SECTION EIGHT

- THE WORK BEGINS

My Home Office – The Kitchen Table

By counseling with each other, Kim and I determined the best location to spread out the project every evening and on weekends would be the kitchen table. That way I wouldn't be entirely isolated from the family for six months. D inners would be relocated to the adjacent kitchen counter.

Utilizing the kitchen table provided a location strategically placed at the main thoroughfare of our home. Out of the corner of myeye, I could assist in keeping track of the children-their



comings and goings. The children would even stop occasionally and speak to me! Some of them were interested enough in what was happening to stop and draw a line or two on the computer. After all, this would be our family's special temple. I occasionally stopped to share stories about the people of Nauvoo, reminding them of their

noble history. They loved to hear the story of how Shadrach defended the Prophet Joseph Smith by pushing



forty men out a gate with his "rascal beater." Our kitchen table was not only my office for the duration of the project, but, more importantly, a teaching opportunity.

There was the time, however, it became necessary to move the "office" to Grand Cayman Island in the British West Indies for a week during a scuba diving vacation (mid

September 2000). I would work at the small round table in our hotel room. I don't recall how much I actually accomplished while in Cayman—but I worked every evening. Through the convenience of my laptop computer and a small set of design drawings the work continued—on a global level.

SCOPE OF THE WORK

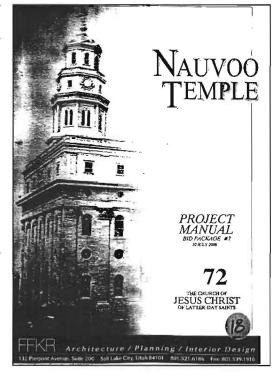
"Design-build" is the recent term, coined in the construction industry, explaining the procedures

contractor's use to approach all phases of the building process.

Prior to the last decade (or so) when an owner wanted to build a structure he would hire an architect to complete concept drawings for the project. The owner would then hire an engineer who would provide the necessary calculations for the safe design and stability of the building. After securing the proper concept and engineering

specifications, the owner would then find a contractor who would follow the finished designs to complete the project.

Today "design-build" provides the owner with more options than the former industry protocol. Buildings are literally fabricated while the design process is still taking place. This



allows for greater flexibility on the job site, placing more responsibility on the general contractor to play the role of "construction manager." Steel detailers must now recognize and "solve" design problems previously addressed

by the design team. On most projects detailers now work hand-in-hand with the project management team (on the job site) during the course of a job.

With the advent of "design-build" over the past decade it has become necessary for the structural steel detailing business to change its mind-set. Not only are we now draftsmen, we have also become design problem solvers and project managers. In fact, as we used to spend about 10 percent of our day addressing design problems and job coordination, now we spend about 40 percent of our time doing the same.

The "design-build" concept also creates more scheduling strain on the detailer. Whereas the detailer used to complete the entire project before submitting the completed fabrication drawings to the engineer for final review, now various components of the job are "split up" and submitted. This allows for a quicker "turn around" time for fabrication of steel components, erection of the structure, and eventual completion of the entire project—saving everyone time and money.

The following is the approximate schedule for detailing of fabrication and erection drawings for the structural steel of the temple project:

Chronological Schedule

(some dates overlap)

- Anchor Bolts, start date, (week ending) Sept. 2, 2000 Nov. 14, 2000
- Embeds, Sept. 2, 2000 Nov. 11, 2000
- Fifth Floor Attic "Box", Sept. 9, 2000 Sept. 30, 2000
- Sixth Level Roof, Sept. 16, 2000 Sept. 30, 2000
- Attic Roof Framing, Sept. 30, 2000 Oct. 7, 2000
- Chimney Supports and Pilaster Supports, Oct. 1, 2000 Oct. 7, 2000
- Fourth Level Catwalks, Oct. 8, 2000 Oct. 14, 2000
- Tower, Oct. 15, 2000 Nov. 11, 2000
- Font, Nov. 18, 2000 Nov. 18, 2000
- Miscellaneous, Nov. 26, 2000 Apr. 15, 2001
- Utility Building

