## **GRAIN PROPERTY TYPES**

Grain production was essential for Texas farmers in the nineteenth and twentieth centuries. Various grains provided food, animal feed, and profit. Up through the mid-twentieth century, corn and wheat were the most significant grain crops.

The state's earliest grain crop was corn, which predates Spanish contact. Native Americans brought corn culture to Texas, and the Spanish missions continued its cultivation. Corn was essential to Anglo-American settlement in Texas, and the newcomers used it for all kinds of foodstuffs and in liquid form as whiskey sour mash. They fed primarily corn to their livestock as grain and silage. All parts of the corn plant, not just the grain, were valued for practical applications. Husks were used to write on, wrap food, and fill mattresses; stalks and leaves served as roof thatch, scarecrows, erosion control, and fencing. By the late nineteenth and well into the twentieth century, farmers grew corn for home use and to participate in the ever-grow-



ing market economy. Industrial buildings and structures related to corn production dotted the landscape.

Wheat had somewhat more-limited home use and was not as widely grown in Texas. The first commercially grown wheat was in 1833 in Sherman. By the mid-nineteenth century wheat cultivation had spread to North Central and East Texas. Farmers planted wheat with grain drills and reaped it with machines. Threshers could work up to 300 bushels daily. Production continued to increase through the 1920s. New equipment and varieties of wheat, coupled with rising prices for the grain, shot production up through the mid-twentieth century. By this time the High Plains had become the greatest wheat-producing area in the state and the construction of industrial buildings and structures related to wheat paralleled this movement.

The property types associated with the grain industry and discussed in this field guide are storage complexes, processing complexes, auxiliary buildings, and storage bins.

## **S**TORAGE COMPLEXES

## **Character-defining Features**

- Complex of buildings and structures
- > Elevator with headhouse, workhouse, engine-driven or pneumatic leg, and chute
- Storage bins
- ► Scale room
- ➤ Office
- ► Coal bins or engine shed
- ► Warehouse
- Driveway to dump pit or boot
- ► Loading dock and platform
- Signage identifying associated company
- > Railroad sidings or on main railway line

## **Principal Subtypes**

#### Field Elevators-

- ▶ Small-scale steel elevators and bins
- > Include only the essential leg and conveyor mechanism
- ► No office, scale, or boot
- Minimal storage needs

### **Country Elevators**-

- > Wood, steel, brick, tile or concrete elevators and bins
- ► Drive sheds
- > Engine shed, office, and scale room are frequently housed together
- > Some are self-contained systems, others are annexed systems

### Terminal Elevators—

- Concrete elevators
- Huge concrete storage and work bins

### Comments

Storage complexes offer a simple means of receiving, storing, and shipping bulk grain, particularly small cereal grains such as wheat, corn, oats, barley, milo, and soybeans, to distant markets. The elevator, also known as the main house, has a headhouse atop, a workhouse at its base, and an engine-driven or pneumatic leg whose drive shafts move one or more vertical belts and bucket conveyors to the headhouse. Processed grains exit through a chute, which faces the railroad siding. Grain storage complexes are strictly functional and any stylistic influences reflect emerging industrial design trends that rejected ornamentation.

Farmers occasionally install their own field elevators with a few small steel bins near rail lines. They may use the raw grain for seed or feed, but more often they ship these small quantities to country elevators.

Country elevators serve local farmers who deliver their harvest to elevators in small towns and county seats. Country elevators weigh, clean, and store the grain before it is transported by railroad to terminal elevators. At country elevators, farmers bring a wagonload of grain to the drive shed where it is protected from weather conditions. There they have it weighed and unloaded into a dump pit (also known as a boot) from which a conveyor carries the grain to the top of the elevator. The leg distributes the grain to work and storage bins. Country elevators were commonly of wood, steel, brick, or tile construction through the 1930s, when concrete became the more predominant material. Some country elevators are self-contained systems with constituent parts in the main house, others are annexed systems with elevating machinery in the main house and storage

## STORAGE COMPLEXES

bins connected with conveyors and external spouts. An independent company, a larger terminal elevator company, a cooperative, or a wheat pool might own a country elevator.

