

THINK 👶 DESIGN 💑 BUILD

SCHNITZHOFER & ASSOCIATES, LLC

CONSULTING STRUCTURAL ENGINEERS

DECEMBER 2011 NEWSLETTER

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CURRENT PROJECTS



STUART HALL EAST LAWN RETAINING WALL S&A HAS BEEN SELECTED TO COMPLETE THE DESIGN OF THE STUART HALL EAST LAWN RETAINING WALL. WE WILL WORK CLOSELY WITH THE PROJECT CONTRACTOR TO ACCOMPLISH A NEW, FOLLOW OUR PROGRESS OF THE WALL REHABILITATION



<u> "The Virginia House" - Glasgow, VA</u>

We've broken ground on the earth sheltered home, "The Virginia House" STRUCTURAL ENGINEERING BLOG '



307 NORTH AUGUSTA STREET - STAUNTON, VA

REINFORCING NEW OPENINGS IN THE LOAD BEARING WALLS. SEE BEFORE & AFTER PHOTOS AND THE REINFORCE-MENT OF THE HISTORIC BRICK AT THE



UNSUBSCRIBE



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CURRENT PROJECTS

HISTORIC CARTERS GROVE ESTATE: COLONIAL WILLIAMSBURG, VA

SCHNITZHOFER & ASSOCIATES, LLC IS TASKED TO DEVELOP A MODERN STRUCTURAL DESIGN OF AN EXACT SCALE REPLICA OF THE HISTORIC CARTERS GROVE ESTATE LOCATED IN COLONIAL WILLIAMSBURG, VA. BUILT IN THE 1750'S, WE ARE CURRENTLY DEVELOPING WORKING DRAWINGS THAT INCORPORATE SOLUTIONS ALLOWING FOR NEARLY IDENTICAL GEOMETRY, WHILE



MAINTAINING MODERN BUILD-ING STANDARDS AS WELL AS NEEDED MODERN EFFICIENCIES. MAKE SURE YOU FOLLOW OUR BLOG FEED FOR THIS CARTERS GROVE REPLICA DESIGN TO GET UPDATES ON THE DEVELOPE-MENTAL PROCESS, DESIGN AND CONSTRUCTION PHASES, THIS IS



SURE TO BE AN EXCITING ENDEAVOR AND WE ARE LOOKING FORWARD TO MAK-ING IT A SUCCESS! FOLLOW THE PROGRESS **HERE**...

RESIDENTIAL DESIGN - NELSON COUNTY, VA

S&A has begun the design of a beautiful residential project located in Nelson County, VA. Working closely with Frazier Associates in Staunton, VA, we've begun preliminary framing layout and are preparing for spring construction. Follow the progress on our website <u>HPRE...</u>



S&A TECHNICAL BULLETINS

PROFESSIONAL RISK MANAGEMENT

BASICS OF WOOD INSPECTION: CONSIDERATIONS FOR HISTORIC PRESERVATION

PROFESSIONAL DEVELOPMENT: SEISMIC STABILIZATION

ENGINEERING LAW: STANDARD OF CARE

2009 VRC BRACED WALL PANEL PROVISIONS

SCHNITZHOFER & ASSOCIATES, LLC PRO-VIDES CONSULTING STRUCTURAL ENGINEER-ING SERVICES IN VIRGINIA, WEST VIRGINIA AND TENNESSEE. KNOW THAT WE WILL FIND MODERN AND <u>CREATIVE SOLUTIONS</u> FOR YOUR STRUCTURAL PROJECTS. IF YOU KNOW THAT YOU NEED A STRUCTURAL ENGINEER, CONTACT US <u>HERE...</u>



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SCHNITZHOFER & ASSOCIATES, LLC

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CASE STUDY: SAVING HISTORIC STONE LINTELS

HISTORIC RESIDENTIAL RENOVATION - LEXINGTON, VA



THE PROBLEM: IRREPLACEABLE STONE LINTELS HAVE EXPERIENCED DETERIORATION AND DAMAGE OVER THE YEARS. AS A RESULT, FAIL-URE HAS OCCURRED RESULTING IN THE PHYSICAL DISLOCATION OF THE LINTELS. AS YOU CAN SEE IN THE PHOTO TO THE LEFT, BOTH STONE LINTELS ARE LYING ON THE SLAB ON GRADE BELOW THEIR ORIGINAL LOCATIONS.