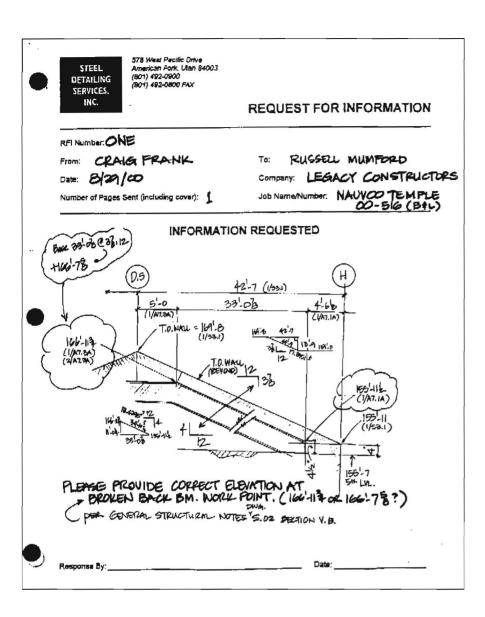
Despite the design teams' best efforts to resolve design problems *before* contract documents are issued, there are nearly always a few residual questions regarding potential errors or clarification in design.

I should comment here that on a project of this size and complexity, this design was far superior to most of the projects I've seen in our office over the past eight years. FFKR Architects and Reaveley & Associates Engineers are to be applauded.

The following is a list of design questions in which a "Request For Information" (RFI) was issued from the steel detailer to the design team:

DESIGN PROBLEMS ENCOUNTERED WHILE DETAILING, REQUIRING SUBMITTAL OF A "REQUEST FOR INFORMATION"

- #1 Gabled Shear Wall Elevation Bust
- #2 Headed Stud Anchor Size at Shear Wall
- #3 Braced Frame "Call Out" Bust
- #4 Tube Steel Column Base Plate Info Needed
- #5 8" Stud Embeds @ 5th Floor
- #6 Mechanical Openings at Catwalk
- #7 Tapered Pilasters at Grid 11
- #8 Length of Extended Flange
- #9 Elevations Of TS 6 x 4 Horizontally at Observatory
- #10 Dome Steel Set-back Dimension
- #11 Belfry Level Mud Stop Location
- #12 Redirect on #9/Connection for Bracing
- #13 Spiral Stair Fouling Problem
- #14 Font Framing Dimensions
- #15 As-built Diagram Tapered Pilasters
- #16 Ladder Codes
- #17 Platform and Ladder at Roof
- #18 Redraw Stair Dimensions & Handrail Dimensions



RFI #1, dealt with a conflict in the design drawings regarding the pitch (or slope) of the roof. The design called for a pitch of 3 7/8" to 12". However, upon closer inspection the engineer had created a 4" to 12" pitch. The question was asked and the following response was provided:



Request for Information

DEL Annuar Nicke

RF) #, 0131			Date Crested - 8/29/00
Answer Company	Answered By	Author Company	Authored By
Reavalley Engineers & Associates 1515 South 1160 East Self Lake City, UT 84105	Jeff Milar	Steel Detailing Services, Inc. 378 Winst Pacific Drive American Fork, UT 84003	Craig Frank
Subject		Discipline	
Structure Steel Questions		Structural	
Co: Company Heme	Contact Name		
B & L Steel Co., Inc.	Scall Young		
Question			Date Required: 9/6/00
Please answer the following que	cilions today.		

- 2) What is the length of the 3/4 HSA's shown on detail 6/88.1?
- 3) What is the length of the two 5/8 DBAs shown on detail 5/S6.1?

