport Systems (fiber/broadband, data/comm, IT)
- Construction Start-up Support/Field and Commissioning Services
- LEED Commissioning, and Measurement & Verification services
- Bidding/Negotiation/Procurement Phase SUpport Services
- Construction Phase Support Services
- Program and Project Management Services

I. C. Thomasson Associates, Inc.

- Founded in 1942
- Employee owned
- Over 200 professional employees
- 69 Professional Engineers
- 14 LEED accredited professionals
- Corporate Headquarters - Nashville, TN
- Over 600 projects each year, large and small
- Many projects from repeat clients

I. C. Thomasson Associates, Inc.

Our Alliance Partners

Carpenter Wright Engineers
Structural Consultants

- Established: 1976 (44 yrs. in business) with offices in Nashville, TN & Knoxville, TN
- Sectors: Industrial, Institutional, Commercial, Residential and Infrastructure Structures
- Specialties: Manufacturing Facilities for steel, automobiles, tires, plastics and food
- Specialty Skills: Mission-critical Data Centers and Long-Span Aircraft Hangers
- Unique procedures to accelerate the design, fabrication and delivery of steel framing systems.

DIA
Design Innovation
ARCHITECTS + INTERIORS + PLANNING

- Established: 1989 (30 yrs. in business) based in Knoxville, TN
- Services include: architecture, interior design, land planning, and project management
- Sectors: Multi-Family & Single- Family Residential, Corporate, Commercial, Hospitality & Theaters, Retail, Food Service, Industrial / Manufacturing, Religious, Educational, and Health Care
- Project Size from 2,000 sq. ft. to over 1,000,000 sq. ft. with budgets from $50k to upwards of $200m

MANOUS DESIGN

- Established: 1992 (over 25 yrs. in business) based in Lebanon, TN
- Services include: Architectural Design, Life Safety, Master Planning, Civil Engineering, Structural Engineering, Interior Architecture & Design, Landscape Design, 2D and 3D Computer-Aided Designs
- Budgets have ranged from $250,000 to more than $250 million
- Projects include everything from private residences to master-planned projects, from historic restorations to mixed-use retail centers, and from commercial distribution centers and industrial facilities to country clubs.

Food Grade Manufacturing Plant
Taiwanese Confidential Client
Murfreesboro, TN

I. C. Thomasson Associates, Inc.
Mechanical, Electrical, Plumbing and Fire Protection

Manous Design
Architecture

Carpenter Wright Engineers
Structural

ICT was responsible for all planning and architectural and engineering design for the upgrade of an empty (approximately 138,000 SF) industrial facility into a state-of-the-art USDA food production facility. The design was prepared so that the utilities infrastructure could be added over an extended period in a phased approach.

The Planning Phase included the development of an Operating and Design Criteria planning document for use as the guideline during the design development of the construction documents. This planning document included all plant capacity and performance requirements including production (cases per month) criteria from initial production thru ramp-up to the forecast ultimate production capacity. The planning document included detailed narratives of the material flow thru the plant and each of the production processes, from raw ingredients/materials receiving thru final processing, packaging, cold storage and shipment, as well as employee headcounts and all supporting process utility systems.

Design included the following elements:

- Civil – revised existing sewer service to upgrade from a 6-inch service to an 8-inch service. Provided a design to upgrade the existing 3-insch water service to a 4-inch service, including new reduced pressure principle backflow preventer. Provided design for a solids settling tank. Designed upgrades to the site parking and paving layout. Provided design for a rodent prevention strip around the existing facility.
- Structural – provided design for structure at building additions; structural supports for piping and HVAC, utility, and refrigeration equipment; design for access stair towers; and miscellaneous structural supports.
- Architectural – provided design for upgrades at Raw and Ready-to-Eat Break Rooms; provided design for two-story Maintenance Offices, Truckers' Lounge and Break Area; provided design for insulated metal panel walls and walk-on ceilings at 120,000 SF production area. Design at production area included selection of interior finishes, doors and windows and design of curbing and floors sloped for daily wash down.
- Process - ICT provided the General Arrangement of the entire plant process and support systems and equipment, and the plant layout of the individual storage (dry goods, freezers, in-progress and final products storage), preparation and processing areas. The systems included the raw ingredients (meat, vegetables, flour, et al) processing, dough making/mixing/filling, cooking/frying, product cooling/freezing (including cooling rooms, blast freezers and spiral freezers), and finished goods cold storage. ICT provided the design

of of ancillary systems such as the clean-in-place sanitary systems and all utility systems.

