

INTISARI

Berbagai macam langkah telah dilakukan untuk mengatasi masalah sampah plastik dan masalah penggunaan kayu yang tidak terkendali dimana salah satunya dengan melalui produk *Wood Plastic Composite* (WPC). Produk WPC pada penelitian ini menggunakan campuran limbah kayu sengon berupa tepung hasil gergajian dan limbah plastik *High Density Polyethylene* (HDPE) dimana keduanya dicampur ke dalam mesin pencampur dan dicetak dengan sistem ekstrusi.

Pengujian pada penelitian ini terdiri atas kembang susut dan cabut sekrup. Pengujian kembang susut dilakukan dengan merendam papan WPC ke dalam air dengan variasi waktu perendaman yaitu 2 jam dan 2+22 jam. Dimensi papan WPC berupa tebal dan panjang diukur sebelum dan sesudah direndam dalam air sehingga dapat diketahui perubahan dimensinya. Untuk pengujian cabut sekrup variasi menggunakan 3 jenis sekrup yaitu *sheet metal*, *cut thread wood*, dan *fine thread drywall wood* dimana sekrup *sheet metal* dan *cut thread wood* menggunakan masing-masing 3 diameter yang berbeda sedangkan sekrup *fine thread drywall* hanya menggunakan 1 diameter saja. Variasi kondisi juga dilakukan dalam penelitian sifat mekanik cabut sekrup yaitu kondisi kering dan kondisi basah (direndam selama 7 hari di dalam air laut). Pada pengujian cabut sekrup, sekrup dipasang pada spesimen uji sesuai kode untuk setiap jenis variasinya. Pengujian dilakukan dengan menggunakan alat *Universal Testing Machine* (UTM).

Hasil pengujian kembang susut papan WPC memberikan nilai pengembangan tebal dan panjang berturut-turut 1,04% dan 0,05%. Tegangan cabut sekrup papan WPC terbesar pada kondisi kering terdapat pada sekrup *sheet metal* yaitu 18,50 Mpa. Hasil pengujian cabut sekrup pada kondisi perendaman air laut selama 7 hari menunjukkan bahwa terjadi kenaikan kuat cabut sekrup akibat pengembangan tebal papan WPC. Kuat cabut sekrup juga mengalami kenaikan seiring dengan bertambah besarnya diameter sekrup. Hasil penelitian kembang susut dan cabut sekrup papan WPC jika dibandingkan dengan persyaratan yang terdapat pada SNI 03-2105:2006 dan JIS A 5908:2003 tentang papan partikel menunjukkan bahwa papan WPC memenuhi persyaratan minimum sebagai bahan struktur sehingga berpotensi digunakan sebagai bahan struktural.

Kata Kunci: WPC, plastik HDPE, kembang susut, kuat cabut sekrup

ABSTRACT

Various efforts have been taken to overcome the problem of plastics waste and uncontrolled woods utilizing which one of them is through Wood Plastic Composite (WPC) products. In this research, WPC product was made from Sengon flour and recycled HDPE plastic which are both mixed in the mixing machine and formed using extrusion system. Sengon flour can be taken from lumbermill as residue and HDPE plastics are easy to be found because plastics are biggest waste problem.

The test on this research are divided into shrinking-swelling and screw withdrawal test. Shrinking-swelling test was performed by soaked the WPC board in to the water with the variation of soaking treatment for 2 hours and 2+22 hours. Dimension of the WPC board such length and thickness were measured prior and after soaking treatment so the alteration of the dimension can be calculated. Withdrawal screw test used 3 kinds of variation which are screw type, screw diameter and condition (dry and wet). Type of screws are sheet metal, cut thread wood and fine thread drywall and each type of screw used 3 kinds of diameter except fine thread drywall that used 1 kind diameter because the availability on the market. Dry and wet conditions were applied on this test. For wet condition, WPC specimens were soaked in to sea water for 7 days. Screw withdrawal test were performed by embedded screw on marked area in the specimen appropriate with the code of variation and tested in to Universal Testing Machine (UTM).

The result of shrinking swelling test gives the value for thickness swelling 1,04% and length swelling 0,05% . The biggest stress of screw withdrawal test for dry condition is on sheet metal screw with 18,50 MPa. Soaking treatment in the sea water for 7 days showed, there is increase of screw withdrawal strength because swelling influence in WPC board near embedded screw. Screw withdrawal strength increase as screw diameter. The comparison between test results with the minimum requirement based on SNI 03-2105:2006 and JIS A 5908:2003 about particleboard shows that WPC board has potential to be used as structural material.

Keywords: WPC, HDPE plastic, shrinking-swelling, screw withdrawal strength