

## Construction and Demolition Byproducts

### 533. Agricultural disposal method of construction site gypsum wallboard waste.

Carr, J. and Munn, D. A.

*Journal of Construction Education* 6(1): 28-32. (2001);  
ISSN: 15228150

*Descriptors:* agricultural uses/ disposal/ drywall/ gypsum wallboard/ recycling/ tipping fees

*Abstract:* Over two million tons of gypsum wallboard waste is created each year. Traditionally this material ends up in landfills. The wallboard waste takes up considerable amounts of space since it is difficult to compact. Also the potentials exist for elements in the wallboard to be acted upon by bacteria in municipal solid waste and create harmful concentrations of hydrogen sulfide that can escape from the landfill. Additionally, disposal costs at both municipal sanitary landfills and construction and demolition landfills are very high exceeding \$300.00 per ton in some areas. This paper explores an alternative to landfill disposal. The reuse of the gypsum wallboard scrap in agricultural uses may be a suitable best method to be used for the disposal of these materials. The paper presents the results of an experiment that investigates the agricultural use of scrap gypsum and its effect on soybeans.

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### 534. Beneficial reuse of aggregate mineral fines and scrap new construction wallboard.

Korcak, R. F.; Meininger, R.; and Yost, P. A./ Power, J. F.; Dick, W. A.; Kashmanian, R. M.; Sims, J. T.; Wright, R. J.; Dawson, M. D.; and Bezdicek, D.; Series: Soil Science Society of America Book Series 6.

Madison, USA: Soil Science Society of America Inc. 2000; pp. 583-603.

*Descriptors:* application to land/ gypsum/ industrial wastes/ soil amendments/ waste disposal/ waste utilization/ land application/ mineral fines

*Abstract:* The types and amounts of aggregate mineral fines and scrap gypsum wallboard are examined. Agricultural utilization studies including the benefits derived from mineral fines and scrap gypsum wallboard are reviewed.

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### 535. Characterization of dairy cattle manure/wallboard paper compost mixture.

Saludes, Ronaldo B.; Iwabuchi, Kazunori; Miyatake, Fumihito; Abe, Yoshiyuki; and Honda, Yoshifumi  
*Bioresource Technology* 99(15): 7285-7290. (2008)

NAL Call #: TD930.A32 ; ISSN: 0960-8524

*Descriptors:* dairy cattle/ cattle manure/ compost/ bulking agents/ composting/ physicochemical properties/ hydrogen sulfide/ ammonia

*Abstract:* The aim of this research was to evaluate the use of manufacturing wallboard paper scraps as an alternative bulking agent for dairy cattle manure composting. The characteristics of the composting process were studied based on the changes in physico-chemical parameters and final compost quality. Composting of dairy cattle manure with wallboard paper was performed in a 481-L cylindrical reactor with vacuum-type aeration. Rapid degradation of

organic matter was observed during the thermophilic stage of composting due to high microbial activity. High temperature and alkaline pH conditions promoted intense ammonia emission during the early stage of composting. The number of mesophilic and thermophilic microorganisms were found to be affected by changes in temperature at different composting stages. The total nitrogen (N), phosphorus (P), potassium (K), and sodium (Na) concentrations of the mixture did not change significantly after 28 days of composting. However, the presence of gypsum in the paper scraps increased the calcium content of the final compost. The wallboard paper had no phyto-inhibitory effects as shown by high germination index of final compost (GI=99%).

This citation is from AGRICOLA.

### 536. Composter expands with additional feedstocks.

Block, D

*Biocycle* 40(3): 30-32. (1999)

NAL Call #: 57.8 C734 ; ISSN: 0276-5055

*Descriptors:* composting/ food wastes/ litter/ manures/ organic wastes/ recycling/ waste wood/ United States of America

*Abstract:* Recent expansion of the Wood Recycle and Composting Centre in Wichita, Kansas, USA, is described. The expansion was implemented to take advantage of opportunities for organics and drywall recycling.

Composting trials are being carried out with a wide mix of residuals including grain, food, wood, low-grade fibre and animal bedding and manure. Organic materials are also enabling the company to gain more value from low-end woody materials by using them in composting rather than in mulch production. The site has received a modified site permit to allow 1,000 tons each of new materials to be composted in separate windrows.

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### 537. Composting and bioremediation process evaluation of wood waste materials generated from the construction and demolition industry.

McMahon, V.; Garg, A.; Aldred, D.; Hobbs, G.; Smith, R.; and Tothill, I. E.