- Refrigeration - provided the design of the 350 psig rated R-507 refrigeration system, including the central refrigeration plant (screw compressor packages, condensers, refrigerant pumps, heat exchangers, pressure vessels / receivers / accumulators / recirculator, controls, et al) of approximately 500 tons capacity; and the associated refrigerant delivery systems and evaporators for the various freezer loads throughout the plant.
- HVAC – provided design for 1,200-ton chilled glycol hydronic system, including roof-mounted cooling towers, recirculation pumps and chemical water treatment. Air flow in food production areas was designed to facilitate relative pressurization adjacent process areas. HVAC design included ability to accomplish daily wash-down of food production areas on a single shift.
- Plumbing – provided design for sanitary and process sewers. Design included separation of process sewers for raw and cooked products. Design included partial replacement and refurbishment of existing plumbing fixtures in process areas and design of new plumbing fixtures at the Raw and Ready-to-Eat Break Rooms and at the Maintenance Offices.
- Utilities – provided design of utilities systems, including piping and equipment. Design included three 6,900 pound per hour 90 psig steam generators, two 300 HP air compressors, air dryers, oil-water separators, steam-to-water heat exchangers (process and domestic water heaters), domestic water booster pumps and high pressure washdown water booster pumps.
- Fire Protection – provided design to upgrade existing fire protection system. Design included wet sprinkler systems for food processing areas, warehouses (including rack storage), and "dry" ESFR systems for rack storage in freezers. Provided design for the upgrade of an existing electrically-driven fire pump from 1,000 GPM to 1,500 GPM.
- Power – provided a design for two 4,000 amp services to feed the main plant and one 3,000 amp service for refrigeration equipment. Service for the refrigeration equipment included a 1,600 amp generator quick connect to facilitate providing emergency power to the refrigeration equipment. The design included three new transformers at the site. Provided design for a frost heave prevention system under process freezers.
- Lighting – provided design for lighting in common and food processing areas.
- Fire Alarm – provided design of fire alarm systems for food processing areas including warehouses and freezers.

Tennessee Rehabilitation Initiative in Correction (TRICOR) Cook-Chill Facility
Equipment Replacement - Food Process Chillers
Nashville, TN

ICT provided prime MEFP design services to replace three existing antiquated refrigeration racks, associated refrigeration piping, and electrical service associated with the production of food for inmates and facilities across Tennessee. The new design includes three new packaged air-cooled direct-expansion refrigeration racks totaling 290 tons of refrigeration for chilled production rooms (40-50 degrees), cold storage rooms (26 degrees), storage freezers (-20 degrees), and blast chillers (-40 degrees). The design addressed logistical concerns to maintain operations during construction to avoid disruption of services.

The design addresses bringing new refrigeration equipment on-line while phasing out the old refrigeration systems.

Thomasson
Industrial Services

Specialty Breads
Freezer Addition
Lebanon, TN

I. C. Thomasson Associates, Inc.
Mechanical, Electrical, Plumbing and Fire Protection

Manous Design
Architecture

ICT provided mechanical, electrical, plumbing and fire protection engineering design and construction phase support services for an approximately 10,200 SF addition consisting of a freezer and cooler dock to unloading facility with approximately 100-ton split-system refrigeration system.

Features

- -10 degrees freezer (5,600 SF)
- 45 degrees cooler/shipping dock (3,250 SF)
- New receiving dock (1,150 SF)
- -35 degrees cooler (200 SF)
- Electrical floor warming system.
- Evaluated existing electrical service and 3,000 amp switchboard and was able to utilize unused capacity without upgrading the existing service and a new 480/277 volt panelboard for the new plant addition.
- Electrical power control panel interface for future solar photovoltaic system.
- Electrical interface provisions for future standby power generator.
- High efficiency fluorescent lighting.
- Extended sprinkler service to new addition by modifying an existing sprinkler riser.
- Sprinkler design included new dry system risers and a double-interlock pre-action system for the rack storage freezer area. A Protesto-wire system was used for heat detection at the pre-action system.
- Coordinated new hydrant flow test to obtain updated design information.

Food Grade Manufacturing Facility
Nashville, TN

ICT provided project management, architectural and MPFE design and construction phase services for a meat processing line, a soup line and a retail line.

- Refrigeration – ICT coordinated and provided design for utilities including structural supports for receivers and evaporative condensers and electrical power to engines. Design for refrigeration upgrades will be provided by CAT (refrigeration sub-consultant).
- Process - ICT coordinated the General Arrangement of the plant process and support systems and equipment based on input from the Owner.
- Utilities – ICT provided design of utilities systems, including piping and equipment for steam, compressed air, and cold and hot potable water.
- ICT provided design for HVAC, Plumbing, Fire Protection, Power, Lighting and Fire Alarm.

Food Grade Manufacturing Facility
Fort Worth, TX

ICT provided project management, architectural and MPFE design services and is providing construction phase services for a meat processing line and a soup line.

