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ADDITION OF RED PIGMENT ON GLAZUR TO INCREASE ART VALUE AND FINANCIAL VARIABLE FOR CERAMIC PRODUCTS

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Abstracts : The aims of this research are determine the influence of red pigment addition to glazur colour (lighting rate, red spectrum intencity, and yellow spectrum intencity) and financial variable (cost of goods manufactured, cost price, and ending inventory). Research results shew that : (1) Red pigment addition influence to glazur colour (lighting rate, red spectrum intencity, and yellow spectrum intencity). The increasing red pigment that added on test goods, so by visually its lighting rate was decrease and the red glazur colour that resulted was dark. This think was shown by L* value that so decrease (74,8until57,0) together with the increasing of red pigment on glazur, or colour will change to black. The increasing red pigment that added on test goods, so red spectrum intencity that resulted was increase. The addition of red spectrum intencity was shown by its addition of a* value (11,68until26,4) from that glazur eguation. The increasing red pigment that added on test goods, so red spectrum intencity that resulted was decrease or glazur colour change to blue. The increasing of yellow spectrum intencity was shown by its decreasing of b* value (15,0until10,8) from that glazur eguation. Its red glazur can applied on castle mass, body mass, colouring stoneware, and uncolouring stoneware (white). The addition of red pigment can increase art value of ceramics product. The red glazur (GMR) can applied into production process of ganesha statue (l 14 cm, w 9 cm, h 17 cm); and (2) The red pigment addition influence to financial variable (cost of goods manufactured, cost price, and ending inventory) red glazur (GMR). The weight addition of red pigment about 0,50% (GMR-1), 0,99% (GMR-2), 1,48% (GMR-3), 1,96% (GMR-4), and 2,44% (GMR-5) can increase cost of goods manufactured red glazur 19,34% (GMR-1), 23,05% (GMR-2), 26,77% (GMR-3), 30,17% (GMR-4), and 34,03% (GMR-5).The weight addition of red pigment about 0,50% (GMR-1), 0,99% (GMR-2), 1,48% (GMR-3), 1,96% (GMR-4), and 2,44% (GMR-5) can increase cost price of red glazur about 19,36% (GMR-1), 23,09% (GMR-2), 26,74% (GMR-3), 30,21% (GMR-4), dan 34,11% (GMR-5). The weight addition of red pigment about 0,50% (GMR-1), 0,99% (GMR-2), 1,48% (GMR-3), 1,96% (GMR-4), and 2,44% (GMR-5) can increase ending inventory red glazur about 37,24% (GMR-1), 41,50% (GMR-2), 45,78% (GMR-3), 49,70% (GMR-4), and 54,13% (GMR-5).If the Technology Service ofBTIKK want to get special red glazur (GMR-1, GMR-2, GMR-3, GHR-4, and GMR-5) according to its red intencity, so Its can acted, that follow by its increasing of cost of goods manufactred, cost price, and ending inventory, so can acted by added the percentage of red pigment weight on each composition.

Keywords : pigment, glazur, art value, ceramic product, financial variable”

INTRODUCTION

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The art value of ceramic goods are determined by some variable, that is design, decoration, uniques, and others. The decoration can show : decoration form (carvingorstickerthat participate in product), colour, and composition. There are many ways can used to give interest colour on ceramic goods, such as : rubbing withhusk duston earthenware, painting, electroplatting, and glazuring. Glazuring is the feaseable ways used, specially on porcelain and stoneware kinds of ceramic. The beauty of this glazur is influenced of three different factors, that is : energy between glazur and ceramics body, quality of surface, and its glazur colour.The using of glazur as decoration technic on ceramics as any benefit (Lawrence, 2012), that is : (1) Give effect surface decoration on ceramic goods and add aesthetics; (2) Close defectof surface on ceramic goods; (3) ceramic surface easier be cleaned; (4) Make ceramic bodies does not perforated easy by fluid or other material and cover of dew entrance that cause spoiling; (5) Cover underglaze decoration, so it does not spoile easy resulted its environment consequences; (6) Cover ceramaic bodies from spoiling mechanically, such as : on dinnerware, that is scraping by foods, acetic acid from foods and environment condotion; (7) Increase good strenght; and (8) Give gloosy performanceso precious ceramics.

