METHOD OF TEST FOR DETERMINATION OF AMOUNT OF CONTAMINATION OF COARSE AGGREGATE

1. SCOPE AND SIGNIFICANCE

1.1 This method covers the determination of the per cent, by mass, of aggregate particles composed of material judged to be contamination.

1.2 The purpose of limiting the amount of contaminants is so that the function of the material is not compromised. MTO and OPSS specifications for aggregates limit the amount of contamination permitted to be present in the material.

1.3 The determination of the amount of reclaimed asphalt pavement material (RAP) is covered by LS-621.

2. DEFINITION

2.1 A particle judged to be contamination will be composed of one of the following materials: Gypsum or cement wall board, gypsum, clay brick or tile, wood, cardboard and paper, glass (of any kind), ceramic material (typically bathroom porcelain or ceramic tile), rubber, metal, and plastic.

<u>Note</u>: There are other types of contaminants which may be encountered from time to time and these are defined as materials which are <u>not</u> composed of, or derived from, one of the following: bedrock or gravel, cobbles, boulders, sand, and fines produced from naturally formed deposits; crushed slag produced from air-cooled iron blast furnace slag, nickel slag; or reclaimed hydraulic cement concrete.

3. APPARATUS

3.1 BALANCE: Of sufficient capacity and sensitive and readable to 0.1 g or less.

3.2 OVEN: An oven capable of maintaining a temperature of $110 \pm 5^{\circ}$ C.

4. PREPARATION OF TEST SAMPLE

4.1 Oven dry the sample to a constant mass at $110 \pm 5^{\circ}$ C.

4.2 Separate the sample into the following 3 fractions by sieving according to LS-602:(i) material retained on the 26.5 mm sieve; (ii) material passing the 26.5 mm sieve, retained on the4.75 mm sieve, and (iii) material passing the 4.75 mm sieve.

4.3 Reduce the fraction passing the 26.5 mm sieve, retained on the 4.75 mm sieve by splitting or quartering to approximately the masses given in Table 1.

<u>Note</u>: The largest particle size is determined from the smallest sieve in Table 1 that 95% or more of the material passes.

Largest Particle Size (>95% Passing Sieve)	Mass (Minimum), g
26.5 mm	2000
16.0 mm	1700
13.2 mm	1000
9.5 mm	400
6.7 mm	150

Table 1 - Sample Preparation Masses

4.4 Weigh and record the mass of sample to the nearest 0.1 g. Record this mass (A).

4.5 Immerse the sample in a bucket filled with sufficient water to cover the sample and allow the floating off of wood.

4.6 Agitate the sample with the hand or a stick so as to float off any wood or paper that may be present and also to remove dirt and dust from the surface of the particles. Collect any floating wood, cardboard, and paper with a suitable skimmer or by hand. Drain the sample and spread the wet sample from the bottom of the bucket on a clean, flat surface large enough to permit the particles to be visually inspected. If, at this time, wood, cardboard, and paper that does not float is encountered, add this to the sample. Place the wood, cardboard, and paper in a bowl and oven dry to a constant mass at $110 \pm 5^{\circ}$ C. Following drying, weigh the wood, cardboard, and paper to the nearest 0.1 g. Record the mass (B).

4.7 Separate the particles into portions composed of different types of contamination and those, which do not meet the definition of contamination. Oven dry the contaminated particles to constant mass at $110 \pm 5^{\circ}$ C.

4.8 Weigh the portion of particles of each type of contamination to the nearest 0.1 g. Record this mass (C).

4.9 For material retained on the 26.5 mm or larger sieves, a visual examination of the whole sample may be made. If there is no visual contamination, nothing further need be done and the amount of contamination in that fraction is zero. If contamination is present, proceed as follows: The material need not be oven dried. Prepare by scooping or shovelling, and examine a sample of a minimum of 200 particles. Remove wood, cardboard, and paper and all other contaminants manually, weigh and record the mass, and calculate the per cent of each kind of contamination.

5. CALCULATION

5.1 Calculate the percentage of particles of wood, cardboard and paper in the test sample (to 2 decimal places), using the following formula:

Per cent of wood and paper = $\frac{B}{A}$ x 100

Where: A = mass of original sample

B = mass of particles of wood and paper

5.2 Calculate the percentage of each type of contamination (to one decimal place), using the following formula:

Per cent contamination = $\frac{C}{A}$ x 100

Where A = mass of original sample

C = mass of contamination

5.3 Repeat 5.2 for each type of contamination, which is present.

5.4 Sum the per cent contamination determined in 5.2.

5.5 Calculate a weighted average of per cent contamination based on the coarse aggregate grading when material coarser than 26.5 mm is present.

6. **REPORTING OF RESULTS**

6.1 Report the amount of total amount of contamination (wood, cardboard, and paper excepted) to the nearest 0.1% by mass of the coarse aggregate.

6.2 Report the amount of wood, cardboard, and paper contamination to the nearest 0.01% by mass of the coarse aggregate.

6.3 Report the amount of each type of contamination present to the nearest 0.1% by mass of the coarse aggregate.

7. GENERAL NOTES

7.1 If the amount of contamination is negligible, it is permissible to omit the oven drying and weigh the samples when wet. Note this in the report. In the case of referee testing, oven drying shall be conducted.

7.2 Material used in this test may be re-used if insufficient material is available for other required tests.

Laboratory Sample No.	Largest Particle size	Mass of Sample, g A	Mass of Wood, g B	Mass and Type of Contaminant, g C	B/A x 100 = % wood	C/A x 100 = % Contaminant
Date:	Operator:	ŀ	Remarks:			•

Figure 1: Data Card for MTO LS-630, Determination of Amount of Contamination of Coarse Aggregate