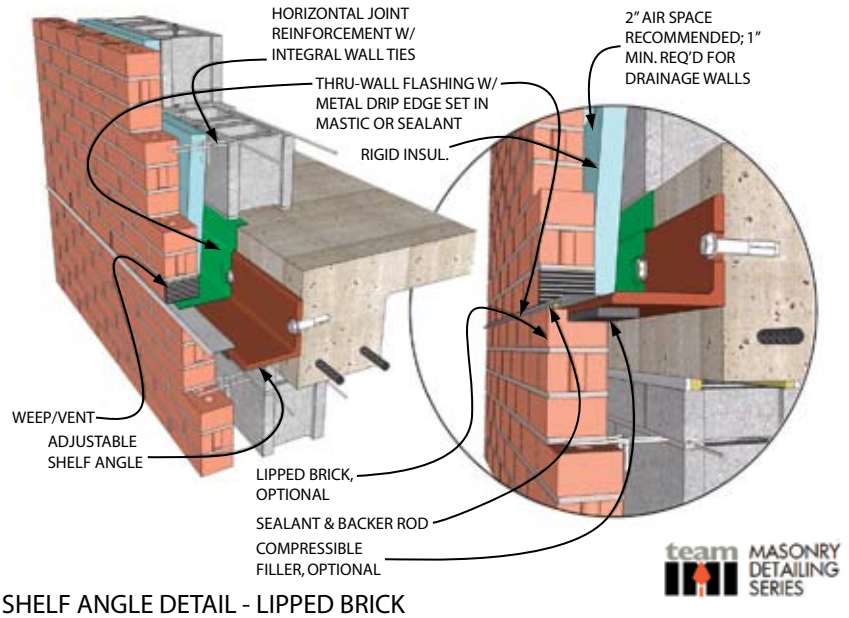
Masonry Detailing from Desktop to Job Site

By Diane Throop, P.E., Keith Lashway, P.E., and Scott Conwell

Using the Internet to find solutions for technical questions is nothing new for architects and structural engineers, but a new Masonry Detailing Series (MDS) takes web-based education one big step further. Created by the International Masonry Institute (IMI), the series educates everyone – from the designer to the contractor and craftworker – involved in seeing a project to fruition. That continuity means better understanding by all parties of how masonry works, and that leads to fewer problems on the job site. With an understanding of these details, structural engineers can affect the structural design and help make sure that assumptions made in design are carried through to construction.

As a strategic alliance of the International Union of Bricklayers and Allied Craftworkers (BAC) and their signatory contractors, IMI works with designers, specifiers and builders to help them really understand both the "why" and "how" of masonry construction, right on down to individual details.

"The MDS offers a one-stop-shop approach to finding information on a specific topic," says IMI Director of Engineering Diane Throop, P.E. That is something that even seasoned designers are finding. Although Holabird & Root architect Greg Marinelli of Chicago specifies masonry regularly, he gained more insight into specifying expansion joints and control joints from the details, which gave him "a true understanding of where you need them and why you need them," he says.



SHELF ANGLE DETAIL - LIPPED BRICK

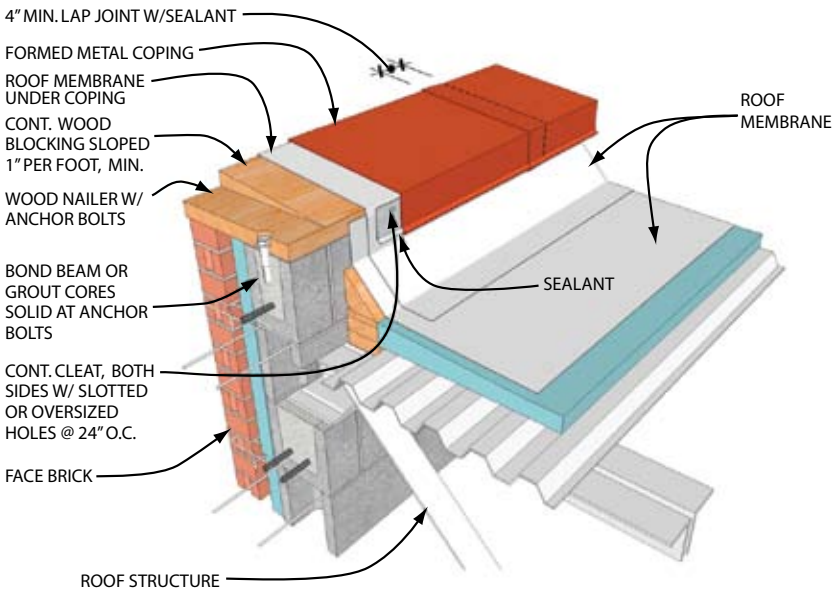
The Masonry Detailing Series presents different ways to handle relieving angles.