Grain is shipped from country elevators to large, concrete terminal elevators in major transportation centers. Terminal elevators are equipped to clean, clip, dry, grade, mix, store, and sack raw grain and grain products. From terminal elevators, unprocessed or minimally processed grain is loaded onto railroad cars or ships and sent to large mills; grain products are transported to distribution and consuming centers. Terminal elevators operate at a much greater capacity and charge higher rates for storing grain than do country elevators. A large independent company or railroad line usually owned terminal elevators.







- 1, 2 These 1911 drawings show a prototypical elevator leg (1) and belt elevator (2).
- 3 This plan and section of a 1911 reinforced concrete country elevator was very early for its time because wood, steel, brick, and tile were the most common materials used until the 1930s.

STORAGE COMPLEXES



- 4 The Missouri Pacific Railway owned and operated this concrete terminal elevator in Kansas City in 1911.
- 5 R. E. Sherrill's ca. 1913 country elevator in Haskell had a gas-driven engine and a 15,000 bushel capacity.
- 6 This ca. 1940s steel field elevator along a railroad line near Roscoe has the essential components: a leg and conveyor mechanism with two small storage bins.
- 7 The view looking north from the 1945 Harmon-Toles country elevator in Happy shows this concrete elevator's square main house is central to 10 concrete storage bins.

# **PROCESSING COMPLEXES**

## **Character-defining Features**

- Wood or concrete mill building
- ► Single-sided or double-sided
- > Elevator within mill with headhouse, workhouse, engine-driven or pneumatic leg, and chute
- ► Scale room
- ➤ Office
- Engine shed
- Work bins
- > Various chutes, discharge spouts, and related docks and platforms
- Warehouses
- Testing laboratories at larger facilities
- > Cleaning equipment such as dampers, washers, and dryers
- > Packing spouts and machines for packaging
- Driveway to dump pit or boot
- Water tower
- Signage identifying associated company
- Railroad sidings or on main railway line

## **Principal Subtypes**

#### Feed Mill Elevators-

- > Specialized machinery including sifters, scalperators or plansifters, and aspirators
- > Seed-cleaning equipment in some mills
- ► Small storefront operations

#### Flour Mill Elevators-

- > Specialized machinery including sifters, scalperators or plansifters, and aspirators
- > Specialized machinery including roller mill and reduction roller mill

### Comments

Farmers bring their grain to processing elevators that serve local or regional areas. The grains are broken, scalped, reduced, divided by grade, and packaged into flour or feed. Feed tends to be distributed locally, while flour more commonly is sold to both local and more-distant markets. Flour and feed mills often are combined within a single operation, although some remain exclusive to one activity. Some mills are single-sided with elevators in a row along one wall and machinery extending the width of the building; others are double-sided with central elevators and machinery surrounding them. In either case, elevators have a headhouse atop, a workhouse at the base, and an engine-driven or pneumatic leg whose drive shafts move one or more vertical belts and bucket conveyors to the headhouse. These buildings and structures are strictly functional and any stylistic influences reflect emerging industrial design trends that rejected ornamentation.

Feed mill elevators process a variety of different grains. After being dumped, weighed, cleaned, and graded, feed grain is transported vertically and horizontally from holding bins to a grinder. Corn, for example, is shelled and crushed, the cob is crushed, and all particles are conveyed to a roller mill where they are further refined. These particles are then aspirated with a suction device and augered to an overhead bin, which spouts the meal into 100-lb sacks. Sometimes, after aspiration, corn is blended with other grains and mineral supplements as per customer specifications, and then sacked. The finished product is stored in a warehouse and sold to local customers or sent to other markets. Feed mill elevators must be organized so that a maximum number of various-sized work bins can accommodate different types of grains. Bins are spaced apart to provide for more interstice

### **P**ROCESSING **C**OMPLEXES

bins. Chutes, discharge and packing spouts, packaging machines, and related docks relevant to processing, packaging, and distributing feed stuffs are particular to this type of mill. Feed mill elevators may also include seed-cleaning equipment. Often, they have small storefront operations from which they market feed products.

