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A STUDY OF THE PRODUCTION OF CEMENT FROM  
SPENT SHALE BY SEMI-DRY PROCESS



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                                  by Semi-Dry Process

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บทคัดย่อ

วิทยานิพนธ์นี้เป็นการศึกษาการผลิตซีเมนต์โดยใช้กากหินน้ำมันเป็นวัตถุดิบร่วมกับหินปูน และดินเหนียว โดยก่อนทำการผลิตได้ทดสอบหาองค์ประกอบทางเคมีของวัตถุดิบแต่ละชนิด เพื่อที่จะ คำนวณหาสัดส่วนที่เหมาะสม ส่วนอุณหภูมิ และ เวลาที่จะใช้เผาวัตถุดิบผสม ได้ทำการทดสอบเป็อง - ตันโดยนำปูนเม็ดที่เผา ณ อุณหภูมิ และ เวลาต่าง ๆ กัน มาทดสอบหาเปอร์เซ็นต์ฟรีไลม์ จากผล การทดสอบเป็องตัน จึงได้ผลิตซีเมนต์ที่อุณหภูมิ 1400<sup>o</sup>ซี เป็นเวลา 1 ชั่วโมง นำปูนเม็ดที่ผลิตได้ ไปบดให้ละเอียด พร้อมกับเติมยิบซั่ม 5% ผสมเข้าด้วย แล้วจึงนำซีเมนต์ผงนี้ไปทดสอบคุณสมบัติทาง เคมี ฟิสิกส์ รวมทั้งใช้เอ็กซ์เรย์ดิฟแฟรคโตมิเตอร์ตรวจสอบด้วย ผลที่ได้พบว่า ปูนซีเมนต์ที่ผลิต โดยใช้กากหินน้ำมันนี้อยู่ในเกณฑ์มาตรฐาน และมีคุณภาพดี

ศูนย์วิทยทรัพยากร  
จุฬาลงกรณ์มหาวิทยาลัย

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#### ABSTRACT

This study is to determine the production of cement by using spent shale, limestone and clay as the raw materials. Chemical composition of the raw materials was first analysed in order to find their suitable proportions. The raw mix was made into nodule forms and was fired at various temperature and time. An analysis of the free lime in the clinkers gave the results that the lowest amount of free lime was obtained by firing the raw mix at  $1400^{\circ}\text{C}$  for one hour. Hence, the cement from spent shale was produced at those conditions. The clinkers were crushing and adding 5% of gypsum and were tested for the chemical properties, physical properties and x-ray diffractometer was used as well. The cement from spent shale which was within standard limits, has a good quality.

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จุฬาลงกรณ์มหาวิทยาลัย

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