The interactive, multimedia format of the Masonry Detailing Series includes drawings, images, narratives, animated details and more. The details are provided in PDF format that can be downloaded. One popular feature is the "similar details" link, which offers a direct listing of similar details instead of sending the user searching through the entire series.

On control joints, for example, the website offers everything a structural engineer, architect or builder might need to know about control joint design, placement and construction: images, three-dimensional drawings, a detailed description, product samples, technical data sheets, specifications, case studies, product literature, and even a short movie – all of which is downloadable.

"Control joints are usually thought of as an architectural detail," says Throop, "but in some situations, control joint location and type can affect the structural performance of the wall system." The multimedia resources allow for easy communication of structural and architectural considerations between both design professions and field personnel.

To keep users coming back for more, IMI continually adds new topics. Although many of the initial details in the series seem more architectural in nature, a new emphasis is being made to include structural details such as floor/wall connections, bond beams, foundation dowels, intermediate floor support, and more. Detail 03.501, a floor connection detail showing a structural connection from masonry wall to concrete floor slab is one such new detail current in the preliminary stages of inclusion to the site. A series of three options for intersecting wall connections are also new details that have structural implications. Even those that appear to be architectural include structural detailing components. One of



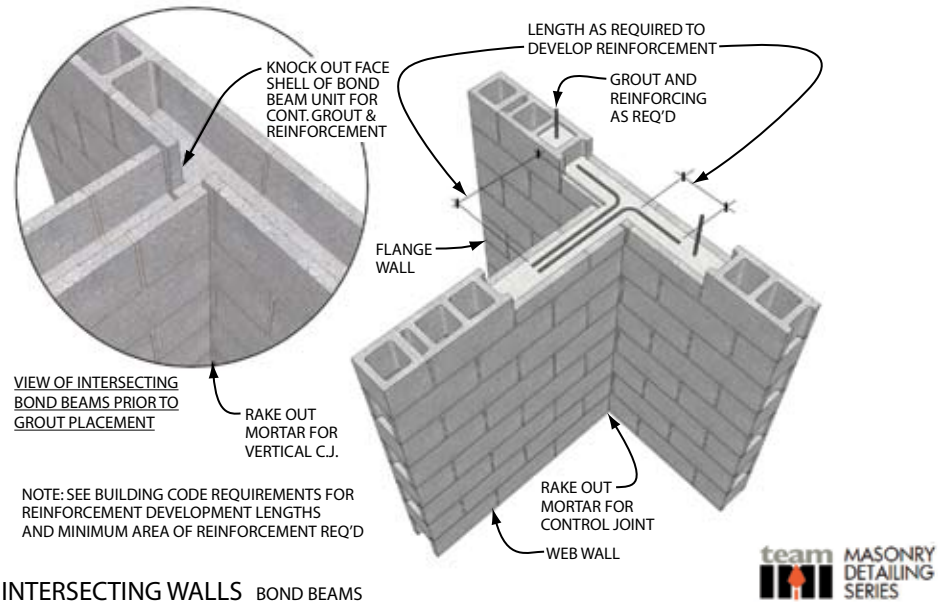
ROOF DETAIL LOW PARAPET

2D and 3D versions are available for many of the details.

the strengths of the series is the way it presents an entire wall – structural components and architectural details. This is the way a building is constructed, and viewing the wall section with all components in place is a realistic way to determine the constructability of a structural component. Details at the base of the foundation include foundation dowels and reinforcement along with flashing, weeps, cavity inserts, insulation, vapor barriers and more.

