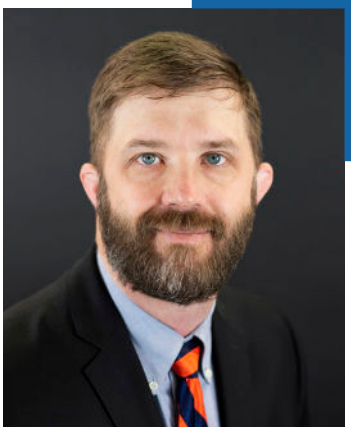
Benjamin Birch, P.E.

Senior Engineer



Mr. Birch has extensive experience working with high-performance concrete from mixture proportion development to the evaluation of many fresh and hardened properties. He has developed CTLGroup's testing capabilities in the area of unique and challenging test methods. He has experience working with ultra-high performance concrete (UHPC) and self-consolidating concrete (SCC) both in the laboratory and in the field. Mr. Birch has studied the factors influencing formwork pressure exerted by SCC. He has helped clients identify safe casting rates with SCC so as to not risk the integrity of their forming system while still maintaining economical placement rates. Mr. Birch also has extensive field experience with evaluation of in place structures through visual observation and the use of nondestructive testing (NDT).

Mr. Birch has a great deal of experience related to concrete pavements, and a lot of his prior experience involved evaluation of airfield and roadway pavement at installations ranging from small general aviation airfields to large commercial service and military installations. He is well versed in evaluation of mixture proportions for properties specific to the needs of pavement and associated specifications.

Representative Experience - Bridges

Missouri Department of Transportation | Jefferson City, MO

- Assisted in leading the research team that investigated the properties of fiber reinforced concrete (FRC) overlays for bridge decks. Evaluated fiber dispersion, fiber types, and developed an in-depth testing program to provide evaluate the performance of different RFC mixtures. Scope of work included the identification of potential field issues with production and made recommendations to improve performance criteria via the development of specifications and special provisions.

Yakima County Bridge Deck Rehabilitation | Union Gap, WA

- Sr. Materials Engineer for a Washington Dept of Transportation concrete bridge deck repair project. Following apparent performance issues with the new overlay, CTLGroup was retained to assess the contributing factors and provide recommendations to mitigate the issue for future project with similar scopes.

Blanchette Memorial Bridge Replacement | St. Louis, MO

- Sr. Materials Engineer for a Walsh Construction project that required concrete mixture design support for the new twin cantilevered spans over the Mississippi near St. Louis.

Chesapeake Bay Bridge Tunnel | Cape Charles, VA

- Sr. Materials Engineer for the materials consulting and testing program for the pre-cast tunnel liner segments. Testing included inverse carbonation resistance

Academic Credentials

M.S. in Civil Engineering University of Illinois at Urbana Champaign, 2007

B.S. in Civil Engineering University of Illinois at Urbana Champaign, 2004

Licensure / Certification

Professional Engineer CO, IL, TX, VT, RI, MO, WA, OR, DE, OK, ME, NV

Professional Affiliations

American Concrete Institute

Transportation Research Board

American Society of Civil Engineers

American Concrete Pavement Association

American Society of Mechanical Engineers

ASTM International

Contact Information

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and water permeability. In addition, NT Build 492 (chloride migration coefficient) testing was performed to determine the long-term durability of the liner system.

Representative Experience - Mixture Design / Optimization

Concrete Mixture Proportion Optimization

- Conducted materials evaluation, mixture proportioning and review of strength test results to develop a mixture for a runway replacement project requiring high early strength and limited placement time at a major commercial service airport.

High Performance & Self-Consolidating Concrete

- Developed experiments and models to study and predict formwork pressure exerted by self-consolidating concrete (SCC). Worked with DOT engineers to measure formwork of SCC being placed in the field to better understand the behavior of material in real-world applications.
- Assisted on a project to Investigate high performance concrete materials for Illinois Tollway bridge decks in order to generate information to support the development of new performance-related specifications to be used for future Tollway project.