Flour mill elevators process wheat. The wheat is weighed, broken in a roller mill on the first or second level, sifted on the third level, cleaned with a scalperator or plansifter and dried with a damper on the fourth level, reduced with a reduction roller mill or aspirator on the fifth level, and centrifuged on the sixth level, where dust is collected. The processed wheat is then fed to a revolving telescopic spout and distributed to holding bins. The bins release wheat to be weighed again, blended, and conveyed to storage bins.



**PROCESSING** COMPLEXES



- 1 In 1913, R. E. Sherrill operated a wood grain elevator in Haskell that had an office, scales, and a maize thresher. A gasoline engine drove the elevator, which could process 15,000 bushels of grain.
- 2 By 1927, Sherrill had expanded his elevator to a full service mill and grain company that had a grain pit, elevator, feed store, flour mill, and warehouses. The elevator looms behind the feed store on the left with the flour mill on the right.
- 3 Pioneer Flour Mills in San Antonio was a very large concrete processing facility in 1915.
- 4 Small-town mills like the ca. 1920 Munday Mill & Elevator Company were typically wood buildings. A water tower is on the far right.
- 5 By 1925 a 25 horse-power oil engine drove the elevator at Munday Mill & Elevator Company, but a large area set aside for coal bins hearkened back to an earlier time when steam powered the operation.
- 6 Constructed by 1921, the Bell Mill & Elevator Company in Crowell was an early example of a processing complex made of reinforced concrete.
- 7 A feed mill had been on this site in Lamesa for some time, but the Quonset-hut style of these warehouses probably dates to the late 1940s. The protruding tripartite bay on the north elevation and gable roof (hidden behind the rounded gable end) indicate that the warehouse to the right is substantially older despite later changes to the main façade.
- 8 Behind the Lamesa warehouses, the elevator connects with six steel tanks.

# **A**UXILIARY **B**UILDINGS

## **Character-defining Features**

- > Wood, brick, metal, or concrete building
- ► Usually rectangular plan
- ► Usually gable roof
- > Part of storage or processing complex

## **Principal Subtypes**

### **Office Buildings**-

- ► Small, one-story building
- Square or rectangular plan
- Gable or hipped roof
- > Interior may include reception, bookkeeping, management, weighing and testing, and display areas
- ▶ Frame sash or metal casement windows
- > Some offices are contained within a warehouse

### Warehouses-

- Gable roof of truss or clear-span construction
- > Wood or concrete piers with plank or concrete slab flooring
- ► Typically 50x150 ft
- > Truck bays on at least one façade
- > Some warehouses include an office

### Comments

Office buildings serve the business needs of grain complexes. They house bookkeeping and management employees and offer reception and display areas for showcasing products to customers. Usually office buildings have windows to both provide interior light and to allow the manager a view of the facility's operations, particularly the scale. Late-nineteenth- and early-twentieth-century office buildings may exhibit modest stylistic influences, most often classically inspired symmetrical fenestration patterns, emphasized cornice and frieze lines, and prominent central entryways. Those constructed in the 1920s and 1930s may exhibit Craftsman, Art Deco, or Art Moderne attributes. Office buildings constructed in the mid-twentieth century likely employ International Style design principles.

Warehouses store overflow grain during peak harvest season, seed-cleaning operations, retail products, or plant vehicles and equipment. Warehouses can also be used for packing feed or flour. These buildings are strictly functional and any stylistic influences reflect emerging industrial design trends that rejected ornamentation.

AUXILIARY BUILDINGS



- 1 The windows on the one-story wood office building in the foreground at Knox City Elevator reveal the location of office space, 1927.
- 2 A small wood office building with shed roof, in the foreground, and a larger metal warehouse in the background, both ca. 1930s, surround this steel elevator in Merkel.
- 3 The Bell Mill & Elevator Company, powered by electricity, could produce 75,000 bushels of grain. The company had a grain warehouse across the street from the elevator.
- 4 A ca. 1930s metal warehouse in the foregrounds flanks the elevators in Follett.