Date An	swered: R/30/00
	Date An

- 1.) Top of steel elevation. Change to 166' 7.5/8" to maintain 3.7/8:12 pitch. We are in the process of revising details on drawings A7.* to reflect this change. Disregard our earlier response to this RFI.
- 2.) The HSA's on cetail 6/86 1 shall be 8" long.
- 3.) The 5/8" diameter DBA's on detail 5/86.1 shall extend into the concrete wall 9.5" at the 12" thick wall (see detail 16/85.1) and 13.5" at the 16" thick wall. The total length of the DBA's shall be 30".

"Crunch" Times

At times during the project it became necessary to enlist the resources of the SDS office employees. These wages were compensated by SDS. And, although employees were utilized to do the work on the CAD, most of the employees worked from sketches and diagrams I had generated the previous evening so that detailing time would be efficiently used. Most of the help was utilized on the top portion of the tower framing and on the font. Bottlenecking seemed to occur during this time because of fabrication scheduling for B&L Steel Co. The general feeling around the office was that of excitement to be working on the Nauvoo Temple. "Others" as delineated on the time cards submitted were comprised of Jeremy Hall, Jason Crowther, Robert Williams, and Jeff Rasmussen.



Nauvoo Temple Site, June 17, 2001 at 15:29



(Above) The DeseretBook.com Nauvoo Temple Cam was an invaluable link to the job site. Pictures were updated minute by minute during most workdays.

(Below) Nick Literski's LDStemplepage.org also provided periodic photos of completed work and notable events at the job site.

SECTION NINE

Human, Heaven, and Technological Intervention

Visits With LaVar Walgren @ 3-D Art

When the Saints evacuated Nauvoo they left behind a fine, sturdy font created from stone excavated from the nearby quarry. The "bowl," which had previously been fashioned from wood, was replaced around the time of the dedication, with handsome gray regional limestone. T welve stout stone oxen shored up the laver on their backs.

The modern fiberglass insert for the baptismal font was

created by Brother
LaVar Walgren and his
company 3-D Art, in
Kearns, Utah. Prior to
actually meeting with
Brother Walgren on
matters pertaining to
obtaining necessary



technical information about the font insert, I had spoken with him on the phone on several occasions.

Doug and I made arrangements with Brother Walgren to stop by his fabrication shop one morning (Wednesday, December 13, 2000) to take some dimensions from the mold of the font insert. The font insert had already been packaged and shipped to Nauvoo months before and had been placed in the basement prior to pouring the first floor concrete slab. My only hope was to take the necessary dimensions I needed from the form that Brother Walgren said was laying out in his yard covered with snow.

Doug and I had arranged with Brother Walgren to be at 3-D Art for about 15 minutes. When we left his shop three



hours later, I had a renewed appreciation for the exceptional details and craftsmanship found in latter-day temples.

Brother Walgren spent a good deal of time with us explaining fabrication processes and design elements of various temples throughout the world. Although "retired," Brother Walgren supplies the Church

with a large portion of architectural features, including: the small fonts for the new regional temples throughout the world. He personally sculpted, designed, and molded the oxen and the laver which rests on the oxen's back. Each is a self-contained unit and is shipped to various parts of the world directly from his shop.

Brother Walgren has also personally produced many of the angel Moroni figures atop temples around the world. He escorted us into a large spray booth, where, laying on the floor was a dismantled mold of Moroni laid out ready for casting.

Also, a good portion of the temple's Sun stone research and design was provided by him. He explained many of the technical design features required to accommodate the modern temple design with an old architecture feature. His insights were enormously enlightening.

He spoke of past conversations he'd had with former latter-day prophets. It was truly a rare treat to spend the morning with this man who had given so much to help "build" the kingdom throughout the world.

RUSSELL MUMFORD

The "human link" between American Fork, Utah and Nauvoo, Illinois was a man named Russell Mumford. All primary coordination at the jobsite was accomplished through Russ of Legacy Constructors. Throughout dozens of technical phone calls back to the job site, Russ was always pleasant, helpful, and professional. He was a critical factor in the successful coordination of indispensable procedural information needed almost daily, at times, from the project site.