- Refrigeration – The existing facility utilizes an ammonia refrigeration system. There are about 900 tons of cooling at -40F and about 2,000 tons of cooling at -20F. ICT coordinated the phasing and sequencing of the ammonia refrigeration upgrades for the individual project additions. ICT coordinated and provided design for utilities including structural supports for receivers and evaporative condensers and electrical power to engines. Design for refrigeration upgrades was provided by CAT (refrigeration sub-consultant). Process - ICT is coordinating the General Arrangement of the plant process and support systems and equipment based on input from the Owner.
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- ICT provided design for HVAC, Plumbing, Fire Protection, Power, Lighting and Fire Alarm.

Food Grade Manufacturing Plant
Confidential Client

Design Build

I. C. Thomasson provided mechanical, electrical, plumbing, fire protection, building power and process engineering design and construction phase services for a greenfield food plant. The client is relocating its food operations and U.S. Headquarters to the new state-of-the art facility. The plant is being designed with sustainable features and will attempt to achieve LEED certification by the U.S. Green Building Council.

Building services design support included a central utilities plant with gas-fired steam boilers and compressed air. Process support design included all mechanical and electrical utilities, hookup of equipment for the make/fill areas, retort areas and packaging, as well as a separate cereal plant. Design of sanitary product piping and clean-in-place systems was also provided.

Features

- 550,000+ SF (with 50,000 S.F.. 2-story office areas)
- 94 acre site
- Construction Cost: Approximately $200,000,000
- Dry and Wet Mix Batching and Mixing
- Raw Vegetable Processing and Cooking
- Meat Handling and Preparation
- Combination Steam Cooking and Blending
- Clean-in-Place (CIP) Systems
- Celass and Plastic Jar Fillers
- Refrigerated Product Storage
- Juice Processing and Filling
- Retort Processing
- Finished Product Handling and Packaging
- Steam, Water, Natural Gas, and Compressed Air Utilities
- Culinary Steam and Filter Ingredient Water for Processes
- Multi-Stage Boiler Feedwater Economizer
- Sustainable Design including 40% reduction in domestic water usage
- 13.2 kV, 10,500 kVA Service, 500 MVA Metal Clad Paralleling Switchgear, 2000 kW Emergency Generator
- Metal Enclosed Switchgear and Site Distribution
- Three (3) 2500/2800 kVA Transformers and One (1) 225 kVA Transformer, 150 kW Life Safety Generator

Food Grade Manufacturing Plant
Confidential Client

Design Build

ICT provided full mechanical, electrical, plumbing, fire protection and process support engineering for the design of a new pet food manufacturing facility on a green field site. Project was approximately 500,000 SF.

Features

- Rail/Truck Unloading Pits
- Transfer Systems
- Drag Lines and Pneumatic Conveying Systems
- Eight-Level Processing Plant and Storage Building for Raw Materials for Mixing/Milling Corn, Rice, "Micro-Ingredients"
- Dry-Mix Batching and Mixing
- Meat Slurry Handling/Preparation
- Oils, Fats and Liquids - Bulk Storage/Processing Areas
- Extrusion Processing, Drying, Enrobing, Cooling Systems
- RTO Odor Control
- Dust Collection Systems
- Clean-In-Place Systems
- Glycol Cooling System
- Finished Product Packaging, Handling, Storage
- Steam, Process (Ingredient), Water, Chilled Water, Compressed Air, Natural Gas Power
- Central Vacuum System
- Lighting
- Manufacturing/Warehouse Areas - Fluorescent High Bay
- Office Areas - Recessed Fluorescent
- Exterior Site Lighting/Wall Packs - Metal Halide
- Four Each 2500 kVA Services Operating at 480 Volts
- Transformers Serving "Clean" and "Dirty" Explosion Proof Process Areas and all Building Requirements

Green Mountain Coffee Roasters
Knoxville, TN

Design Innovation Architects
Architectural

As demand grew for Green Mountain Coffee, their need for expansion has grown. Multiple times over the last few years, the owners have called upon Design Innovation to perform renovation designs for their facility.

The first was a renovation to their electrical room. A year later, they contacted DIA again to assist them with the expansion of the Flavor Mixing Room.

Renovation of Heat Recovery System

I. C. Thomasson Associates, Inc.
Mechanical, Electrical, Plumbing and Fire Protection

ICT provided mechanical, plumbing and fire protection design for this renovation to the existing Green Mountain Coffee Roasters 334,000 SF facility in Knox County, TN.

