

## Hemal Patel, PE, SE

President, Structural Engineer

10-4 Engineering, PLLC

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10-4 Engineering, PLLC

### Summary

Hemal Patel is a licensed structural engineer with 12 years of experience in bridge design, analysis, and inspection. He has worked on large infrastructure projects involving reconstruction of major highways and public transit networks including highway ramps, river crossings, and railroad track structures.

Hemal has specific experience in several projects involving rehabilitation, reconstruction, and complete replacement of steel and prestressed concrete girder bridges around Illinois for IDOT and IL Tollway. He has taken these projects through the full evaluation and design process, including inspection, bridge condition report, load rating and contract plans, specifications, and estimates.



### Credentials

<b>Licensed Structural Engineer</b> , Illinois, 081.008021	June 2017 - Present
<b>Licensed Professional Engineer</b> , Illinois, 062.068639	June 2015 - Present
<b>Bridge Team Leader</b> , NBIS Inspector, NHI-130056 Course Certificate	April 2024 - Present

### Highway Bridges – New Design

Experience on a variety of new or replacement highway bridge structures, with most notable projects listed below.

#### **WS-130 over the Wisconsin River, Design-Build, Lone Rock, WI – Client: WisDOT**

- Design-build project for a 920' long, 6-span continuous river bridge, with 72-in deep PPC girders.
- The substructure consisted of tall abutments and hammerhead piers on steel H-piles driven to rock.
- Complex foundation design to ensure stability in the scoured condition, which was more than 30' deep.
- Featured a unique 32' tall abutment, on steep bluff, supported by dead-man system and prestressed tie rods.
- Project structural engineer for design and coordination with contractor, roadway, geotechnical, and hydraulic.

#### **IL-104 over Illinois River, Meredosia, IL – Client: IDOT**

- Replace an old truss bridge with a new 2250' long bridge with a 590' long steel-tied arch main span.
- Approach units consisted of multi-span continuous plate girders supported on hammerhead piers on steel H-piles.
- Cofferdam was required for each pier. Foundation design was governed by vessel impact and hydraulic scour.
- Responsible for design and detailing of stub abutments, approach piers, HLMR bearings, and modular joints.

#### **I&M Canal Aqueduct over Nettle Creek, Morris, IL – Client: IL Capital Development Board**

- Single-span 150' long, post-tensioned CIP concrete aqueduct carrying I&M canal over Nettle Creek.
- Cross section included a 6' deep, 20' wide trough for canal, saddled by two 8' x 8' post-tensioned CIP beams.
- Post-tensioning was used to prevent creep caused by heavy dead load of concrete and water.

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- Design challenges included staged tensioning and rebar detailing to prevent cracking, as well as preventing superstructure creep and shrinkage from excessively prying on the 20' tall abutments.
- Project structural engineer responsible for calculations, contract plans, specifications, and estimates.

### **I-490 (EOWA) to I-90 Exit and Entrance Ramps, Des Plaines, IL – Client: IL Tollway**

- Two new curved ramps, 1100' and 1200' long, each 65' wide, providing all movements from I-490 to I-90.
- Continuous steel girder units (92-in web) supported by multi-column piers on drilled shafts socketed in rock.
- Peer review and QC of multi-column pier and drilled shaft calculations for loads, sizing, and reinforcement.

## Highway Bridges – Inspections, Rehab, Reconstruction

Structural engineer for inspection, bridge condition report, design, contract plans and cost estimates.

### **I-74 Bridge over the Illinois Central Railroad, Champaign, IL – Client: IDOT, District 5**

- Reconstruction of a 725' long, 125' wide bridge carrying 8 lanes of I-74 traffic over 18 railroad tracks.
- 4-span continuous plate girder spans (220' max. span) on multi-column concrete piers and stub abutments.
- The rehab scope included superstructure replacement, pier repairs and abutment backwall reconstruction.
- Calculated capacity of existing girders, piers, and abutments; fatigue life analysis of existing cover plates.