Speed is definitely one of the detailing series' charms. Minutes before heading into a project meeting, Steve Drangenis, Project Manager for Brayman Hollow Masonry in Connecticut, needed a shelf angle detail. He went to to the IMI website (**www.imiweb.org**), and with two clicks downloaded exactly what he wanted. "It was quick and easy," he says. ArchiTech Consulting, Inc. Vice President Kenneth Crocco, FAIA, CCS, CSI, likes having it at his fingertips when a client calls with a specific masonry detailing question.

The Masonry Detailing Series goes beyond merely collecting details and technical data by offering a range of design conditions and solutions. "It's more than details," says Sheldon Wolfe, RA, FCSI, CCS, CCCA, Director of Specifications for BWBR Architects in St. Paul, MN. He likes the perspective drawings that show components in different colors, plus the movies and "explanations of everything."



INTERSECTING WALLS BOND BEAMS

IMI presents three alternate methods for intersecting structural masonry walls.

Another plus is the technical expertise behind the details. One recent Friday morning, Louisville, Kentucky contractor Barry Clements from PCM Construction wanted an end dam detail for above masonry openings or at window sills. By that afternoon, he received the details he wanted, plus some alternative scenarios

Perhaps the details' most dramatic contribution is closing any potential gaps between design and execution. At Kinateder Masonry, Inc. in Wisconsin, they use MDS details so often that President Fred Kinateder, Sr. is considering more laptops for his people in the field. "It's really helped us a lot," says Kinateder. "We've been using it all the time since it came out, for outlining details for the journeymen, as well as steering architects in the right direction."

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BAC Business Manager Timothy J. Aikens from Local 56 in Illinois wishes he had had the details in his superintendent days. "We find people out there who may not be doing it properly. If I come across that now, I can look it up." He likes that it "is not a piece of paper. It's a perfect three-dimensional picture." He believes that the details benefit the public in general, particularly on safety-sensitive features. On several occasions, he has used the details to show architects or contractors a better way, or alternatives to consider. They also come in handy at bid time, he says. "It helps our contractors bid to the right specs."

The more direct connection between structural engineer and mason afforded by a uniform set of details is appreciated by structural engineer and mason alike. "Masonry is drawn and built to last, if it's engineered well and built right," says Aikens. "That helps the industry." Imparting consistent information all the way from the structural engineer to the mason on the wall is a function that IMI is in a unique position to undertake.

Having the details to teach young masons "is a great tool," says Steve Martini, National Director of Apprenticeship and Training for IMI. "Our instructors can stay up to date with the latest specifications in all of our crafts, and it keeps trainees current in techniques, materials and proper installation." (*See Sidebar, page 13*)

The details in the series are reviewed and delineated by IMI's technical staff of structural engineers, architects and masons. That collaboration of design professionals, labor and contractors greatly enhances their flexibility and relevance to ever-changing construction trends.

Perry Sanders, Vice President of Caretti, Inc., a masonry contractor based in Pennsylvania, says he has noticed a difference since the detailing series was launched. "We are getting standard details that work," he says. Sanders believes that one advantage is that some designers who might hesitate to ask for help can discreetly turn to the web. He also thinks it is particularly useful for younger designers, who may not yet grasp "how things come together."