- Year round make-up air
- Re-circulate rejected heat to the compressor room for heating and pressurization
- Exhaust air when not needed for heating
- Provided for future extension of duct into the factory for heat
- Provided various automation designs for food-grade manufacturing process based on Allen-Bradley PLC's

Merita Bakery
Knoxville, TN and Birmingham, AL

Knoxville, TN Location

DIA designed a new 7,800 sq.G. retail and distribution warehouse facility to store and sell excess bakery products for Merita Bread Corporation. The site of the structure was an existing parking lot with a stormwater utility easement through its center. The design solution resulted in a two-part building connected by a covered, ramped breezeway over the easement.

Birmingham, AL Location

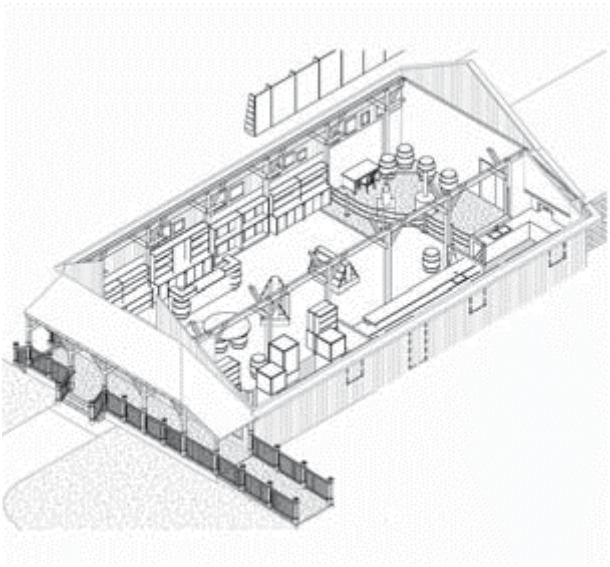
This project consisted of the renovations of various portions of the existing 215,000 square foot facility. The plant is a large bakery for Merita Bread Corporation producing, bread, snack cakes, and other bakery items. The renovations dealt with food prep areas and worker support areas including relocation of production lines, restroom and changing room upgrades, and meeting / training room upgrades. The renovations were spread out over most of the facility.

Thomasson
Industrial Services

Old Forge Distillery
Pigeon Forge, TN

DIA
ARCHITECTS + INTERIORS + PLANNING

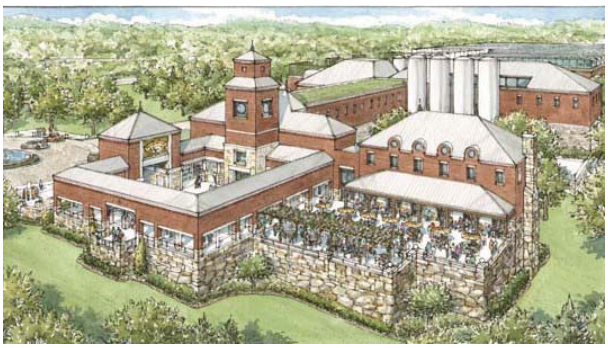
To expand on their already successful Old Mill Square in Pigeon Forge, the owners decided to take advantage of the opportunities presented through new legislation and add a Moonshine Distillery to their traditionally themed complex. After the initial meeting with the design staff at DIA, the owners immediately knew that DIA would be the right firm to help bring their dream to reality. The Distillery will serve many purposes beginning with the actual Distillery process, to packaging, and direct to customer sales. All of these components were worked into a single, highly optimized building which will serve the owners purposes for many years to come.



Thomasson
Industrial Services

DIA has been called upon multiple times in recent years to design breweries for prospective companies. Samples of the most prominent Breweries which we have provided designs for in recent years are Sierra Nevada Brewing Company and Stone Brewing Company. Details of both are described below.

Sierra Nevada Brewing Company
Alcoa, TN



DIA
ARCHITECTS + INTERIORS + PLANNING

As Sierra Nevada Brewing Company grappled with the decision of whether or not to build a new brewery, and where to build it, one decision was simple for them to make. If the Brewery was to be built in Alcoa, Tennessee, then Design Innovation was their architect of choice. We were able to best capture the “Old World Brewery” look the owners were searching for.

In addition to the manufacturing, bottling, and distribution components, the vision for the new brewery was to incorporate a visitor center, restaurant, and a tourist shop into the design. The building total area was 335,000 sq.ft. This would insure that the brewery was a visitor attraction as well as a functioning brewery able to distribute beer to the Eastern United States.

DIA
ARCHITECTS + INTERIORS + PLANNING

To entice Stone Brewing Company to select Blount County for their new location, the Chamber desired a completely different feel for the marketing geared towards them. After researching the company and determining their style, we found that a less ornate feel was in order for Stone Brewing Company than had previously been designed for Sierra Nevada Brewing Company. The programming needs, however were very similar, of course. Stone Brewing Company also includes a World Bistro and Gardens on site for visitors and special events.