WEEKLY TIME CARDS

Submitted on a weekly basis to the Nauvoo Temple Volunteer Service Coordinators' office was a weekly time sheet. Daily hours and project summaries were recorded then faxed early Monday mornings back to Elder and Sister Hemphill who are the Nauvoo Temple Volunteer Service Coordinators. The sheets were used for tracking volunteer service hours and for summary data on monthly reports. The reports were then sent "to four different people at the Church Office Building." (See faxed letter from Nauvoo Temple Office Aug-28-00 Mon 10:10 AM.)

This was, believe it or not, one of the more challenging tasks during the project. It had been literally fifteen years since I had had to conscientiously fill out a time card of any sort. I don't normally track personal work hours at the office.

DESERETBOOK.COM'S NAUVOO TEMPLE CAM

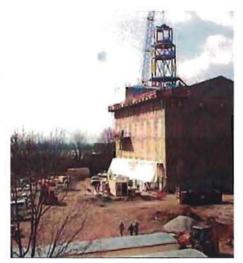
We live in a day of high technology. Information from local, as well as, global sources is literally at our fingertips at a little less than the speed of light. For good or evil, the internet is a vital and rapid method of information exchange. In the case of data transfer from the job site—it's good. Monitoring and cataloging of information from

the job site by way of the DeseretBook.com Nauvoo Temple Cam was more of a luxury than anything. It provided daily (or moment by moment) pictorial information about what was happening out on the job site and, at times, even aided in scheduling.

Shortly before the structural dome support was placed atop the tower, it became evident that the top of the camera frame was out of position to capture this historical event.







Nauvoo Temple Site, March 22, 2001 at 14:20

In my eagerness to witness the event on the Temple Cam, I sent off a quick e-mail to Jeff Clark at DeseretBook.com/Nauvoo, explaining that the camera needed to be adjusted or the Church would remain in darkness and all would be lost...OK, not really lost, but, certainly not recorded! Jeff graciously and swiftly

responded, the camera was adjusted, and history was recorded. Whew!

LDSTemplePage.org

Another helpful resource for cataloging information about site progress was Nick Literski's Temple Web Page.



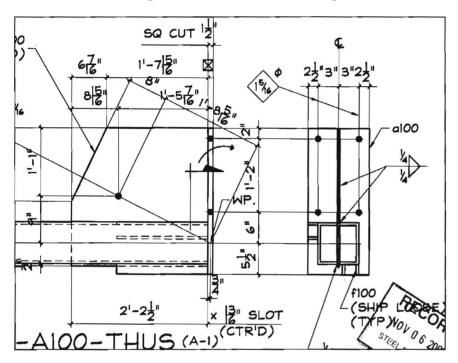
According to an article written by Larry Furr of BYU NewsNet, Nick Literski, "lives ¾ of a mile from the Nauvoo Temple...(and) believes the temple is a blessing to both the Church and the Nauvoo

area." Literski, according to the article, visits the temple site in order to update his web site, as well as, to teach non-members about the gospel in conjunction with his calling as the Ward Mission Leader of the Nauvoo First Ward.

Fabrication Innovation With CAD & Laser Technology

Recent technological advancements available with Computer Aided Drafting (CAD) have given rise to

complimentary functions between the department of drafting and the division of fabrication. Until recently, it was necessary for manufacturing shops to "translate" many of the components required for the fabrication of a specific part from what was produced on the drafting board in an office to something more usable in the shop environment.



Today's CAD environment has bridged the gap between board theory and shop reality.

B&L Steel Company utilizes an automated fabrication tool, driven by a laser, to burn (or cut) plate material to the proper size and shape. Using CAD, I was able to "up scale" some of the drawings I had produced to provide full-size

laser cutting templates for B&L to use for producing gusset plates on the tower columns and beams. Normally, these gusset plates would be produced by the fabricator, utilizing hand-drafting techniques. By eliminating the need for hand drawn gussets, literally dozens of hours hand-drawing were saved—and time is money.