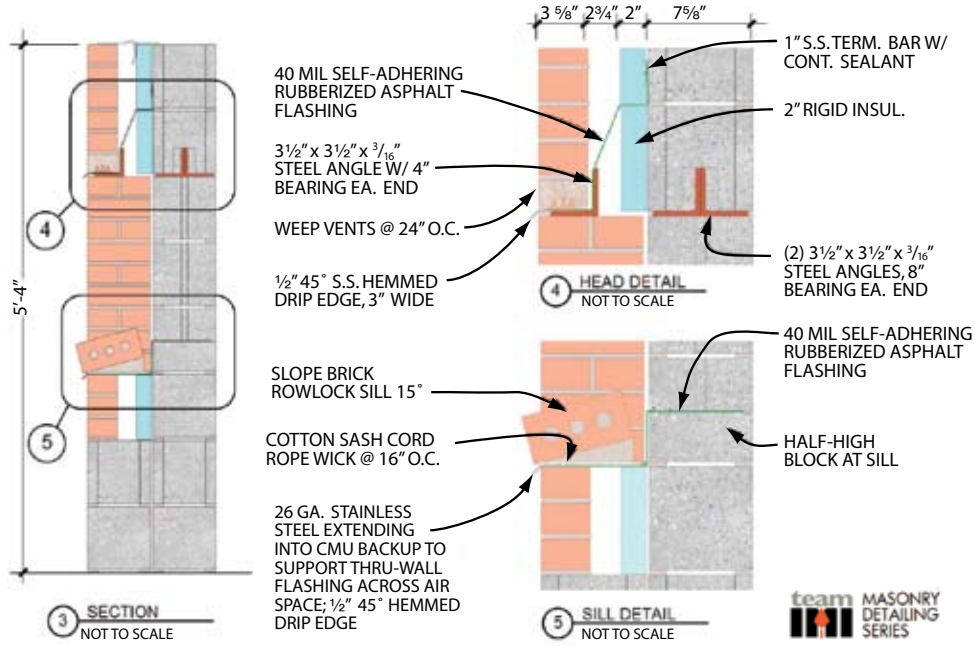
When a question arises on a Caretti project site, contractors and foremen can refer right to a detail. Sometimes that leads to clarification of an issue. At other times it has allowed the contractor to suggest another approach. "Instead of drawing a picture, they are using the details," he says. "It's having an impact."

One firm they deal with regularly has found it efficient to incorporate the details into their standard specifications.

IMI conducts seminars throughout the country on how to get the most out of the details, including several options for handling a range of specific conditions.

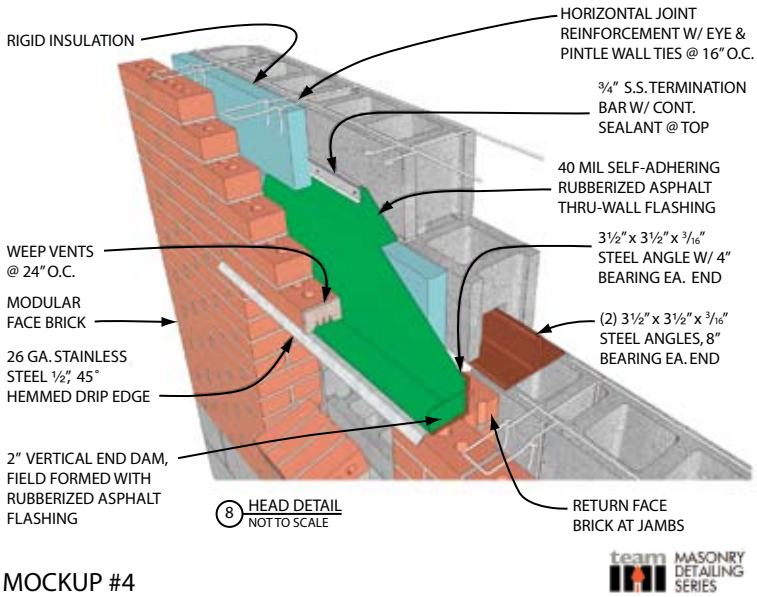
In January, more than 100 engineers, architects, and mason contractors participated in a three-hour seminar at World of Masonry, entitled *Masonry: Beyond the Details*, where they analyzed a masonry building from the ground up, looking at a variety of wall conditions.

For window heads, for example, IMI shows one option of a continuous bond beam spanning the opening. Another suggested tack is a double steel angle supporting the block above. Either way, the structural engineer is better informed when making the final decision.▪



MOCKUP #4

IMI bricklaying instructors use the Masonry Detailing Series in their mockups to instruct apprentices on a variety of wall conditions.