Tennessee Cook-Chill Production Center
Nashville, TN

Carpenter Wright Engineers
Structural

The State of Tennessee Cook/Chill Production Center is located on the grounds of the Old State Prison in Nashville. This USDA approved facility is 93,000 SF and capable of producing 21 million meals a year to 31 facilities across the State. The facility prepares and distributes food supplies for several State agencies such as the Departments of Corrections, Mental Health/Developmental Disabilities, Children Services and Education. In addition, the facility produces food product for the U.S. Marines at several locations on the East and West Coast.

Carpenter Wright Engineers provided structural design services for the building, mezzanines and equipment support platforms. The concrete floor was designed as a super-flat floor with sanitary provisions to meet USDA requirements.

Cold Storage Facilities

Carpenter Wright Engineers
Structural

Tennessee Cook/Chill Kitchen
Nashville, TN
Hardaway Construction

Nashville Refrigerated System Addition
Lebanon, TN
Carden Company

PFG Freezer/Cooler and Dry Storage Additions
Gainesville, TN
Manous Design

PFG Freezer/Cooler and Compressor Room Addition
McKinney, TX
Manous Design

Flowers Bakery Freezer Addition
Crossville, TN
Armstrong Associates Architects

Tyson Chicken Plant Freezer Addition
Shelbyville, TN
Armstrong Associates Architects

Cracker Barrel Distribution Center
Phase II
Lebanon, TN

Carpenter Wright Engineers
Structural

Manous Design
Architect

This 250,000 SF expansion doubled the size of the original project, which was also designed by staff members of Carpenter Wright Engineers in a previous employment. This automated distribution center contains high storage racks, conveyor and sorting systems. The project required 70,000 SF of superflat floor.

Thomasson
Industrial Services

Food Products Facilities

Carpenter Wright Engineers
Structural

Ardaph Can Manufacturing Facility
Roanoke, VA
I.C. Thomasson Associates

Tennessee Cook/Chill Kitchen
Nashville, TN
Hardaway Construction

Cracker Barrel Distribution Center – Phase II
Lebanon, TN
Manous Design

Nashville Refrigerated System Addition
Lebanon, TN
Carden Company

PFG Freezer/Cooler and Dry Storage Additions
Gainesville, TN
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PFG Freezer/Cooler and Compressor Room Addition
McKinney, TX
Manous Design

Flowers Bakery Freezer Addition
Crossville, TN
Armstrong Associates Architects

Tyson Chicken Engineering Services
Multiple Locations
Tyson Chicken

Tyson Chicken Plant Freezer Addition
Shelbyville, TN
Armstrong Associates Architects

Aubrey's Restaurants
Multiple Locations
Johnson Architecture

Hankook Tire Canteen
Clarksville, TN
I.C. Thomasson Associates, Inc.

Harpeth Hall Dinning Room Addition
Nashville, TN
Street Dixon Rick Architects, P.L.C.

Green Mountain Coffee Roasters
Knoxville, TN
Multiple Clients

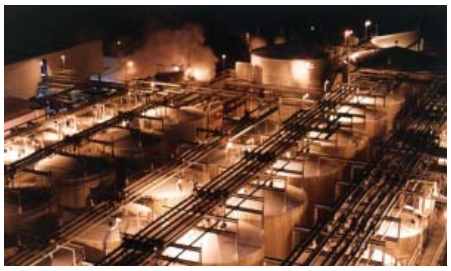
IHOP Restaurants
Multiple Locations
Michael Brady, Inc.

McAlister's Deli
Multiple Locations
Odom Architects, P.C.

Ruby Tuesday Restaurants
Multiple Locations
Multiple Clients

Ruby Tuesday Culinary Center
Maryville, TN
Johnson Architecture

Bunge Corporation
Edible Oil Refinery
Decatur, AL



Design Build

ICT served as prime professional on this project. The refinery has a capacity in excess of 100,000 pounds per hour. The refinery processes crude soybean oil into refined oils for hundreds of uses in foods.

The plant consists of thousands of feet of process pipe and dozens of pressure vessels. Among the challenging design features is 800 psi steam used in the deodorizing process and highly flammable hydrogen used to “harden” some of the oil. The hydrogenation bay included blowout panels to control and direct an explosion. The refinery design included an oil tank farm of more than 30 tanks built to API specifications.

The facility had rail tank car washing and loadout facilities. This design included rail spurs to serve the facility. These rail lines necessitated the installation of sheet piling because of their proximity to the river.

Other challenges at the Decatur site included designing the facility to work efficiently within tight geographic limitations. This facility is surrounded on three sides by the Tennessee River.

Design Build

Refinery Process Expansion
Decatur, AL

ICT provided mechanical, electrical, plumbing and fire protection design, and construction administration for a new process expansion to an existing edible oil refinery. Project includes expanding building, additional process equipment including 120-foot tall deodorizer, new tank farm and pipe bridge with over 200-foot span crossing city street and CSX rail tracks to new packaging facility.

