

## REFERENCES

- [1] Adeola, J.O. "A Review of masonry block/brick types used for building in Nigeria". M. Eng. Thesis, University of Benin, 1977.
- [2] Karaman S., Gunal H., Ersahin S. Assessment of clay brick compressive strength using quantitative values of colour components. *J. Construct Build Mater.* 2006; 20: 348-354.
- [3] Cultrone G., Sebastián E., Torre de la, M.J. Mineralogical and physical behavior of solid bricks with additives. *J. Construct Build Mater.* 2005;19: 39-48.
- [4] Prachumpun, P. "Quality improvement of Hang Dong clay for some ceramic products development". M.S. Thesis, Chiang Mai University, 2537.
- [5] Demir I. Effect of organic residues addition on the technological properties of clay bricks. *J. Waste Manage.* 2008; 28: 622-627.
- [6] Schmidt-Reinholz Ch. Suggestions for the reduction of bulk density through additives. *Tile brick Int.* 1990; 6: 23-27.
- [7] Dondi M., Marsigli M., Fabbri B. Recycling of industrial and urban wastes in brick production a review. *Tile Brick Int.* 1997; 13: 218-225.
- [8] Karaman S., Gunal H., Ersahin S. Quantitative analysis of pumice effect on some physical and mechanical properties of clay bricks. *J. Appl Sci.* 2008; 8: 1340-1345.

- [9] Elwar M.M., Attriss M.S., Mahmoud A.A., Salem A.S. Characterization of rice straw/ash and using in clay brick. In: *Proceeding of first scientific environmental conference*. Zagazig University. 2006; 79-92.
- [10] Weng C.H., Lin D.F., Chiang P.C. Utilization of sludge as brick materials. *J. Adv. Environ. Res.* 2003; 7: 679-685.
- [11] TISI 77, Standards specification for building brick (Solid masonry unit made from clay or shale) *Thai Industrial Standards Institute*, p. 3, 1988. (in Thai)
- [12] Wouter P. Energy Performance of Building: Assessment of Innovative Technologies, ENPER-TEBUC Final report. 2004.
- [13] Zerroug A., Zehar K., Refoufi L. Thermal conductivity models of porous materials. *J. Eng. Appl. Sci.* 2007; 2: 722-727.
- [14] Margaret G.T., David R.S. Income opportunities in special forest products, agriculture Information Bulletin 666, Washington, D.C., pp. 25-29, 1993.
- [15] Sutcu M., Akkurt S. The use recycled paper processing residues in making porous brick with reduce thermal conductivity. *Ceram Int.* 2009; 35: 2625-2631.
- [16] K BLOCKTM Technology Company Co. Ltd. (No date). "K Block: Products." [Online]. Available <http://www.k-bloce.com/products.php> (24 August 2008).
- [17] Sengkhamboutlavog B. "Size effect of burnt clay brick". M. Eng. Thesis Asian Institute of Technology, Bangkok, 2000.

- [18] Mchally G.H. Soil and rock construction materials. Simultaneously published in the U.S.A. and Canada. pp 300-301, 1998.
- [19] Lyons A., Materials for architects and builders 4<sup>th</sup>. British library cataloguing in publication data. pp 4-7, 2008.
- [20] Energy efficiency improvements in the Indian brick industry. 2010. "*Clay brick extruding machine.*" [Online]. Available <http://www.resourceefficientbricks.org> (4 August 2011).
- [21] Katikamu Community Brick Making. 2009. "*brick press.*" [Online]. Available <http://www.justkikemychild.com> (30 September 2011).
- [22] Shutterstock images. (No date). "*handmade bricks from clay.*" [Online]. Available <http://www.shutterstock.com> (4 August 2011).
- [23] Duggal S.K. Building materials. Third revised edition. New Age International (P) Ltd., Publishers, 2008.
- [24] Jackson N., Dhir R.K. Civil engineering materials. Fifth edition. MACMILLAN PRESS LTD, Houndmills, Basingstoke, Hampshire RG21 6XS and London. pp. 495-498, 1996.
- [25] Ritchie T. Moisture expansion of clay bricks and brickwork. Division of Building Research, NRC. pp 1-4. 1975.
- [26] Ramachandran V.S., Paroli R.M., Beaudoin J.J., Delgado A.H. Handbook of thermal analysis of construction materials. WILLIAM ANDREW PUBLISHING, Norwich, New York, U.S.A. pp. 519-526, 2002.

