CHAPTER II

LITERATURE REVIEW

2.1 Self-Compacting Concrete (SCC)

1. "Pengaruh Penambahan Fiber Lokal Terhadap Kuat Geser Balok Beton Memadat Mandiri" by Leonardo (2014). The author substitute the cement with fly ash with proportion 20% and using superplasticizer Sika Viscocrete-10 with percentage 1.5, fiber that used has 60 mm length and 0.8 mm diameter. The conclusion of this experiment is by added fiber to SCC as much as 0.7% can increase the compressive strength of SCC when the concrete at the age 7 days from 15.8 became 28.12 MPa or increase 77.97%. For SCC at age 28 days, the added of fiber can increase the compressive strength from 35.01 MPa became 41.32 MPa or increase 18.02%. On SCC beam without fiber has more crack pattern compare to SCC beam with fiber. This can became the indication that SCC beam with fiber is more ductile compare to SCC beam without fiber.
2. "Pengaruh Penambahan Serat Baja Lokal (Kawat Bendrat) pada Beton Memadat Mandiri (Self Compacting Concrete) by Agil, L (2013). From the experiment, the highest compressive strength when the concrete at the age 14 days happen in self-compacting concrete without fiber with value 33.61 MPa. For concrete at the age 28 days happen in self-compacting concrete with fiber with value 47.66 MPa. For concrete at the age 56 days happen on self-compacting concrete without fiber with value 60.80

MPa or increase 13.96 MPa. The used of fiber toward compressive strength not too effective, but the used of fly ash 20% and viscocrete 1.5% can affect the increasing of compressive strength value. The used of fiber toward splitting tensile strength is a bit effective, it's also happens toward the modulus of elasticity test, the used of fiber not too effective.

3. "Pengaruh Penggunaan Serat Kawat Galvanis pada Sifat Mekanik Beton Memadat Mandiri (Self Compacting Concrete/SCC) dan Beton Non-SCC" by Krisnarosa, V (2015). Based on the experiment that already did by the author, the highest value of compressive strength SCC fiber with SS 75 the value is 62.7608 MPa. The value of compressive strength non–SCC with SN 65, SN 70 and SN 75 are 34.7009 MPa, 38.9310 MPa, and 32.1054 MPa, all of the sample increased the value by 32.4278%, 15.0713% and 95.4835% from fiber concrete non-SCC.
4. "Pengaruh Penggunaan *Silica Fume, Fly Ash* dan *Superplasticizer* pada Beton Mutu Tinggi Memadat Mandiri" by Miranty, R (2014). The result of average compressive strength when the concrete at the age 28 days with variation of SCC and normal concrete are 73.47 MPa and 45.64 MPa. The highest compressive strength value happen on SCC that increase 60.98% from the normal concrete. The result of average modulus of elasticity when the concrete at the age 28 days with variation of SCC and normal concrete are 35690 MPa and 26508.72 MPa. The highest compressive strength value happen on SCC that increase 34.63% from the normal concrete. The used of viscocrete-10 can increase the

compressive strength significantly because it can reduce the water cement ratio and increase the workability of mixing concrete.

5. "Pengaruh Variasi Kadar *Silica Fume* Terhadap Sifat Mekanik Self Compacting Fiber Reinforced Concrete (SCFRC)" by Yudha, P (2016). The compressive strength value of SCC without fiber and SCC with fiber (SCFRC) are 40.23 MPa and 33.07 MPa. The added of polypropylene fiber as much as 0.6 kg/m^3 on SCFRC decrease the compressive strength by 17.8% compare to SCC without fiber. The value of SCFRC compressive strength with variation of silica fume 0%, 5%, 10% and 15% are 33.07 MPa, 41.06 MPa, 50.38 MPa and 44.29 MPa. He highest value is using 10% of silica fume, and increase by 52.35% compare to SCFRC with silica fume. The optimum of silica fume rate is 10% as cement substitution, it shown by the increasing of compressive strength, splitting tensile strength and modulus of elasticity SCFRC value.
6. "Pengaruh Varasi Penambahan *Filler Zeolit* pada Kuat Lentur Balok Beton Memadat Mandiri (Self Compacting Concrete) dengan Viscocrete-10" by Riono (2012). Added zeolite to the beam can increase the flexural strength value when the concrete at the age 56 days. Added zeolite with rate 10% can give the maximum flexural strength and compressive strength. The increasing of beam flexural strength when the concrete at the age 56 days with zeolite variation 10% increase by 37.69% compare with concrete at the age 28 days. The maximum flexural strength is 6.10

MPa and for compressive strength is 32.69 MPa. The maximum value can get by used zeolite 10% and when the concrete at the age 56 days.

7. According experiment that conducted by Poerwadi, et al (2014) about the using of zeolite local mineral toward self-compacting concrete (SCC) characteristic, the result of compressive strength with variation of zeolite 0%, 5%, 10% and 15% are 25.23 MPa, 25.74 MPa, 28.06 MPa, 26.76 MPa.

2.2 Red Tile Waste

1. "Pengaruh Penambahan Foaming Agent ADT Terhadap Beton dengan Genteng Merah sebagai Agregat Halus" by Bernadus (2016). The result about compressive strength when the concrete at the age 14 days for variation foam 0%, 15%, 30% and 45% are 24.5833 MPa; 27.8162 MPa; 11.4549 MPa; and 5.4416 MPa. The result about compressive strength when the concrete at the age 28 days for variation foam 0%, 15%, 30% and 45% are 31.0675 MPa; 20.5792 MPa; 14.1484 MPa; and 4.9043 MPa. From the result of compressive strength and modulus of elasticity, concrete with variation foam 0% and 15% has compressive strength value above the f'c but not include the lightweight concrete because the density more than 1800 kg/cm^3. Concrete with variation 30% and 45 % include lightweight concrete because the density under 1800 kg/cm^3, but not include lightweight structural concrete because the compressive strength still under the lightweight structural concrete according SNI 03-2461-2002

there are 21-28 MPa for density 1760-1840 kg/cm^3 and 17 MPa for maximum density 1600 kg/cm^3.

2. The research to make Self Compacting Concrete (SCC) with red tile waste ever done by Herbudiman and Dewi (2012). In that research used red tile waste as fine aggregate, coarse aggregate and cement substitution with rate 20% of weight of cement. From this research, the result about physical properties of red tile waste is: SSD density 2.11 kg/cm^3; absorption 28.9%, amount of mud 14.89%, water content 11.5. The test conducted when the concrete at age 28 days and the compressive strength of the concrete is 30.58 MPa. For the modulus elasticity test, the result for all variation of the foam under the theories of modulus elasticity concrete.
3. "Pengaruh Penggunaan Kalsium Karbonat Sebagai Substitusi Semen pada Beton dengan Pecahan Genteng" by Mahot (2016). The research used 10% red tile waste proportion as substitute of coarse aggregate. The result of compressive strength when the concrete at the age 28 days with carbonat calcium adictif substitution 0%, 5%, 10% and 15% are 22.426 MPa, 23.124 MPa, 18.511 MPa and 15,496 MPa respectively. The result of modulus of elasticity when concrete at the age 28 days with substitution 0%, 5%, 10% and 15% are 10882.42 MPa, 10259.22 MPa, 8436.436 MPa and 4181.28 MPa respectively.

Therefore, the author wants to investigate about Self Compacting Concrete using red tile waste aggregate only because at the previous research it also using foaming agent ADT. The other research using red tile waste aggregate to substitute both fine aggregate and coarse aggregate.