# STORAGE BINS

## **Character-defining Features**

- ► Cylindrical or rectangular
- Concrete foundation
- > Connected to elevators with conveyor gallery above and tunnel conveyor below bin
- > Part of storage or processing elevator complex

## Principal Subtypes

### Wood Storage Bins-

- ► Usually rectangular
- > Up to five stories in height
- ► Studded bins: base of heavy posts and girders
  - upper stories are balloon-frame construction
  - tie rods anchored to horizontal braces on exterior walls
- Cribbed bins: base and walls of 2-inch-thick wood planks from 4 to 10 inches wide planks laid flat atop each other
- > Galvanized corrugated tin or iron exterior walls
- Metal or wood lid

### Steel Storage Bins-

- > Cylindrical or rectangular
- ► Height of 30 to 80 ft
- ► Cylindrical diameter of 15 to 45 ft, rectangular with dimensions of 14x18 ft
- > Square or rectangular steel plates bolted or riveted together
- > Z-bar reinforcements overlap in single, double, or triple joints
- Interiors grouted with cement and sand mixture, primed with iron oxide, and top coated with white paint and linseed oil mixture
- Conical or flat steel lid

### Tile Storage Bins—

- ► Cylindrical
- > Hollow clay tiles, two-courses deep, reinforced with steel
- Semiporous tiles are 12x12x6 inches with semiporous channel tile layer between each row Channel tile is 12x4x5 inches with vertical steel reinforcing bands
- ► Outside facing tile is 12.0x12.0x1.5 inches and semiglazed
- > Wire netting bonds bin wall to outside facing tile
- ► Tile lid with cement mortar

### Brick Storage Bins-

- ► Cylindrical or rectangular
- ► Cylindrical bins: brick walls three-courses deep
  - bonded two inner courses and outer course spaced about two inches apart wire bonds connect outer to inner courses
  - vertical steel reinforcements about every 12 inches
- Rectangular bins: brick pilasters at outside corners
  - columns at interior corners
    - steel reinforcements span from corner to corner along wall planes
    - arched brick siding with concave shape facing outward
- Metal or concrete lid

## Concrete Storage Bins-

- ► Cylindrical
- Diameter of 15 to 25 ft
- ▶ Height of 50 to more than 100 ft
- > Concrete walls from 6 to 8 inches thick with both horizontal and vertical steel rod reinforcements
- One or two doors allow entrance to bin at base
- ► Flat concrete lid

## Comments

Storage bins, also known as tanks or towers, were commonly constructed to meet additional storage needs of grain facilities, especially during peak harvest periods. This additional storage space saved local farmers the expense of housing their grain at terminal elevators and afforded them the opportunity to await favorable price increases during the off season.

Wood storage bins are seen only at late-nineteenth- and early-twentieth-century complexes. The tie rods of studded wood bins, anchored to horizontal braces on exterior walls, are distinctive to studded wood storage bins. Cribbed storage bins required a lot of wood for the horizontal arrangement of planks. The cribbed construction method allowed bins to reliably bear the tremendous pressure that large quantities of grain exerted. Steel storage and tile bins were common through the mid-twentieth century. Concrete storage bins became increasingly common after the early 1920s, when technical knowledge of slip-form construction became more widespread. This method of construction was preferable because of its durable, fireproof, rodent-proof qualities, which saved operators in terms of insurance, spoilage, and damage to grain. These structures are strictly functional and any stylistic influences reflect emerging industrial design trends that rejected ornamentation.



- 1 A ca. 1920s cylindrical steel storage bin is to the far left and a ca. 1930s concrete storage bin is to the right in Brownfield.
- 2 At the far left is a ca. 1900 rectangular steel storage bin with a tall elevator leg just behind it.



- 3 A plan for eight cylindrical steel storage bins shows diameter, bin placement, and stay rod locations.
- 4 This plan for four rectangular steel storage bins also shows diameter, bin placement, and stay rod locations. Splice bars that came in contact with grain were to be beveled.
- 5 Tile storage bins under construction in 1911.
- 6 A section drawing of a patented tile storage bin illustrates the placement of steel bars, various tile types, and wire netting.
- 7 A vertical section of a reinforced concrete grain elevator denotes the smaller size of side versus corner columns.
- 8 These 1945 concrete storage bins at the Harmon-Toles complex in Happy had doors at their bases to provide interior access.