- [27] Eduardo D. G., Michael T. K., Thomas F., Edgar. Unit Operations of Chemical Engineering, 5<sup>th</sup> Edition. McGraw-Hill Chemical Engineering Series, 2005.
- [28] Hongssa-ngiam A. "Thermal conductivity of ceramics". M.S. Thesis Chiang Mai University, Thailand. 1978.
- [29] Grimshaw R.W., The chemistry and physical of clays, 4<sup>th</sup> Edition, Ernest Benn Limited., London, pp. 934-954. 1971.
- [30] Poul Klenz Larsen. Moisture physical properties of bricks. Building Materials Laboratory Report, Technical University of Denmark. pp. 4. 1995.
- [31] Koronthalyova O., Matiasovsky P. Pore Structure and thermal conductivity of burnt clay bricks. (In press)
- [32] Characterization of Pore Structure: Foundation. (No date). "*Porous Materials.*" [Online]. Available [http://www.pmiapp.com/pubication/docs/characterizaton\\_pore\\_structure\\_foundation.ppt](http://www.pmiapp.com/pubication/docs/characterizaton_pore_structure_foundation.ppt) (20 July 09).
- [33] Bevilacqua P., Ferrara G. Comminution of porous materials. *J. Miner Process.* 1996; 117-131.
- [34] Shaocheng JI QI GU., BIN XIA. Porosity dependence of mechanical properties of solid materials. *J. Mater Sci.* 2006; 1757-1768.

- [35] Smaller pores. (No date). "Porous Materials." [Online].  
[http://www.uio.no/studier/emner/matnat/.../16KJM5100\\_2006\\_porous\\_epf](http://www.uio.no/studier/emner/matnat/.../16KJM5100_2006_porous_epf).  
(6 June 2011).
- [36] Okunade E. A. The effect of wood ash and sawdust admixtures on the engineering properties of a burnt laterite-clay brick. *J. Eng Appl Sci.* 2008; 8: 1042- 1048.
- [37] Demir I., Baspinar M. S., Orhan M. Utilization of kraft pulp production residues in clay brick production. *J. Build Environ.* 2005; 40: 1533-1537.
- [38] Demir I. An investigation on the production of construction brick with processed waste tea. *J. Build Environ.* 2006; 41: 1274-1278.
- [39] Ugheoke B. J., Onche E. O., Namessan O. N., Asikpo G. A. Property optimization of kaolin-rice husk insulating fire-bricks. *J. Practic Technol.* 2006; 167-178.
- [40] Jung J. H., Yoo J. W., Lee J. U., Kim H. T. Application of coal wastes to clay bricks and investigation of their physical properties. *J. Indus Eng Chem.* 2005; 11: 175-179.
- [41] Rahman M. A. Properties of clay sand-rice husk ash mixed bricks. *J. Cemen. Composites Lightweight Concr.* 1987; 9: 105-108.
- [42] Viktor B., László A. G. Improvement of insulation properties of conventional brick products. *J. Mater Sci. For.* 2008; 589: 1-6.

- [43] Department Mechanical Engineering. (No date). "Effect of Rice Husk and Diatomite on the Insulating Properties of Kaolin - Clay Firebricks." [Online]. Available <http://www.lejpt.academicdirect.org> (14 May 2008).
- [44] Russ W., MÖrtel H., Meyer-Pittroff R. Application of spent grains to increase porosity in bricks. *Construct Build Mater.* 2005; 19: 117-126.
- [45] Elinwa A. U. Effect of addition of sawdust ash to clay bricks. *J. Civ Eng Environ Sys.* 2006; 23: 263-270.
- [46] Ramadan M. O., Fouad H. A., Hassanain A. M. Reuse of water treatment plant sludge in brick manufacturing. *J. Appl Sci Res.* 2008; 4: 1223-1229.
- [47] Intarachai P. "Mechanical and thermal properties of fat clay brick mixed with fly ash and gypsum from Mae Moh power plant". M. Eng. Thesis, Chiang Mai University, 2005.
- [48] Chopradub A. "Physical properties of common brick made from mixtures of clay and rice husk". M. Eng. Thesis, Chiang Mai University, 2004.
- [49] Ten J.G., Orts M.J., Saburit A., Silva G. Thermal conductivity of traditional ceramic Part II: Influence of mineralogical composition. *Ceram Int.* 2010; 36: 2017-2024.
- [50] Gualtieri M.L., Gualtieri A.F., Gagliardi S., Ruffini P., Ferrari R., Hanuskova M., Thermal conductivity of fired clays: Effects of mineralogical and physical properties of the raw materials. *J. Appl Clay Sci.* 2010; 49: 269-275.