The material that use to prepare glazur divided by 3 (three) component, that is : material that use to make body, dissolver, and colour giver (Parmele, 2013). The glazur colour very depend on amount and kinds of metal that coantaint of that glazur. As sample, the glazur will brown colour if there areiron oxide (Fe_2O_3) and mangan oxide (MnO_2), green if there are cuprum oxide (CuO) or chrom oxide (Cr_2O_3), and blue if there are containt of oxide cobalt (Co_2O_3). On the other that, the giving of colour can acted by add finished goods which manufacturing result that is colour pigment. This material does not general metal oxide. The benefit of glazur which material of colour pigment compare with glazur which material of metal oxide are : their colour more flat, their pinhole more little, and glazur smelting more flat. The glazur colour were very influenced by amount of colourer which used, if the colourer used was increase, so the glazur colour resulted was concentrated. The changing of this colour can measured by colorimeters, and the systems which used were CIELab systems. The changing which applied will follow a line equation, such as : linier, polynomial, power, exponential, or other line. This line equation can followed to made red glazur composition. If we expect to make red colour glazur with the special spectrum value (L* a* b* known), the pigment which add to composition was applied by include the pigment into graph equation. This way can save time, material, and power if we compare with trial and error method.

The glazur making research is a one of activity in BTIKK-BPPT. This process is one of the production process which acted by ceramics industry. The production activity need economic resources expenditure, that is any other cost to result product which will marketed. This costs will be base into determine cost of goods manufactured. The production process of near young red glazur (GMR-2) use process cost method with goal to fulfill inventory. This inventory available to be sold and used as colourer material to glazuring division (Normal, 2014, 98). According to Supriyono (2014:19), the elements which made production cost can classified to three big elements, that is : direct raw material, direct labor, and manufacturing overhead cost. The third of that cost must recorded and classified accuratelly according to kinds and characteristics of that cost. This matter be meaned to easier company into : determine cost of goods manufactured, control cost, and make a business decision.

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Production cost is all of cost which expenditure by company to result amount of product sold (Rudianto, 2013:17). Production cost is cost which be expenditure to make a product from raw material become finished good and be calculated its cost of goods manufactured so be knew all of production cost which expenditure by company (Agustina and Ahmar, 2014:1179). Cost of goods manufactured in manufacturing is the biggest element of cost which expenditured by firm. If the cost information to working or process available speedly, management has strong base to planning their activity. The firm must accurate and detail into make financial report mainly which relate with cost production so there do not create the frauds or cost wasted into production process. The information about cost of goods manufactured could be get measurement into determine cost price exactly to the consumer. According to research by Normal (2014:120) saw that sizing of firing stove influence of cost of goods manufactured jangir statue (l 11 cm, w 4 cm, h 14 cm). The more and more sizing firing stove, the cost of goods manufactured was decrease.

he glazur which GMR code is a glazur that red colour is one of the product in BTIKK-BPPT. This glazur is made from white basic glazur which have given red pigment between 2,5% to 2,5% with interval 0,5%. There are five red glazur composition with GMR code. Colour pigment is a material which high (expensive) value, addition of little pigment will influence of colour characteristic, financial variable, and financial performance that is operating profit. In one side we expect a good red glazur and according to each preference. But on the other side, making red glazur exactly need addition of red glazur quantity which expensive price relatively. This condition will increase expense of the firm mainly raw material cost. How did the influence of the red pigmen quantity addition to colour characteristic and financial variable which will be problem on this research.

The problem of these research are : (1) How did the influence of red pigment addition to red glazur characteristics (lighting level, red spectrum intencity, and yellow spectrum intencity); and (2) How did the influence of the red pigment addition to financial variable which become base business decision making (cost of goods manufactured calculation, cost price determination, and inventory valuation). The aims of this research are : (1) To know the influence of red pigment addition to red glazur characteristics (lighting level, red spectrum intencity, and yellow spectrum intencity); and (2) To know the influence of red pigment addition to financial variable which become base business decision making (cost of goods manufactured calculation, cost price determination, and inventory valuation). This researchs are expected useful for BTIKK-BPPT, ceramics businessman (craftsman), an academic, researcher, engineer, and others side as the first information to develop research that relate with colour characteristics, financial variable, and operating profit from production and sale of GMR glazur (base of R338 red pigment).