Features

- Building expansion
- New process equipment
- 120-foot tall deodorizer
- New tank farm
- Pipe bridge over 200-foot span

Bunge Corporation
Edible Oil Refinery
Council Bluffs, IA

Design Build

ICT served as prime professional on this project. The refinery has a capacity in excess of 100,000 pounds per hour. The refinery processes crude soybean oil into refined oils for hundreds of uses in foods. The plant consists of thousands of feet of process pipe and dozens of pressure vessels. Among the challenging design features is 800 psi steam used in the deodorizing process and highly flammable hydrogen used to “harden” some of the oil. The hydrogenation bay included blowout panels to control and direct an explosion. Refinery design included an oil tank farm of more than 30 tanks built to API specifications. Additionally, the facility had rail tank car washing and loadout facilities. The Council Bluffs site presented several challenges due to the inability of the soil to support significant loads and snow and wind considerations.

This design included rail spurs to serve the facility. These rail lines necessitated the installation of sheet piling because of their proximity to the river.

Today the plant employs 126 people and purchases 55 million bushels of soybeans per year.

Zeeland Farm Services
Zeeland, Michigan

Design Build

Zeeland Farm Soya operates the largest facility in the state of Michigan that produces meal and oil from soybeans. ZFSoya uses state-of-the-art technology to process approximately 26,000 bushels of soybeans per day. The facility operates 24 hours per day, 360 days per year to produce two primary products, soybean meal and soybean oil. The 47.5% and 44% soybean meal is used in animal feed as a primary source of protein in rations. The soybean hulls that are produced during the processing are used in animal feed as a source of fiber. The crude soybean oil is refined and further processed for human consumption.

ZFS commissioned ICT to provide engineering design services for installation of their new process equipment and utility systems for:

- An edible oil refinery with two-story refinery area and three-story officelab area.
- A tank farm enclosure building with an attached truck load-out bay.

ICT provided general arrangement drawings for equipment settings and piping drawings for steam and cooling water. The installation phase occurred while the facility maintained full production capability.

AG Processing, Inc.
Soybean Processing Facilities
Emmetsburg, IA and Hastings, NE

Design Build

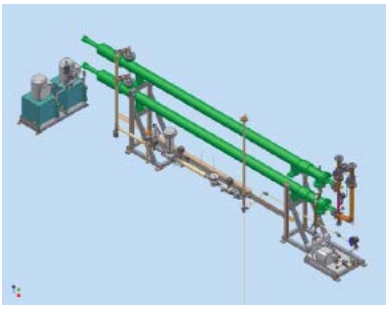
AG Processing built a new large soybean processing facility on sites in Emmetsburg, IA, and Hastings, NE. The material handling building receives soybeans by truck and rail and includes elevators and storage silos. The beans are crushed and flaked in a preparation plant, then an adjacent solvent extraction plant produces meal and crude oil. These two end products are stored and loaded on rail cars or trucks for the market. A 150 psig boiler plant provides process and heating steam and compressed air for the site. The facility-wide process monitoring and control is provided by distributed PLC's linked to distributed computer monitoring stations. The site includes two office buildings and new parallel rail sidings that connect the main rail lines of two companies providing raw material unloading and product load out capabilities. Finished products include both dry and liquid materials.

ICT was responsible for all engineering for the design-build contract. This included civil, structural, and architectural work under a subcontract. All mechanical, electrical, and controls and instrumentation engineering was provided in-house. ICT's responsibilities extended through start-up of the facility.

Ag Processing, Inc.
No. 6 Fuel Oil Storage Tank
Manning, IA

ICT examined codes for both existing hazardous liquid storage and new fuel storage. An existing spill containment dike was modified and subdivided with a concrete wall to allow proper installation of a new 542,000 gallon No. 6 fuel oil storage tank inside the same dike as tanks with other non-compatible liquids. New underground storm drainage systems were designed to catch the water inside the dikes. The new steam-heated tank and associated pump house allows optimum-timed large bulk purchases to save the owner fuel costs for steam production for this large soybean processing facility. The project also included a rail unloading station with pumps and piping systems to transport the fuel to the existing powerhouse.

GreenShift Corporation
Corn Oil Extraction Facility



Design Build

GreenShift Corporation hired ICT to provide detailed engineering of their patented process for a corn oil extraction system, Type 1 (COES-1). Their Corn Oil Extraction System (COES) recovers up to 75% of the corn oil trapped within the Distillers Dry Grain (DDG). This enables a 100 million gallon per year dry mill ethanol production facility to recover up to 7.5 million gallons of crude corn oil. The COES is automated and adapts to an existing plant with only minor stoppage for plant tie-ins.