- [51] Ten J.G., Orts M.J., Saburit A., Silva G., Thermal conductivity of traditional ceramic Part I: Influence of bulk density and firing temperature. *Ceram Int.* 2010; 36: 1951-1959.
- [52] Bhattacharjee B., Asce M., Krishanmoorthy S. Permeable porosity and thermal conductivity of construction materials. *J. Mater Civ Eng.* 2004; 322-330.
- [53] Quesada D.E., Martnez-Garca C., Martnez-Cartas M.L., Coter-Palomino M.T., Pérez-Villarejo L., Cruz-Pérez N., Corpas-Iglesias F.A. The use of different forms of waste in the manufacture of ceramic bricks. *J. Appl Clay Sci.* 2011; 270-276.
- [54] Aeslina A. K., Abbas M., Felicity R., John B. Density, Strength, Thermal Conductivity and Leachate Characteristics of Light-Weight Fired Clay Bricks Incorporating Cigarette Butts. *Worl Acade Sci Eng Technol.* 2009; 53: 1035-1040.
- [55] Aeslina A. K., Abbas M. Possible Utilization of Cigarette Butts in Light-Weight Fired Clay Bricks. *Worl Acade Sci Eng Technol.* 2008; 45: 153-157.
- [56] Ajam L., Ouezdou M.B., Felfoul H.S., Mensi R.E. Characterization of the Tunisian phosphogypsum and its valorization in clay bricks. *J. Construct Build Mater.* 2009; 23: 3240-3247.

- [57] American society for testing of materials, Designation C 372-94 Standard test method for linear thermal expansion of porcelain enamel and glaze frits and fired ceramic whiteware products by the dilatometer method. In: Annual Book of ASTM standard 15.02, West Conshohocken, Pennsylvania : ASTM (2001).
- [58] American society for testing of materials, Designation C177-97 Standard test method for steady-state heat flux measurements and thermal transmission properties by means of the guarded-hot-plate apparatus. In: Annual Book of ASTM standard 04.06, West Conshohocken, Pennsylvania : ASTM (2000).
- [59] American society for testing of materials, Designation C 326-82 Standard test method for drying and firing shrinkage of ceramic whitewares clays. In: Annual book of ASTM standard 15.02, West Conshohocken, Pennsylvania : ASTM (2002).
- [60] American society for testing of materials, Designation C 373-88 Standard test method for water absorption, bulk density, apparent density and apparent specific gravity of fired whitewares products. In: Annual Book of ASTM standard 15.02, West Conshohocken, Pennsylvania : ASTM (2002).
- [61] American society for testing of materials, Designation C773-88 Standard test method for compressive (crushing) strength of fired whitewares materials. In Annual Book of ASTM standard 15.02, West Conshohocken, Pennsylvania : ASTM (2002).
- [62] Serhat Baspinar M., Demir I., Orthan M. Utilization potential of silica fume in fired clay bricks. *J. Waste Manage Res.* 2009; 00: 1-9.

- [63] Phonphuak N., Thiansem S., Rujijannagul G., Pengpat K. Qualitative analysis of charcoal on some physical and mechanical properties of clay brick from Thailand. In: *Proceedings of Pure and Applied Chemistry International Conference*, Ubon Ratchathani, 97-399. 2010.
- [64] Karaman S., Ersahin S., Gunal H. Firing temperature and firing time influence on mechanical and physical properties of clay bricks. *J. Scient Indus Res.* 2006; 65:153-159.
- [65] Vieira C.M.F., Sanchez R., Monteiro S.N. Characteristics of clay and properties of building ceramics in the state of Rio de Janeiro Brazil. *J. Construct Build Mater.* 2008; 22: 781-787.

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### **International publication**

1. **Nonthaphong Phonphuak** and Sakdipown Thiansem, “Effects of charcoal on physical and mechanical properties of fired test briquettes.” *ScienceAsia.*, 37 (2011): 120-124.
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