LITERATURE STUDY

Colour

The measurement of colour be acted in this time by two kinds of method, that is : objective and subjective. Objective method can acted by physical instrument, and subjective method can acted by human of the five sense. Objective measurement can acted by spectrophotometer, colorimeter chromatometer, and CCD camera. Subjective measurement can acted by use colour diagram

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Chromaticity CIE 1931, Munsell and Hunter. Work principal of this tool is measure the parameter or tristimulus XYZ colour use three filter, that is X (red), Y (green), and Z (blue). Beside three filter, chromameter has any important component, such as : lighting resource, censor, stronger, data changer, and display. Chromameter is a tool which use to measure colour surface of object. The basic principle of this tool is an interaction between diffuse lighting energy with object atom or molecule which analized. This tool contant of measurement space and data processor. Measurement space function as place to measure object colour with certain diameter. Each chromameter with different type has different measurement space too. Data of measurement result can produce Yxy(CIE1931),L*a*b*(CIE1976),HunterLabor tristimulus XYZ value. Colour system of CIELAB is data. The measurement system which evenly used is system CIEL*a*b*atauCIELAB. That system is colours scale which uniform into colour dimension.

The colour system of Hunter is developed by Hunter in 1952. The colour measurement by this method is more speed with good exactly. On this system, the valuation term containt of three pharameter, that is : L, a, and b. The colour place on this system is determined by L*, a* and b* coordinate.L* = 0 notation for black and 100 for white, This pharameter use to show bounce back colour which produce white achromatic colour, dust, and black. a* notation is mixed chromatic colour between red–green with –a* value from 0 to +80 for red colour, and –a* value from 0 to -80 for green colour. b* notation is mixed chromatic colour between blue–yellow with –b* value from 0 to +70 for yellow colour, and –b* value from 0 to -70 for blue colour. The research that acted by Normal (2014:14) shew that the addition of H79 red pigment percentage on production process of red glazur (GMH) will increased raw material of red glazur (GMH).

Glazur

Glazur is a thin membrane from material of alumino cylicaton surface of ceramic goods then make glases membrane after firing process. Glazur is defined as the suspension liquid which has very small mineral granule which acted by moulding, painting, immersion or spraying on surface of cracker ceramics, then be fired on temperature where the containing material will trickle together with glass membrane on their surface. Glazur can divided by 2 (two) big element, that is : raw and frit. Raw glazur is a glazur which its containing material is mixed and made suspension can used directly on ceramics body and just needed once time firing. This glazur can used on stoneware and porcelain which need high firing temperature. Frit glazur is a glazur which its raw material need dissolving early before be mixed as material of glazur maker. Frit glazur generally used on soft eartheware with low temperature firing (Alexander, 2011).

Glazur raw material is classsified by 4 (four) group, that is : (a) Material which making glass network design, such as SiO_2, ZrO_2, TiO_2, B_2O_3, and P_2O_5; (b) Dissolver material, such as LiO_2, K_2O, Na_2O, CaO, MgO, PbO and ZnO; (c) Thick material, such as Al_2O_3, Fe_2O_3, and Cr_2O_3; and (d) Colourer material, such as Fe_2O_3 (hematit) and Co_2O_3 (oxidecobalt).The glazuring of maroon red colour can increase financial variable of dinner plate prothotype amount 266% for cost of goods manufactured, operation cost, cost price, ending inventory, and operating profit (Normal, 2013:245).