*Chemosphere* 71(9): 1617-1628. (2008)

NAL Call #: TD172 .C54; ISSN: 0045-6535

*Descriptors:* bioremediation/ composting/ composts/ green manures/ hardboard/ industrial wastes/ medium density fibreboards/ melamine/ particleboards/ phytotoxicity/ poultry manure/ waste management/ waste utilization/ waste wood/ chipboards/ medium density fiberboards/ poultry litter

*Abstract:* The suitability of using bioremediation and composting techniques for diverting construction and demolition (C&D) waste from landfill has been validated in this study. Different timber products from C&D waste have been composted using various composting approaches. The present work demonstrates the quality of compost produced as a result of composting of mixed board product wood waste, which is frequently obtained from the construction and demolition industry. Three compost mixes were prepared by mixing shredded chip board, medium density fibre, hardboard and melamine. Poultry manure,

Eco-Bio mixture and green waste were used as nutrient supplements. The results revealed that compost produced from mixtures of poultry manure and green waste used as nutrient supplements improved the performance in plant growth trials (phytotoxicity tests). Results obtained from the experimental study clearly indicate that the composts produced comply with the criterion suggested in BSI PAS 100 (A specification for compost materials) for use in different applications. Composting can also be demonstrated to be a very practical approach to material management including transport reduction to and from the site. The economic suitability of the process will be improved with the increase in landfill tax. In the current regulatory scenario, it is recommended that these materials should be composted at a centralised facility. This citation is from AGRICOLA.

**538. Construction drywall as a soil amendment.**

White, EH and Burger, ME

*BioCycle* . July 1993; 34(7): 70-71.(1993)

NAL Call #: 57.8 C734 ; ISSN: 0276-5055

*Descriptors:* soil amendments/ construction materials/ Zea mays/ nutritional status/ soil fertility/ gypsum

This citation is from AGRICOLA.

**539. Evaluating onsite beneficial reuse of ground engineered wood wastes from residential construction.**

Gaskin, J. W.; Risse, L. M.; Kastner, J. R.; and McLaurin, W. J.

*Transactions of the ASAE* 48(5): 1731-1738. (Sept. 2005-Oct. 2005)

NAL Call #: 290.9 AM32T; ISSN: 0001-2351

*Descriptors:* waste wood/ engineered wood products/ construction materials/ adhesives/ mulches/ mulching/ soil pollution/ water pollution/ pollutants/ leaching/ soil chemistry/ phytotoxicity/ ornamental plants/ risk assessment

*Abstract:* Wood wastes from residential construction can be potentially reused onsite as mulches. Engineered wood products (EWP) are estimated to comprise about 30% of residential construction wood waste. Due to the presence of various adhesives, there is concern about the beneficial reuse of these materials. We evaluated potential environmental impacts of mulches with a ground EWP component. No hazardous levels of constituents were found using a toxicity characteristic leaching procedure (TCLP). Changes in runoff water quality and soil chemistry through the mulch were evaluated through rainfall simulation on 0.9 x 4.6 m test plots using four treatments: bare soil control, 100% dimension lumber, typical residential mix of wood wastes, and 100% structural EWPs. A companion study evaluated the effect of the 100% EWP and the typical residential mix mulches on the growth of common landscaping plants. No purgeable halocarbons, benzene, toluene, ethyl benzene, xylene, or phenols were detected in runoff. Nutrient concentrations in runoff from the freshly ground wood treatments ranged from 0.5 to 8.19 mg L(-1) for total nitrogen and 0.13 to 0.21 mg L(-1) for total phosphorus. The freshly ground 100% EWP treatment had the highest total nitrogen concentrations in runoff (8.19 mg L(-1)). Biochemical oxygen demand was similar for all freshly ground wood treatments, ranging from 155 to 273 mg L(-1). These concentrations decreased by an order of magnitude after one year. There were no significant

impacts on the growth of three common landscaping plants. Results indicate that these wood wastes can be beneficially reused rather than landfilled.

This citation is from AGRICOLA.

**540. Land application of crushed gypsum wallboard waste for alfalfa.**

Wolkowski, R. P.

*Communications in Soil Science and Plant Analysis* 31(1-2): 187-199. (2000)

NAL Call #: S590.C63; ISSN: 0010-3624 [CSOSA2]

*Descriptors:* Medicago sativa/ gypsum/ solid wastes/ land application/ preplanting treatment/ top dressings/ crop yield/ plant density/ soil/ nutrient content/ soil fertility/ application rate/ chemical constituents of plants/ Wisconsin/ site factors/ wallboard

*Abstract:* Three seasons of research that evaluated the effect of the land application of crushed gypsum wallboard waste (CW) for alfalfa were conducted at four Wisconsin locations having differing soil types and climatic conditions. Material was applied at rates up to 36.0 Mg ha(-1) preplant and 2.2 Mg ha(-1) topdress. The highest application of CW pre-plant showed a positive trend for increased yield of alfalfa at three of the four locations, although this response was not statistically significant. Stand density was not affected with the exception of one year at one location for which the stand was lower where the highest rate of CW was applied. The soil pH decreased slightly where high rates of CW were applied, presumably caused by an increase in soil solution hydrogen ions which were displaced from exchange sites. Soil calcium (Ca) and sulfur (S) usually increased, and soil test magnesium (Mg) usually decreased where the highest rate of CW was applied. There was no consistent effect of CW application on the soil test levels of other nutrients. Application of CW generally increased the Ca and S, and reduced the Mg concentrations in the harvested forage. Crushed wallboard appears to be as effective as commercial gypsum fertilizer, although this study did not compare equivalent rates of the two materials. No phytotoxic effects from the direct application of CW were noted. The land application of wallboard was found to have no substantial positive or negative agronomic effect on alfalfa production. This practice provides a reasonable alternative to land filling. This citation is from AGRICOLA.

**541. Mulch and topsoil fit the bill in Florida.**

Block, D.

*Biocycle* 41(2): 71-72. (2000)

NAL Call #: 57.8 C734 ; ISSN: 0276-5055

*Descriptors:* composting/ mulches/ organic wastes/ recycling/ topsoil/ mulching materials/ United States of America

*Abstract:* Recycling of land clearing material, construction and demolition debris and yard trimmings by Florida Recyclers (USA) is described. The recycled product was used as an alternative to cypress mulch while the fines were used in soil blends. Following separation of metals, cardboard and contaminants, the wood waste and trimmings were ground, screened and processed before colouring for use as mulch. The topsoil materials are placed in static piles with occasional watering over the three-month period.

This citation is from AGRICOLA.

**542. Reclaiming acid mine soil with drywall and manure.**

Munn, D. and Murray, F.

*Biocycle* 40(10): 59-60. (1999)

NAL Call #: 57.8 C734 ; ISSN: 0276-5055

*Descriptors:* building materials/ cattle manure/ coal mined land/ manures/ reclaimed soils/ soil types/ United States of America

*Abstract:* The suitability of ground drywall, obtained from construction wastes, as an amendment to revegetate an Ohio acid mine soil was investigated. Germination rates and growth of maize and rye were measured for the amended soil plots with different levels of ground drywall amended with cow manure. The germination, appearance and yield of rye were all enhanced significantly by the addition of ground drywall to the acid mine soil. Although maize yields increased with increasing application rates of drywall, the variation in growth within treatments was smaller at the higher rates of drywall application. Ground drywall at the rates of 10, 20 and 30 g/kg made this acid mine soil, amended with cow manure, better suited for the germination and early growth of rye and maize. Reproduced with permission from the CAB Abstracts database.

**543. Sulfate leaching from recovered construction and demolition debris fines.**

Jang, Y. C. and Townsend, T.

*Advances in Environmental Research* 5(3): 203-217.

(2001); ISSN: 10930191 .

*Notes:* doi: 10.1016/S1093-0191(00)00056-3

*Descriptors:* batch leaching test/ column leaching test/ construction and demolition waste/ drywall/ gypsum/ recovered fines/ recycling/ sulfate

*Abstract:* Recovered soil fines are a product of the mechanical processing of construction and demolition (C&D) debris for recycling. C&D debris fines have been proposed as a substitute for soil in a number of applications. Questions have been raised regarding the potential environmental impact of sulfate leaching from particles of gypsum drywall in the soil fines. Sulfate has a secondary drinking water standard of 250 mg/l and may convert to hydrogen sulfide during some reuse scenarios. Soil fines were collected from 13 C&D debris recycling facilities in south Florida. A leaching study on the C&D debris fines was performed to examine sulfate leachate concentrations resulting from both batch and column leaching experiments. The sulfate concentrations resulting from the batch leaching tests ranged from 890 to 1600 mg/l. The results of the column leaching tests also resulted in high sulfate concentrations. The source of sulfate in the debris fines was the dissolution of gypsum wallboard. The results from a multiple batch test indicated that the mass of the gypsum content in C&D debris fines ranged from 1.5% to 9.1%. The amount of gypsum that would be applied via soil fines during a typical reuse scenario is greater than normal agricultural operations where gypsum is applied. When considering the beneficial reuse of C&D debris fines, site-specific hydrogeology and appropriate state and local regulations for allowable sulfate concentrations in groundwater should be considered. .  
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