Once corn oil has been recovered, its value increases as a crude oil for biodiesel production. Removing oil from the DDG reduces drying costs, reduces emission of greenhouse gases and volatile organic compounds, and enhances marketability of the remaining DDG, as more de-fatted DDG can be included in daily rations fed to beef and dairy cattle.

Central Indiana Corn Oil Extraction Facility
Marion, IN

GreenShift Corporation hired ICT to provide detailed engineering of their patented process for a corn oil extraction system, Type 1 (COES-1).

Global Ethanol Corn Oil Extraction Facility
Riga, MI

GreenShift Corporation hired ICT to provide detailed engineering of their patented process for a corn oil extraction system, Type 1 (COES-1).

Global Ethanol Corn Oil Extraction Facility
Lakota, IA

GreenShift Corporation hired ICT to provide detailed engineering of their patented process for two corn oil extraction systems, Two Type 1 (COES-1).

Clean Tech (Various Project Locations - Confidential)

ICT developed preliminary design layouts for three bio-diesel processing plant projects (as yet undeveloped/un-built) at different locations across North America. Each project was of varying (confidential) production capacity and could use grease, fats, and soybean edible oil as a feedstock.

Confidential Client - Glycerin Refinery Infrastructure

ICT recently completed design of the process/building utilities infrastructure for a confidential client. The glycerin refined is a by-product of an adjacent bio-diesel plant.

Owensboro Grain Company
Owensboro, KY

Edible Oil Refinery

Design Build

This $20 million oil refinery was constructed in 1994, and it produces in excess of 1.4 million pounds of vegetable oil a day at full capacity. Oil from the 14,000 SF complex is used in the food industry for baking and food processing and for industrial products such as paint, plastic and ink.

Owensboro Grain, founded in 1906, operates grain elevators in Owensboro and Henderson, KY, and a soybean processing plant in Owensboro, KY. The company crushes about 100,000 bushels of soybeans daily and buys soybeans from numerous states. The new refinery does not increase the amount of soybeans used, but adds another processing phase to what the company is already doing. The new refinery uses oil that already has gone through a process to remove the lecithin, a sticky fluid derived from soybean oil used in cosmetics, pharmaceuticals and food products. Owensboro Grain began processing lecithin in 1990.

An edible oil refinery consists of three major processes: refining and bleaching, hardening and deodorization.

Meal and Pellet Truck Loading Facility

Design Build

ICT provided MPE design and oversaw architectural, structural and civil design for a 2,000 SF truck loading facility for a food grade manufacturer.

Features

- Control/MCC room
- Structural steel catwalks, landings, platforms, stairs and ladders
- One storage tank and 14’ inside diameter x 60’ high concrete silo with Laidig cantilever soybean meal reclaim system and maintenance access
- Meal transfer drag
- Meal surge bin unloader
- Pellet drag
- Aspiration system for conveyors and dust control hood
- Concrete deck version truck scale with enclosed building around scale

Where We Have Worked

Thomasson Industrial Services


Integrated Steel Design and Delivery
3D / Building & Process Modeling of Process Equipment
Unique Team Capabilities
In-house Industrial Systems Engineering
Life Safety Code Analysis / Fire Protection

3D / Building & Process Modeling

Building Information Modeling

Software Platforms

- Revit
- CAD Works
- Navis Works

Benefits

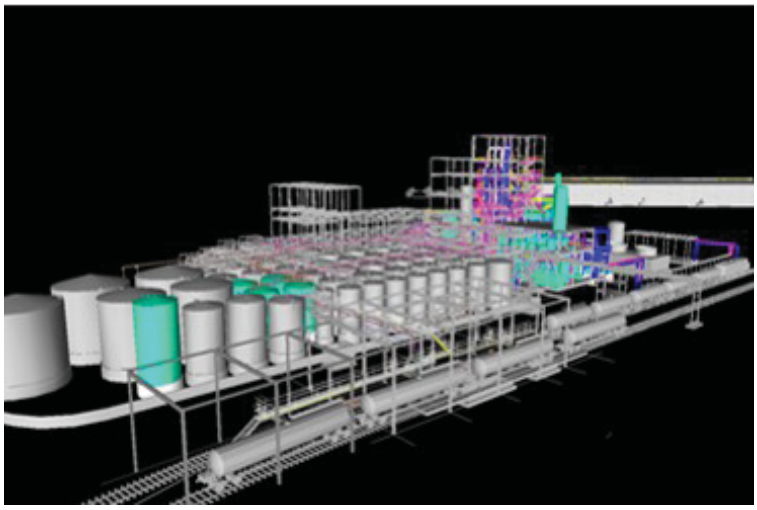
- Coordination
- Clash Detection

Construction Aids

- Spool Piece Drawings
- Bill of Materials

Refinery Expansion

Bunge North America, Decatur, AL



I. C. Thomasson Associates, Inc.

Life Safety Code Analysis / Fire Protection

Life Safety Codes Analysis

Means of Egress

Fire Protection

- Protection Analysis
- Design Management
- Fire Science Human Behavior
- Explosion Protection & Prevention