Fiber Reinforced Concrete

- Lead efforts to expand CTLGroup's testing capabilities in the area of fiber-reinforced concrete. Has overseen testing projects on FRC and ultra-high performance fiber reinforced concrete (UHPFRC) samples.

Shear Testing of Concrete Cores from Dams

- Expanded the testing capability of CTLGroup by developing the apparatus for testing the shear strength and sliding friction properties of concrete cores taken from in place dams. Managed testing of samples from >5 dams and >100 samples.

Condition Assessment

- Designed and organized construction of full-scale mockups for the evaluation of demolition techniques and the formulation of a procedure to expose the containment vessel at its lowest point in support of NDE activities at the Davis Besse Power plant as part of their Commitment #39 to the NRC.

- Conducted condition surveys on more than 10 large commercial service or military airfields, over 100 general aviation airfields and more than five structures. Prepared reports describing distress and analyzed repair techniques and cost projections. Inspected an airfield with blow-up distress and organized laboratory and petrographic testing to identify the underlying cause of the distress. Developed repair techniques to prolong the life of the airfield.

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Thermal Control Plan (TCP) Development | Various Locations, USA

- Developed thermal control plans (TCPs) for numerous bridge and building projects throughout the country. Including basic plans utilizing standard ACI 207 guidelines to plans incorporating measurement of adiabatic temperature rise of the clients concrete mixture and implementation of a performance based temperature difference limit (PBTDL) based on testing the properties of the clients mixture. Help clients make decisions on mixture choices to reduce risk for mass concrete problems. Design cooling pipe layouts and calculate cooling requirements for placements requiring cooling pipes due to project constraints.

Delayed Ettringite Risk Assessment | Various Locations, USA

- Evaluate the risk for delayed ettringite formation (DEF) in mass concrete placements. On-paper analysis of concrete mixture chemistry for its risk for DEF at elevated (>160°F) temperatures. Conducted laboratory evaluation of cast concrete for DEF risk due to known high temperature occurrences.

Representative Experience - Airfield Runways + Pavements

AFB Runway and Facility Materials Testing | Various Locations | USA

- Condition surveys and documentation on more than 10 large commercial service or military airfields, over 100 general aviation airfields and more than 5 structures to prepare reports describing typical distresses and their severity and analyzed repair techniques and cost projections.

Laboratory and Concrete Mixture Development for Milwaukee Airport | Milwaukee, WI

- Laboratory mixture development of a high early strength concrete mixture for a runway rehabilitation project.

Concrete Materials Testing, Analysis, & Expertise - Illinois Tollway | Los Angeles, CA

- Conducted research for materials development and testing for rapid repair and long-term durability requirements of Illinois Tollway pavements and bridge decks for the Move Illinois program.

Evaluation of Concrete Floor Slabs Distress | Princeton, MN

- Evaluation of concrete distress in floor slab at a warehouse located in Princeton, MN.

Representative Experience - Energy

Davis-Besse Nuclear Power Station | Oak Harbor, OH

- Nondestructive testing of shield building wall. Impulse response, ground penetrating radar, and borescope inspection.

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Jardine Design Services with HDR Engineering | Chicago, IL

- Performed a condition survey of precast channel slabs of the roof of the building and provided repair recommendations.

Fermi II Nuclear Generating Station | Newport, MI

- Evaluation of Powder Deposits Turbine, Auxillary, and RadWaste Buildings.

Donald C. Cook Nuclear Power Plant | Bridgman, MI

- Performed a field evaluation of the reinforced concrete base supporting a diesel generator due to concerns of visible cracking in the base of the generator's No. 4 bearing, which had recently failed.

Keeyask Hydrostation | Northern Manitoba, Canada

- Provided concrete mixture development, thermal control plans, and related services for the projects' mass concrete placements, among other services with the goal of increasing constructability.

Evaluation of Contaminated Fly Ash on Concrete Performance - Windmill Bases | Midwest

- Evaluate the effects of contaminated fly ash on the potential performance of multiple large-scale concrete foundations for windmill basins.

Representative Experience - Building Evaluation

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