### **I-74 Bridges over Spoon River, Peoria, IL – Client: IDOT, District 4**

- Reconstruction of 2 separate 390' long, 40' wide bridges carrying EB and WB I-74 over Spoon River.
- Each bridge has 4-span continuous steel plate girders on hammerhead-type piers and stub abutments.
- Superstructure replacement, conversion of stub abutments to semi-integral, substructure repairs.

### **I-474 Bridges over Kickapoo Creek and BNSF, Peoria, IL – Client: IDOT, District 4**

- Rehabilitation of 2 separate 790' long, 55' wide, steel bridges carrying EB and WB I-474 traffic.
- Each bridge has 3 units of continuous steel-plate girders on hammerhead-type piers and stub abutments.
- Deck replacement, abutment backwall reconstruction, pier repairs and extension, and steel repairs.

### **I-390 (Elgin-O'Hare Expressway) Various Bridge Rehabs, Roselle, IL – Client: IL Tollway**

- Rehab of 10 separate multi-span continuous steel girder bridges on I-390 from Irving Park Rd. to U.S. 20.
- Rehab scope included deck, abutment, pier and steel repairs, as well as bearing replacements.

### **I-80 Bridges over Rock River, Quad Cities, IL – Client: IDOT, District 2**

- Rehabilitation of two 1200' long steel plate girder bridges carrying EB & WB I-80 over Rock River.
- Deck, bearing and modular joint replacement with cross frame, girder end and pier repairs.

### **I-190 over I-294 Exit Ramps, Rosemont, IL – Client: IDOT and Tollway**

- Bridge type study for replacement of deteriorated 150' long, 3-span, PPC beam bridge over I-294.
- Major leakage at deck expansion joints and substantial corrosion and spalling at the beam ends.
- Inspection and condition reports for 600' of retaining wall adjacent to the proposed bridges.

## Vinod Patel, PE, SE

Principal, Director of Engineering  
10-4 Engineering, PLLC  
Email: vinod.patel@10-4eng.com



### Summary

Vinod Patel has over 44 years of experience related to civil and structural engineering. Vinod has successfully managed many large and complex transportation projects with major clients including IDOT, IL Tollway, WisDOT, CDOT, CTA, Metra and various counties and municipalities.

Vinod's ability to analyze challenging site conditions and develop elegant, easy-to-construct solutions has earned him wide acclaim with clients, and many of his projects have been award-winning designs. Vinod is also responsible for recruiting, mentoring and staff development, and ensuring all projects comply with the firm's standards for quality and clarity of design.



### Credentials & Affiliations

<b>Licensed Professional Engineer, Illinois, 062.043021</b>	April 1986 - Present
<b>Licensed Structural Engineer, Illinois, 081.004528</b>	March 1984 - Present
<b>American Institute of Steel Construction (AISC), Member</b>	1989—Present
<b>American Society of Civil Engineers (ASCE), Member</b>	1997—Present

### Project Experience

Below are Vinod's most notable projects, where he was Project Manager or Project Structural Engineer, responsible for all aspects of design, including interdisciplinary coordination, technical work, contract plans, specifications and estimates:

#### Major River & Bascule Bridges

##### **WisDOT, WIS-130 over Wisconsin River, Design-Build, Lone Rock, WI**

A \$40M design-build project to replace 3 aging truss bridges with two new bridges on a new alignment – a 920' long bridge over the main river and 1,100' long bridge over the side channel. The proposed bridges were 36' wide, with PPC girder spans.

##### **IDOT, IL-104 Tied-Arch over the Illinois River, Meredosia, IL**

Phase I study and Phase II design of a new 2,130-ft long, 2-Lane bridge & approaches on new alignments, replacing an 80-yr old truss. The new bridge includes a 590' tied-arch span, with 720' and 810' long steel plate girder approach units.

##### **IDOT, US-67 Tied-Arch over the Illinois River, Beardstown, IL**

Phase II design of a new 3,600-ft long, 4-Lane bridge & 4 miles of expressway bypass of US-67 around Beardstown. The new bridge includes a 540' tied-arch span and plate girder approach spans ranging from 150 to 320'.