SECTION TEN

THE BAPTISMAL FONT

The Font In Solomon's Temple

The following description of the "Brazen Sea" in King Solomon's Temple is taken from the account in 1st Kings:

And king Solomon sent and fetched Hiram out of Tyre. He was a widow's son of the tribe of Naphtali, and his father was a man of Tyre, a worker in brass: and he was filled with wisdom, and understanding, and cunning to work all works in brass...And he made a molten sea, ten cubits from the one brim to the other: it was round all about, and his height was five cubits: and a line of thirty cubits did compass it round about. It stood upon twelve oxen, three looking toward the north, and three looking toward the west, and three looking toward the south, and three looking toward the east: and the sea was set above upon them, and all their hinder parts were inward. And it was an hand breadth thick, and the brim thereof was wrought like the brim of a cup, with flowers of lilies: it contained two thousand baths. --1 Kings 7:13, 14, 23, 25-26

A cubit is a measure of length, originally the distance from the elbow to the end of the middle finger. The ancient Egyptian cubit measured 20.64 inches; the Roman cubit was equal to 17.4 inches; and the English cubit is a measure of 18 inches. (Webster's New Universal Unabridged Dictionary, 441)

W. Cleon Skousen further explains in his book, The Fourth Thousand Years, that the "brazen sea," as explained in Old Testament terms was not for baptisms for the dead, but for the cleansing of the priests. Skousen explains:

The brazen sea was located in the southeast corner of the court of the priests. It rested on the backs of twelve oxen, three facing each of the cardinal points of the compass. The sea itself was 7½ feet high and 15 feet across. Its edge was the thickness of the palm of the hand, or about four inches...

Because we know that the ordinance of baptism was performed by the ancient Aaronic Priesthood (D&C 84:26-27), it is most likely that the large brazen sea was used for baptisms just as similar fonts (on the backs of twelve oxen) are used in our temples today. Of course, the ordinance of baptism in ancient times could be done only for the living and not be performed vicariously for the dead as was done after the resurrection of Christ.

(Skousen, *The Fourth Thousand Years*, pp. 220-221.)

Baptisms for the Dead

Else what shall they do which are baptized for the dead, if the dead rise not at all? why are they then baptized for the dead? --1 Corinthians 15:29

The New Testament indicates that the early Christians performed vicarious baptisms for the dead. (See 1 Corinthians 15:29.) This practice was taught for the first time in the present dispensation on 15 August 1840 at the funeral of Seymour Brunson, a faithful member of the Nauvoo high council. The Prophet indicated that the Saints could "now act for their friends who had departed this life, and that the plan of salvation was calculated to save all who were willing to obey the requirements of the law of God." Almost immediately Church members began receiving the ordinance of baptism in the Mississippi River in behalf of deceased loved ones.

In October, the Prophet explained this ordinance to the Twelve who were then in England: "The Saints have the privilege of being baptized for those of their relatives who

are dead, whom they believe would have embraced the Gospel, if they had been privileged with hearing it, and who have received the Gospel in the spirit, through the instrumentality of those who have been commissioned to preach to them while in prison."

The Prophet, on another occasion, referred to "the wisdom and mercy of God in preparing an ordinance for the salvation of the dead." Then, in the spirit of warning, he concluded: "Those Saints who neglect it in behalf of their deceased relatives, do it at the peril of their own salvation."

With such encouragement, the Saints eagerly took advantage of the opportunity to make gospel ordinances and blessings available to their departed loved ones. By 1844, the year of the Prophet's martyrdom, some 15,722 baptisms had been performed in behalf of the dead.

(Susan Easton Black et al., *Doctrines for Exaltation: The 1989 Sperry Symposium on the Doctrine and Covenants* [Salt Lake City: Deseret Book Co., 1989], 20.)

Following the revelation given to the general body of the Saints regarding baptisms for the dead, many individuals desired to save their kindred dead and ran swiftly down to the Mississippi River and had themselves immersed in the frigid water. Shortly thereafter, Joseph hearing of the disorganization of the Saints in relation to this ordinance offered counsel and set the ordinance to order.

Again so important did the Lord consider baptisms for the dead that he authorized the Saints to be baptized for their dead in the Mississippi River, until a place could be provided in his house for this purpose. He further said he would give them sufficient time to build such a house, and while they were doing so, their baptisms for their dead would be acceptable to him if performed in the river, but after a place was prepared, then all baptisms for the dead in the river must cease for this ordinance as well as other ordinances for the dead, properly belongs to the house of the Lord. This revelation was given January 19, 1841, and from that time until the October conference of the Church in 1841, the baptisms in the river were accepted. At the conference in October, the Prophet announced that the time for the discontinuance of the river baptisms for the dead

had come, and from that time forth they must be performed in the temple. The temple was not finished at that time, but it had in the six months progressed far enough so that the basement could be enclosed, and in the basement a font had been built and dedicated, so that early in November, 1841, under the direction of the Prophet Joseph, baptisms for the dead commenced in the house of the Lord.

(Joseph Fielding Smith, *Church History and Modern Revelation*, 4 vols. [Salt Lake City: The Church of Jesus Christ of Latter-day Saints, 1946-1949], 4: 81.)

The Commandment In D&C 124:29-36

For a baptismal font there is not upon the earth, that they, my saints, may be baptized for those who are dead—

For this ordinance belongeth to my house, and cannot be acceptable to me, only in the days of your poverty, wherein ye are not able to build a house unto me.

But I command you, all ye my saints, to build a house unto me; and I grant unto you a sufficient time to build a house unto me; and during this time your baptisms shall be acceptable unto me.

But behold, at the end of this appointment your baptisms for your dead shall not be acceptable unto me; and if you do not these things at the end of the appointment ye shall be rejected as a church, with your dead, saith the Lord your God.

For verily I say unto you, that after you have had sufficient time to build a house to me, wherein the ordinance of baptizing for the dead belongeth, and for which the same was instituted from before the foundation of the world, your baptisms for your dead cannot be acceptable unto me;

For therein are the keys of the holy priesthood ordained, that you may receive honor and glory.

And after this time, your baptisms for the dead, by those who are scattered abroad, are not acceptable unto me, saith the Lord.

For it is ordained that in Zion, and in her stakes, and in Jerusalem, those places which I have appointed for refuge, shall be the places for your baptisms for your dead.

The First Baptismal Font Dedication in the Dispensation of the Fullness of Times

While Brigham Young was away in England in the winter of 1841, the Prophet was commanded by the Lord to build another Temple to His name, and it was then that he received further revelations concerning the principle of baptism for the dead. In a letter on this subject the Prophet wrote: "The doctrine of baptism for the dead was certainly practiced by the ancient churches and St. Paul endeavors to prove the doctrine of the resurrection from the dead, and says: 'Else what shall they do which are baptized for the dead, if the dead rise not at all? Why are they then baptized for the dead?' Great was his joy when on returning home from his foreign mission he learned that the Prophet was inspired to connect him closely with this avenue of missionary labor. On November 8, 1841, he was called upon to dedicate the newly-constructed font in the Temple basement: "The first font erected and dedicated for the baptism of the dead in this dispensation."

(Susan Young Gates, *The Life Story of Brigham Young* [New York: Macmillan, 1930], 25 - 26.)

First Temple Font Made of Wood

A revelation that the Prophet Joseph Smith had received in January 1841 emphasized that sacred ordinances belong in the temple (see D&C 124: 29-30). In July of that year, William Weeks began preparing plans for a baptismal font to be located in the Nauvoo Temple basement. By November, the basement, with its wooden font, was enclosed by frame walls and covered

by a temporary roof. Brigham Young was involved when the first baptisms were performed here. On Sunday, 21 November, a large congregation gathered at 4:00 p.m. to witness this event. Elder Young, together with Heber C. Kimball and John Taylor, baptized about forty persons in behalf of their ancestral dead. (Susan Easton Black and Larry C. Porter, eds., *Lion of the Lord* [Salt Lake City: Deseret Book Co., 1995], 229.)

Permanent Stone Font At Time of the 1846 Temple Dedication

It is worth noting here, once again, that the final stone font in the Nauvoo Temple basement rivaled the size and stature of the "brazen" or "molten sea" found in Solomon's temple.

We next descend to the basement, where is the farcelebrated font. It is in fact the cellar of the building. The font is of white lime-stone, of an oval shape, twelve by sixteen feet in size on the inside, and about four and a half feet to five feet deep. It is very plain and rests on the back of twelve stone oxen or cows, which stand immersed to their knees in the earth. It has two flights of steps, with iron bannisters, by which you enter and go out of the font, one at the east end, and the other at the west end. The oxen have tin horns and tin ears, but are otherwise of stone, and a stone drapery hangs like a curtain down from the front, so as to

prevent the exposure of all back of the forelegs of the beasts. In consequence of what I had heard of this font I was disappointed; for it was neither vast nor gorgeous; everything about it was quite simple and unostentatious. The basement is unpaved, and on each side and at the ends are small alcoves, intended for robing rooms for the faithful. (The Palmyra Courier-Journal, Sept. 22, 1847.)

(E. Cecil McGavin, Nauvoo the Beautiful [Salt Lake City: Bookcraft, 1972], 36.)

A well in the floor of the basement level provided the necessary water to fill the font.

Today the temple site has been repurchased by the Church...The well that supplied water for the baptismal font is preserved.

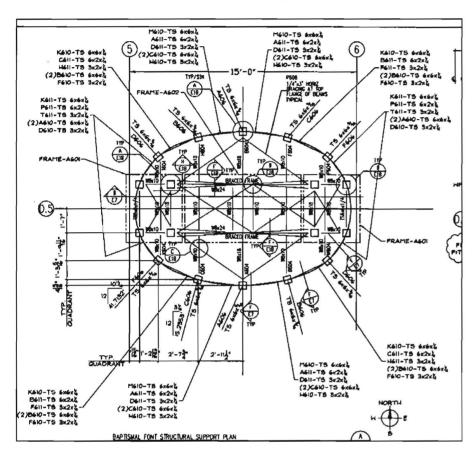
(Encyclopedia of Mormonism, 1-4 vols., edited by Daniel H. Ludlow (New York: Macmillan, 1992), 1003.)

MODERN FONT CONSTRUCTION

At appropriate times I have joked with friends that I have uncovered a vast conspiracy in the Church...the baptismal font in Nauvoo does not, in fact, sit on the back of twelve oxen, but instead, sits on a structural steel frame.

That the oxen are merely half oxen made to *look like* full oxen partially hidden by a stone skirt around the base of the font.

The font insert, in reality, is supported exclusively by a



large structural tube steel frame. A "webbing" of six inch tube steel members forms a rather intricate bowl-shaped (elliptical) assembly around the outside of the entire fiberglass tub. A covering of curved limestone, also supported by the structural frame, will dress the exterior of the font when it is complete.

Measuring approximately 12 feet in the minor axis and 18 feet in the major axis, the Nauvoo Temple Font will, by volume, be "the largest font in any latter-day temple to date," according to Brother LaVar Walgren, owner of 3-D Art, and designer and manufacturer of the fiberglass font insert.

The font, undoubtedly, was the greatest concern when it came to design and drawing accuracy from a detailing standpoint. Because design tolerances were so stringent, the frame needed to be drawn, fabricated, and erected with no more than a one-half inch gap between the steel frame and the fiberglass insert for proper placement.



On numerous occasions while designing components for the font I felt the inspiration of the Spirit. His subtle direction, without question, was what made the font framing a successful endeavor. (I am learning to give credit where credit is due.) With only one inconsequential obstruction, which was swiftly remedied, the font was lowered and settled into near "perfect" position in front of a group of temple construction missionaries and workers.