MOCKUP #4

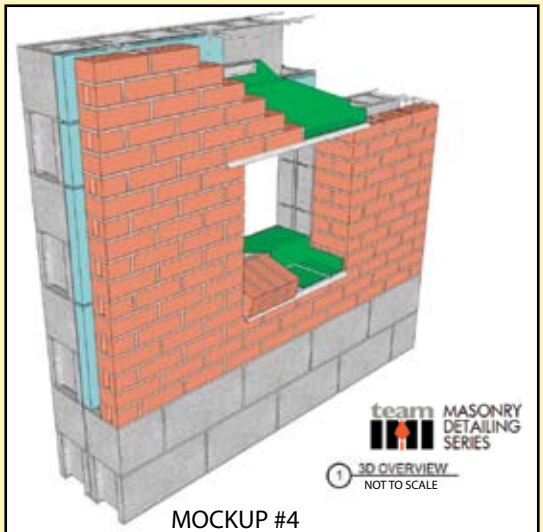
IMI bricklaying instructors use the Masonry Detailing Series in their mockups to instruct apprentices on a variety of wall conditions.

Diane Throop, P.E., is Director of Engineering with the International Masonry Institute and has over 30 years experience in engineering and construction, most with masonry design and construction. Ms. Throop is currently Chair of the Masonry Standards Joint Committee (TMS 402/ACI 530/ASCE 5) and is former chair of ASTM Committee C15 - Manufactured Masonry Units.

Keith Lashway, P.E., has 35 years experience in civil/structural engineering, including project design, construction management, estimating and material specifications. He is a member of the Society of American Military Engineers and the New York State Society of Professional Engineers.

Scott Conwell has been with IMI for over twelve years, and been involved with the Masonry Detailing Series for two years. He is a former board member of Chicago chapter CSI, and currently sits on the editorial advisory board of Masonry Construction magazine. A licensed architect in Illinois, Scott's background includes project management and construction administration.

Confidence from Design through Execution



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Assumptions are made during the structural engineering design process that must be carried through to project construction. Unless the structural engineer has extensive masonry experience, creating these details can be time consuming and the constructability is untested. The Masonry Detailing Series (MDS) offers easy access to details that have been vetted by a team of masonry construction specialists that includes architects, engineers, masons and contractors.

Let's say that a structural engineer requires a detail that permits the transfer of loads across the intersection. A quick check of the MDS turns up three options for intersecting walls that will achieve that. Rather than spending time creating a detail from scratch, the structural engineer can download the detail and incorporate it into the project drawings quickly and with confidence.

That consistency and continuity from design through execution also benefits the masons. "One of the challenges we've faced in the past," says Steve Martini, IMI National Director of Apprenticeship and Training, "is that we would train our apprentice and journeyman bricklayers to do things a certain way, but the project drawings showed different details. With standardized details incorporated into structural drawings, the engineer is using details that reflect the latest technical information. And, we are using the same information to train our bricklayers. The entire industry ends up on the same page."

Martini notes that apprentices and journeyman bricklayers are trained to take responsibility for a building's structural integrity. "The MDS lets our members become conversant and comfortable with a standardized detail," he says. Incorporating details that work structurally and are familiar to craft workers is an important step, but the final piece of the "design to execution" equation is ensuring proper execution of the details.

A perfect companion to the MDS series is IMI specialized training – and certification – in grouting and reinforcement masonry. Driven by the structural engineering community seeking assurance that structural reinforcement was properly installed in masonry walls, "Grout Training" is one of the most sought-after IMI certifications. The training incorporates classroom and hands-on training and testing in the proper techniques for placement of structural reinforcement and masonry grout. Initially targeted for craftworkers, it was quickly expanded to include any member of the construction team. The curriculum is taught at the new John J. Flynn BAC/IMI International Training Center in Maryland and around the country. IMI even takes it on the road offering the training on jobsites, and member's offices upon request.

The designer/craft worker connection is also strengthened through educational seminars for architects, structural engineers, construction managers, mason contractor, craft workers and product manufactures, where topics like detailing masonry or grout training are covered in an interactive setting that includes skilled craftworkers. That inclusive approach gives designers confidence in the details, the installation and the education behind it all.

FLOOR CONNECTION DETAIL

IMI is continually adding to its online library of downloadable details.