##### **WisDOT, Maple-Oregon Bascule Bridge over Sturgeon Bay Ship Canal, Sturgeon Bay, WI**

The overall bridge is 1060-ft long consisting of a double-leaf rolling lift bridge for a 200' navigation channel and PPC I-beam approach spans. The bridge cross-section consists of two 12' lanes, a 6' bike lane, and 6' raised sidewalk on either side.

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### **WisDOT, Michigan St. Bascule Bridge over Sturgeon Bay Ship Canal, Sturgeon Bay, WI**

Phase I study and Phase II Design for rehabilitation of the existing 1,400' long truss bridge, with 200' double-leaf, rolling-lift navigation span with overhead counterweights.

### **WisDOT, Eighth St. Bascule Bridge over the Sheboygan River, Sheboygan, WI**

A new replacement bridge with a single-leaf fully unbalanced span operated by an industrial -scale hydraulic fluid-power system. Located on an EPA Superfund Site, this design minimized river dredging and disturbance to the river sediments.

## Major Interchanges & Highway Corridors

### **IL Tollway, I-490 to I-90 System Interchange, Des Plaines, IL**

Final design of two 1200' long, highly curved, flared bridges over an MWRD detention basin and Higgins Creek. These complex bridges accommodate multiple ramps, superelevation transitions, and unique substructures due to the large grade differential. Construction complexities, including access and erection, were identified and addressed in design.

### **IL Tollway, I-294 Master Plan + Advanced Engineering, from 95th St to Cermak Rd, Cook & DuPage County, IL**

Master planning and studies for a 12-mile section of I-294 for eventual reconstruction and capacity improvement. Contains 7 interchanges, 35 bridges, 6 drainage culverts, over 60,000' of retaining/noise walls, 4 toll plazas and 1 oasis. Led structural team responsible for inspections, alternatives, condition reports, and TS&L plans for the recommended structure options.

### **IDOT, I-74 over Illinois Central Railroad, Champaign, IL**

Phase I and II engineering for reconstruction of a 725' long, 125' wide bridge carrying 8 lanes of I-74 traffic over 18 railroad tracks. The proposed bridge was 4-span continuous plate girder (220' max. span) on multi-column concrete piers and stub abutments. Extensive coordination with railroad about staging, constructability and minimizing impacts to operations.

### **IDOT, US 20 over McLean Blvd (SPUI), Elgin, IL**

Phase II design for complete replacement of existing diamond interchange with a Single Point Urban Interchange (SPUI). Features a new long-span bridge spanning above the at-grade SPUI. The new bridge is on curved alignment and has 3 continuous spans of 175'-250'-175'. It accommodates 2 lanes and 2 shoulders in each direction.

### **IDOT, I-80/94 at Torrence Ave (SPUI), Lansing, IL**

Phase II design for reconstruction and widening of 1.5 miles of I-80/94 Expressway and 0.8 mile of Torrence Ave (IL-83). The scope of included reconstruction of the Torrence Ave interchange as a Single Point Urban Interchange (SPUI). Included 3 miles of retaining/noise walls, new high mast lighting, expressway signage, and drainage systems.

### **IDOT, I-55 at Damen Avenue (SPUI), Chicago, IL**

Phase II design for staged reconstruction of the I-55 expressway mainline from Western Ave to Wood St, including the Damen Ave interchange. The interchange, with four access ramp structures, was reconstructed as a Single Point Urban Interchange (SPUI) for improving the interchange traffic capacity.

### **IDOT, IL-59 from I-55 to the DuPage River, Shorewood, IL**

Phase I study and Phase II design for reconstruction of the IL 59 & I-55 interchange and IL 59 from I-55 to DuPage River. The improvement included relocation of the expressway interchange approximately 1/2 mile to the south, reconstruction of frontage roads, roadway widening, profile modifications, and new bridge over I-55, culverts and retaining walls.

## Gary S. Powell, SE

Principal, Structural Manager

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## Summary

Gary Powell has over 41 years of civil, structural, architectural and construction engineering experience in the transportation field. His major clients have included IDOT, IL Tollway, CDOT, various counties, CTA, Metra, and various Class I Railroads. Gary has directed the preparation of contract plans, specifications and estimates of more than 30 bridges for IDOT, more than 40 bridges for the Illinois Tollway, more than 20 railroad bridges for Metra and other Class I Railroads (CSX, Norfolk Southern, BNSF, Union Pacific, etc.). He has also directed the annual inspections of 50 railroad bridges for CSX, and the FHWA biennial, fracture critical inspections of 375 highway fixed and movable bridges for CDOT and MWRD.



## Affiliations

<b>Licensed Structural Engineer, Illinois, 081.004771</b>	March 1989 - Present
<b>Structural Engineers Association of Illinois, Member</b>	1989—Present
<b>AREMA, Committee 15 – Steel Structures, Secretary</b>	1997—Present

## Project Experience

Responsible for all structural work including bridge rehabilitation and replacement design and contract plans for IDOT, IL Tollway, Chicago DOT, Metra, and Class I railroads. Most notable projects as project manager and engineer include:

### Major Highway Projects:

- I-80/94 from I-294 to US-41, \$465 million reconstruction of 9-mile stretch, including replacement of 3 mainline bridges, 12 new retaining walls, high mast light towers and sign structures along corridor.
- I-90 Chicago Skyway at 92<sup>nd</sup> Street which featured design of partial new interchange providing new exit and entrance ramps and supporting retaining walls.
- Palatine Road in Cook County, reconstruction of 2.9 miles which included three new grade separation (SPUI) structures and 8 new soldier pile retaining walls.
- I-55 from Kedzie Ave to the Chicago Sanitary Ship Canal, design and contract plans for superstructure and substructure widening of 4 separate bridges and 13,000 ft of new soldier pile walls.
- I-88 widening and reconstruction of 8-mile stretch which included design of 4 separate interchanges at IL-59, Winfield Rd, Naperville Rd, and IL-53.
- I-90 at Arlington Heights Rd interchange, replacement of I-90 bridge, plus new exit and entrance ramps

### Bridge Inspection, Evaluation and Rehabilitation:

- I-55 over the Des Plaines River, rehabilitation of a dual 900 ft. long, 3-span, cantilever truss bridge
- IL-89 over Illinois River, fracture-critical inspection of 1200 ft. long, 5-span thru truss bridge
- I-80 over Des Plaines River, fracture-critical inspection of 750 ft. long, 3-span thru truss bridge

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- IL-351 over Illinois River, NBIS inspection of 1850' long, 8-span steel plate girder bridge
  - Bob Michel Bridge (IL-40 over Illinois River) in Peoria, NBIS inspection of 2400' long, 17-span bridge with continuous steel plate girder and PPC beam units
  - Biennial and fracture critical bridge inspections and bridge condition reports for over 350 bridges in the City of Chicago, including 50 inspections on moveable bridges.
  - I-88 from M.P. 60.0 and M.P. 111.3, inspection and plans for rehabilitation of 54 separate bridges.

### **Bridges, Roads/Highways:**

- IL-89 and Plank Rd. over I-80, complete replacement, 275' long, 2-span, plate girder with integral abutments.
- Palatine Rd over IL-83, complete replacement, 350' long, 3-span continuous rolled steel beam bridge.
- I-355, contract plans for rehabilitation of 17 separate structures from I-55 to Butterfield Rd.
- IL-32 over Lake Shelbyville, deck replacement and rehabilitation of 8-span continuous steel girder bridge
- I-55 over Chicago Sanitary and Ship Canal, widening of 600' long, 5-span plate girder bridge on a 45-deg skew.
- I-80/94 over Little Calumet River & NICTD, contract plans for 581' long, 6-span, 10-lane bridge with 54-in deep steel plate girders on stub abutments and multi-column piers.
- I-80/94 over Hohman Ave, contract plans for 176' long, 3-span continuous, 10-lane bridge with 48-in PPC beams on integral abutments and multi-column piers. Bridge supports noise walls at each edge.
- IL-64 over Rock River, Oregon, IL, 1000' long, 4-lane replacement bridge with 7-span continuous plate girder units; piers on shell piles, cofferdam construction was required for each pier.
- 25th Ave over Railroad Yard, Franklin Park, redecking and substructure rehab of 1300' long bridge
- 25th Place over Cicero Ave, superstructure replacement, 177' long, 3-span continuous curved steel girders