Thomasson
Industrial Services

Industrial Systems Engineering

Facilities Planning & Layout

Work Cell / Station Design

Automation

Warehouse Optimization

- Racking Design and Layout
- Floor Space Maximization
- Logistics
- Inventory Planning and Capacity Studies

Operations Research & Simulation Modeling

Process Design and Optimization

Preventative Maintenance

Ergonomics & Safety

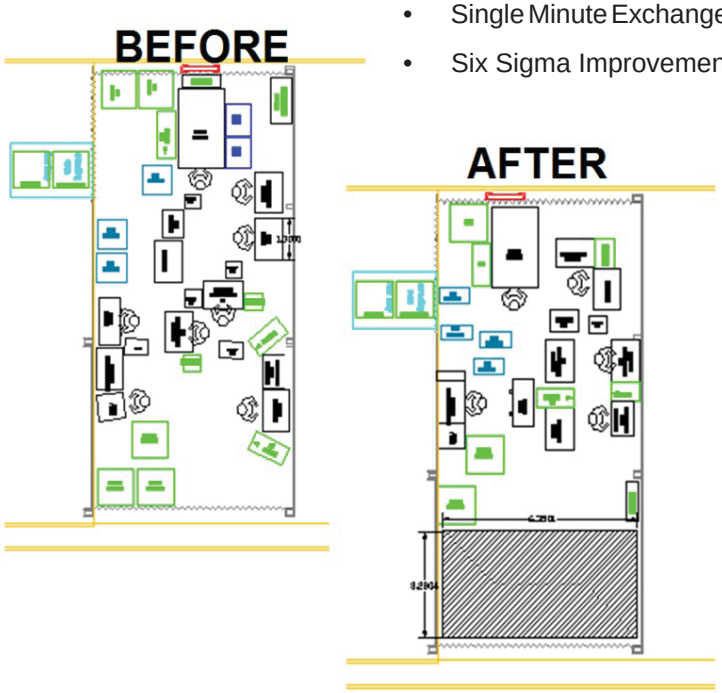
Time Studies / Methods Analysis

Value Added Engineering

Cost / Benefit Analysis

Continuous Improvement

- Cost and Cash Flow Improvements
- Error Proofing (Poke Yoke)
- Just-In-Time Inventory Systems (JIT)
- Lean Construction & Design
- Material Flow Analysis
- Process Improvement
- Model Determination
- Pull Production System (Kanban)
- Single Minute Exchange of Dies
- Six Sigma Improvements



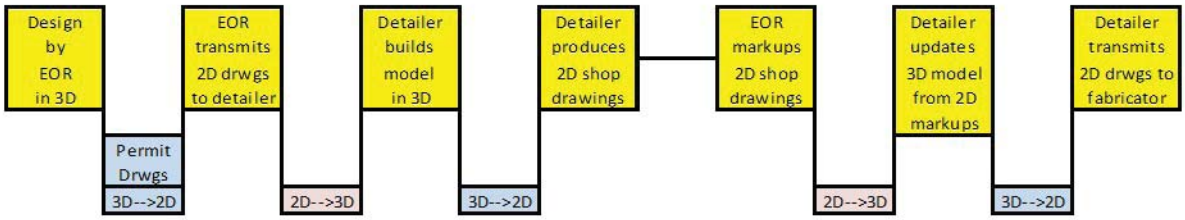
Thomasson
Industrial Services

Integrated Steel Design and Delivery

- CWE builds the 3D BIM model to use in analysis and design of structure.
- As sections of the structure are completed, the BIM model is shared with our steel detailing partner and imported into Tekla Structures.
- Review of steel detailing is expedited using on-screen review available to the entire team (Owner, General Contractors or CM's, Sub-Contractors, Erector, Architect and Engineers).
- Eliminates multiple printings of the 2D drawings for review. Usually only printed for submission for Permit, and final record drawings.
- Connection design for both erection transfer forces and final forces performed by both CWE and detailing partner.
- Erection sheets (E-Sheets) and detail sheets produced by detailing partner are stamped by EOR (CWE), and submitted for permitting.
- Steel detailing services can also include material lists, material tracking, CNC coding, fabrication shop and jobsite observations, and steel brokerage

Flow Chart of 2D/3D Conversions

Conventional Delivery:



Collaborative Delivery: