Union Station Expansion Program - Preparation

Columbus Dispatch Articles

1927-1928

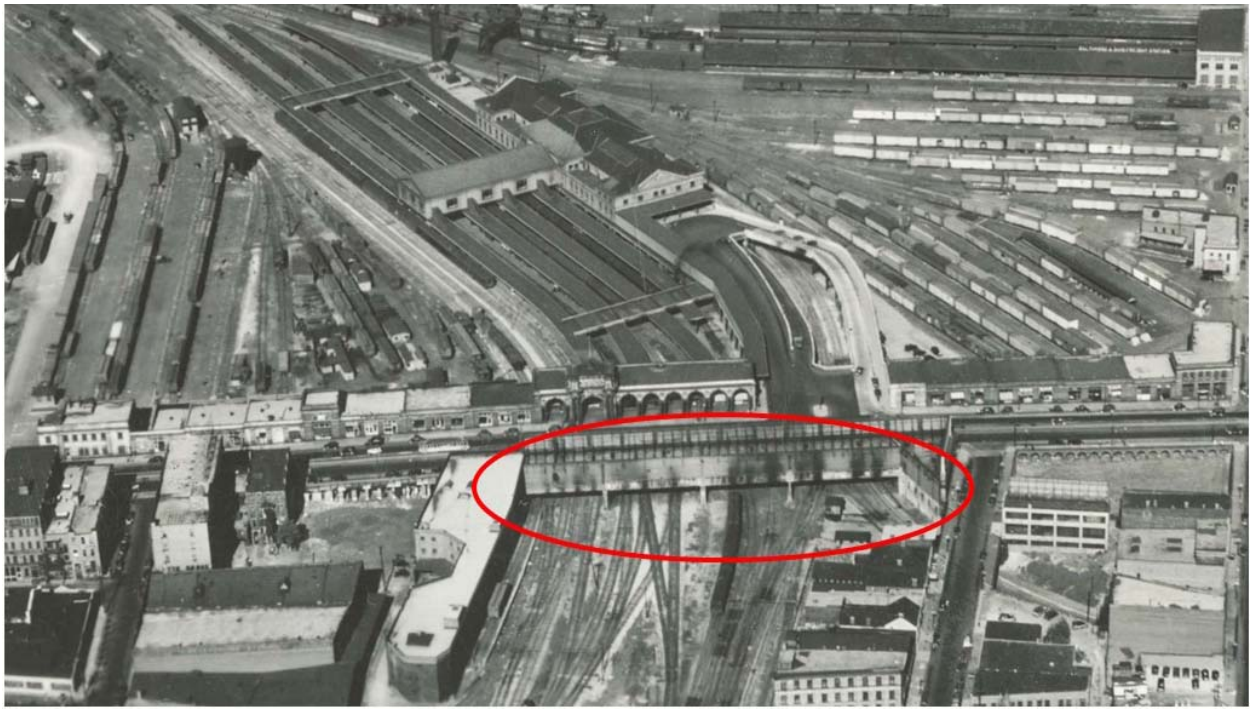


Photo from the Columbus Metropolitan Library – Columbus Dispatch Collection – 1934

Before construction could be started on the Union Station Expansion Program, it was necessary to resolve the deterioration of the 32-year-old High Street viaduct that spanned the station tracks. With the help of the Ohio State University Engineering Department, it was decided to reinforce the girders with new metal and to encase them in gunite.

Columbus Evening Dispatch – July 20, 1927

REPAIR VIADUCT.

Three Bridge Thoroughfares in Downtown Columbus Are Near Completion.

Progress on three bridge thoroughfares in downtown Columbus was reported Wednesday morning by city officials.

Paving under the new Dennison avenue overhead crossing is expected to be completed August 1 and the new artery to the north side opened at that time, City Engineer Simpson said.

The Front street viaduct, which was weakened when struck by a railroad crane several weeks ago, will have been repaired on the west side probably by Saturday and traffic will be directed in that lane, while the east side of the bridge, now being used, is repaired, R. C. Chaney of the engineering department said.

Girders under the North High street viaduct at the Union Station will probably be sprayed, Friday, with cement in an experimental test of a new strengthening process developed at Ohio State university, Chaney said. Ample scaffolding to protect the girders while the cement sets has been erected to give the test a proper trial.

Columbus Evening Dispatch – November 26, 1927

METHOD OF REINFORCING HIGH STREET VIADUCT

Only Necessary Part of Work Will Be Done Immediately.

How the High street-Union station viaduct is to be reinforced by encasement to strengthen the girders that support High street traffic is explained in an article by City Engineer R H Simpson for Engineering News-Record

"High street is carried over the tracks at this point by four 75-foot spans, the structure consisting of deck girders about 4½ feet part, carrying buckle plates to support the floor," the article explains "It has a clearance of 16¼ feet above the railway tracks The viaduct was built in 1895, at the joint expense of the city and the railroad companies By reason of the limited clearance the sandblast action of locomotive exhaust and the action of gases on the steel has caused serious deterioration, resulting in heavy expense for maintenance In 1912 a careful investigation showed that the flange plates and the stiffeners of many of the girders were greatly reduced in cross-section and the web members of some of the girders were rusted through Following this inspection, the badly rusted girders were strengthened by the addition of new plates, stiffeners and web plates

"Some two or three years ago a careful inspection disclosed further deterioration and indicated that the structure should be rebuilt Accordingly, preliminary studies were made and an estimate of cost prepared for a complete renewal of the structure At the time these studies were being made it was suggested that this structure could be strengthened by the use of *reinforcing* rods and cement mortar applied by means of a cement gun Such repairs to the structure if effective would mean that it could be put in a safe condition with no interference with traffic This is an important consideration, inasmuch as the main entrance to the Union station leads from the viaduct and a complete renewal would require some temporary construction to provide access to the station.

"About this time some tests made at Ohio State university on a few old I-beams, which indicated that the strength of the old steel beams could be increased within reasonable limits by the addition of steel rods and the encasing of the entire assembly in cement mortar applied by means of a cement gun

"Notwithstanding the successful results of these tests at Ohio State university, it was felt that this method of strengthening should not be adopted for the High street viaduct without some further investigation as to its effectiveness when applied to the field under adverse conditions It was, therefore proposed that some tests be made on two girders of the High street viaduct, in order to check, if possible, the results obtained on the encased I-beams tested in the laboratory

"These tests demonstrated that it would be possible to design a steel and gunite reinforcement for the girders on the viaduct which would effectively strengthen them and protect the steel from further corrosion, so that the present structure would continue to give service for a long period of time, depending upon the rate of abrasion of the mortar encasement by the cinder blasts from locomotive stacks and the corrision of the encasement due to gases from the engines

"It was estimated that the cost of the encasement of this structure, including the reinforcing steel, would be $112,000 Financial reasons made it preferable to do at this time only that part of the work which is immediately necessary Accordingly, after receiving bids, a contract has been awarded to the Fritz-Rumer-Cooke Co, of this city, to encase about 40 per cent of the girders in the viaduct, the work to start immediately It is expected that funds will be available during 1928 to complete the work This project, while under the general direction of the writer, is under the personal supervision of R. C Chaney of the city engineering department Professor Clyde T Morris was employed as consultant in connection with the stress deflection measurements and the design of the reinforcement."

NEXT MEETING OF ENGINEERS CLUB MONDAY NOON

Dr Harrison J Weaver, who has devoted considerable time investigating and developing methods of aerial photography, will speak on that subject at the noonday meeting of the Engineers' Club of Columbus Monday at the Chittenden hotel

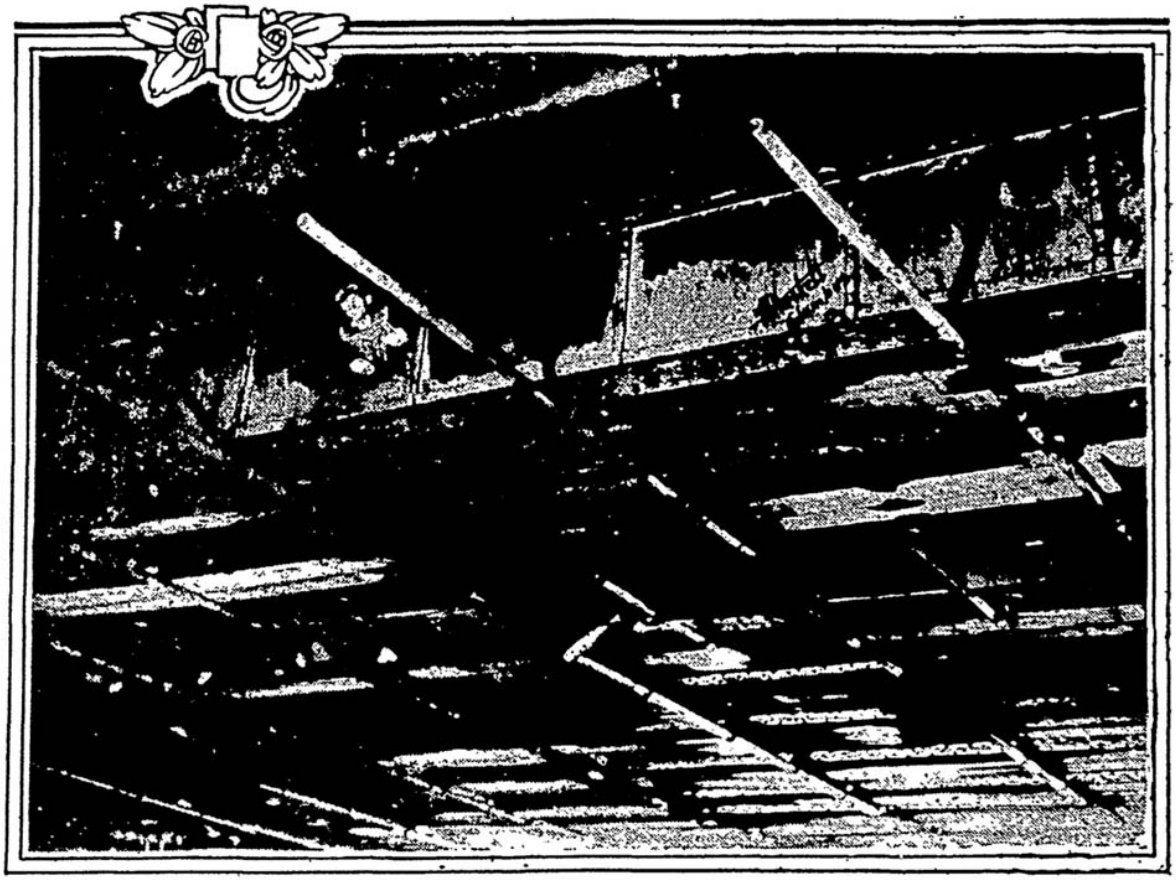
A. I. E. E. MEET FRIDAY.

Manufacture of Carbons to Be Explained with Three Reel Motion Picture

The manufacture of carbons from raw materials to the finished product will be explained to the local section of the American Institute of Electrical Engineers at its meeting in the Fort Hayes hotel next Friday evening A representative of the National Carbon company will give the illustrated talk

Columbus Evening Dispatch – December 18, 1927

Steel Beams Reinforced With Concrete Make Construction of New Viaduct Unnecessary



THE Union station viaduct is being repaired by a method proved in tests made at the engineering experiment station of Ohio State university.

Not only is the cost of this method, about $112,000, decidedly below the estimate for building a new viaduct, $175,000, plus the expense for a temporary roadway to the Union station but the work is being done without interruption to traffic either on the street or on the railways.

R. H. Simpson, city engineer, describes this work in an article in Engineering News-Record. The viaduct, built in 1895, has only about 17 feet clearance above the tracks and the locomotive blast and gases have so eroded and rusted the steel that the webs of many of the girders contain holes large enough for a man to crawl through, as shown in the above photograph. Directly over the tracks, where the blast is strongest, as much as 40 per cent of the section of some of the girders is gone.

THE repair consists of cleaning the steel of rust and dirt, adding reinforcing rods to take the place of the metal which has rusted away, covering the members with wire mesh and encasing the beams with gunite, a dense concrete made of sand, cement and water, shot by compressed air directly onto the steel.

Gunite has been used extensively for the past 10 or 15 years as a protective coating for steel.

Although the experiment station tests had been satisfactory, it seemed best to experiment with the method in the field before letting the contract. Two girders were selected and loaded with trucks to test their strength; they were then reinforced, covered with Gunite and again tested. They were so much stiffer that bending under load was reduced about 11.6 per cent and the strain on the steel about 13.5 per cent. The results obtained in the laboratory were checked convincingly.

BY THIS method those girders most in need of reinforcement can be repaired first. Financial reasons made preferable the doing of only that part of the work which is immediately necessary. Accordingly, arrangements have been made for encasement of about 40 per cent of the girders at the present time. Since it is possible to design the reinforcing steel for loads somewhat heavier than those which the bridge was originally supposed to carry, the girders are being planned for the heaviest loading specifications of the state highway department. This protection and strengthening will make the viaduct serviceable for a long period of time.

The work is under supervision of R. C. Chaney, of the city engineering department. Prof. Clyde T. Morris, of the department of civil engineering, of the university was consultant on the deflection measurements and design of the reinforcement.

$44,000 Needed to Finish

DUFFY TO ASK COUNCIL FOR SECIAL FUND

City Will Lose $4200 if Work on High Street Project is Delayed.

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38 BEAMS RECLAIMED

May have to Readjust Improvement Program to Provide Money.

(Columbus Sunday Dispatch, March 4, 1928) Col. W.H. Duffy, city director of public service, will go before city council, Monday night to urge that body to devise way and means to raise $44,000 with which to complete the reinforcement of the girders supporting the Union Station viaduct.

Colonel Duffy will lay before the councilmen a letter from city engineer Robert H. Simpson, whereon the latter states that if the project is not completed at the present time, the city will lose approximately $4200. This expense will be incurred, Duffy pointed out, by paying the contractors Fritz, Rumer & Cooke for moving their machinery and equipment from the site of operations and replacing them at a time when council can raise the necessary $44,000 to complete this work.

HAVE ASSIGNED LIMIT.

At the present time city council is powerless to issue any further bonds for improvements, having assigned its limit for the first half of the year. It has also set aside $200,000 for the second half toward construction of the east wing of the new city hall, which it can issue in bonds for the second six months of the year. The division in the issuing power of city council is restrained by state bond statutes.

It may, therefore, be necessary for council to readjust the improvement program, financed from general bonds if it desires to complete the Union Station project now. Several members of council have expressed their desire to see the work completed as soon as possible.

STARTED IN FALL.

Work of reinforcing the girders was begun last fall when council contracted for $50,000 worth of work with the contracting company, with the stipulation that the contract would be renewed at the same rate of construction when funds were available. In January an additional $20,000 was expended.

The huge I-beams, 76 feet long, four feet wide and 14 inches thick at the lower flange, have been eaten away by the sulfur and, smoke blast of locomotives during the 35 years existence of the bridge. Engineers say that the beams have lost almost half of their supporting power, placing the structure in jeopardy of collapsing.

RESTORE 38 BEAMS.

Thirty-eight of these beams have been practically reclaimed by the gunite method. The contactors have replaced the lost steel in each beam, covered it with a heavy electrically welded wire and then encased all with concrete by a process of shooting the gunite into place with compressed air. Engineers and contractors claim the process insures the beams against further corrosion and practically restores them to their original strength.

Thirty more beams remain to be reclaimed. Prof. Clyde Morris, consulting engineer for the city and instructor of structural engineering at Ohio State university, reported to the city engineer that some of the unrepaired beams must have immediate attention.

Colonel Duffy expressed himself in favor of completing the work at the earliest possible moment in order to affect the $4200 saving and to avid any possible mishap as the result of the deteriorated girders.

Fritz, Rumer & Cooke, the contractors devised the method of reinforcing the beams, placed their own idea before engineers at Ohio State university, who put the construction method under a rigid test and found it to be entirely feasible. Upon recommendation of engineers the plan was carried out by city council, with the result that other engineering concerns throughout the country are inspecting the method with a view to remedying similar conditions of bridges and viaducts in their cities.

Railroads using the Union Station viaduct have co-operated to the fullest extent with the city and the contractors in making the repairs. The contractor pointed out that the Pennsylvania railroad depressed their tracks under the viaduct three inches to allow for the additional two inches which has been added to the bottom of the girders by the application of gunite.