WHAT WE HAVE TO WORK WITH: LEFT FOR US TO WORK WITH ARE DAMAGED AND BROKEN AUTHENTIC LINTELS. THE LINTELS ARE SOLID BUT UNFORTUNATELY REST ON THE GROUND IN MULTIPLE PIECES.

OUR OPTIONS: WE HAVE A FEW ALTERNATIVES AVAILABLE. PRECAST MASONRY LINTELS WITH SPLIT FACE FAUX STONE VENEER WOULD ACCOMPLISH A NEARLY PRESERVED AESTHETIC CONDITION, WHILE SATISFYING OUR STRUCTURAL REQUIREMENTS. IN OUR CASE, WOOD LINTELS CLAD IN SPLIT FACE VENEER ADDRESSES STRUCTURAL CON-CERNS, HOWEVER INTRODUCING WOOD MATERIALS INTO A BRICK AND

STONE STRUCTURAL SYSTEM IS UNDESIREABLE DUE TO MATERIAL INCOMPATIBILITY, DETERIORATION RESULTING FROM ROT, MOIS-TURE INTRUSION AND RETENTION, AMONG OTHER CONCERNS. FOR THIS BEAUTIFUL HISTORIC RESIDENTIAL PROJECT, WE CHOSE TO REPAIR THE EXISTING LINTELS.

STRUCTURAL ANALYSIS: WE APPROACH THE STRUCTURAL ANALYSIS OF THE STONE LINTEL REPAIR FROM A CLASSICAL PERSPECTIVE. ASSUM-ING COMPARABLE MATERIAL PROPERTIES BETWEEN STONE AND CON-CRETE (FOR APPLIED STRESSES WITHIN ALLOWABLE CONCRETE COM-PRESSIVE STRENGTH RANGES), WE CAN MODEL THE BALANCE OF TEN-SILE AND COMPRESSIVE COUPLING SIMILAR TO THAT OF A NON-RESTRESSED REINFORCED CONCRETE BEAM. UPON VERIFICATION THAT OUR MODEL COMPLIES WITH OUR ASSUMPTIONS, THROUGH COMPUTA-TION, WE REPLACE OUR BEAM/LINTEL MODEL CROSS SECTION WITH CONCRETE AND PLACE MILD REINFORCEMENT IN THE TENSILE ZONE TO RESIST BENDING STRESSES. 5/8" WIDE X APPROXIMATELY 3" DEEP SAW-CUT CHANNELS ARE SCRIBED ALONG THE BOTTOM OF THE RE-ALIGNED BROKEN LINTEL SECTIONS. NEW STEEL REINFORCEMENT IS THEN PLACED WITHIN THE GROOVE, IN EFFECT, RECREATING A BEAM TO RESIST INTERNAL BENDING STRESSES.

MATERIALS: BONSTONE MANUFACTURES TWO-PART STRUCTURAL





FORCING STEEL AND STONE AND CONCRETE MATERIALS. DEVELOPMENT CAPACITIES HAVE BEEN TABULATED BY BONSTONE, ALLOW-ING US TO DETERMINE THE REQUIRED DEVELOPMENT LENGTH, AND EASILY VERIFY THAT THE STRESSES CAN, IN FIACT, BE TRANSMIT-TED. FOR THE PURPOSES OF THIS STONE LINTEL REPAIR PROJECT, OUR STRESSES WERE WITHIN TOLERABLE LIMITS, SO DEVELOPMENT WAS EASILY ACCOMPLISHED. SCHNITZHOFER & ASSOCIATES, LLC IS CONSTRUCTING QUICK REFERENCE TABLES DENOTING RE-QUIRED EXPOXY/REINFORCEMENT INTERACTION DEVELOPMENT LENGTHS FOR VARIOUS SPAN, MATERIAL AND LOADING CONDITIONS FOR USE WITH FUTURE PROJECTS.

<u>FINISHED PRODUCT:</u> While construction is not complete as of 12.01.2011, we anticipate the lintels to have the appearance of solid and working structural lintels, with adeuate capacity to resist vertical loads acting upon them.