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Standard

A standard is a measurement rod or tool to evaluate a thing. Webster's New Collegiate Dictionary in Heckert (1995:243) define that a standard as a thing which be created and setted by authority as a rule to measure quantity, weight, wide, value, or quality. The standar method to act a thing generally can descripted as a good method which planned, as long as maybe humanity on standard setted. The standard cost is an amount must be expended in operational condition normally. The standard cost is a cost be setted before scientifically, as a versus from actual cost, or historical cost. The standard cost does not an actual cost or average cost., although last experience can factor to setting standard. The standard cost must illustrate as a cost which included to financial statement via data processing systems. There are many various in cost accumulated method. Any system use partial planning, and other systems use single planning. That planning centralize on journal entry for work in process goods.

There are three level of standard which be prepared by firm, depend on the goal that pepared by firm and standard tightness. That standard level containt of (Mas'ud, 2005:136) : (1) Ideal standard, that is standard be prepared base on the best (ideal) firm condition. The machine has maximum productivity, the employer work at full work time, there are not any hampered into working action, the material must available well in market or firm. The standard of this kinds rare achieve; (2) The expected standard, that is standard that prepared base on expected condition and can achieved, where the machine is expected work on normal capacity, tha labor can intensively, and the other factors in intern firm can judge; and (3) The economic (normal) standard, that is an exact standard to acted in cost control practice, on economic standard its preparing was calculate factors that influence of firm, such as : machine condition, labor, and others, and firm external factors, such as : inflation, governmental judgment, raw material difficulties, and soon. The economic standard maybe used in firm.

Production

There are three main component into cost of product, that is : direct material, direct labor, and factory overhead that follow by variable factory overhead and fixed factory overhead. The production process according to Hansen & Mowen (2007:127) is a joint production raw material, direct labor, and factory overhead to produce a new product. The goods are produced follow by tangible, can stock taken, and is moved from factory to consumer. The production function is a function which have relate with raw material production activity to be finished goods which sold early (Supriyono, 2014:18). The production process that include in production function concept (Supriyono, 2014:19) as one of firm function is used to determine process technology. Its technic is produce raw material to be finished goods which sold early, according to Picture 1 :

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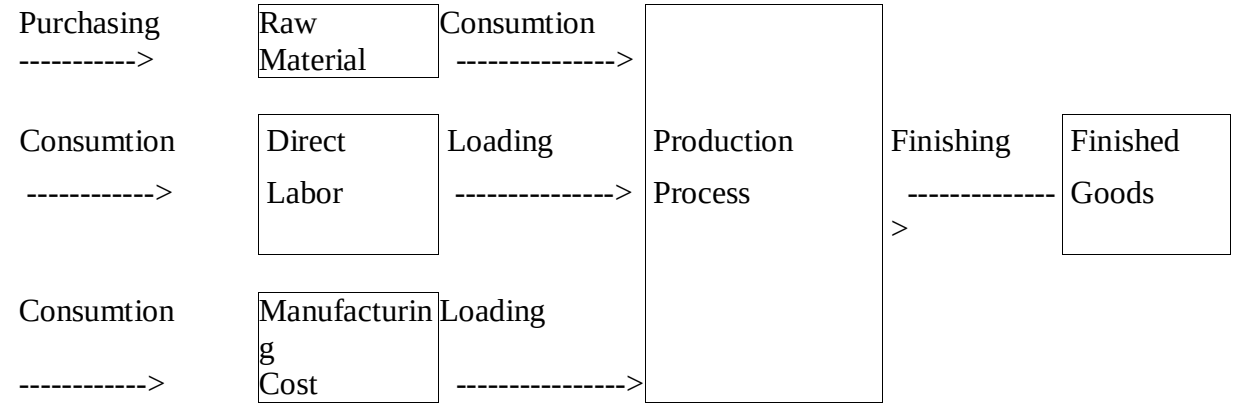
Picture 1: The Production Process and The Cost Component of Manufacturing Firm



------Source : Supriyono, 2014:19.

There are three main component in a product cost, that are : direct material, direct labor, and factory overhead follow by variable factory overhead and fixed factory overhead(Supriyono, 2014:18). The direct raw material are all of raw material physically can identified as parth of finished goods and can traced on finished goods. The direct labor are all of labor can treced physically on finished goods economically. The factory overhead cost are all of the cost except direct raw material and direct labor which relate to production process.

Financial Variable

Cost of goods which finished for a period is called cost of goods manufactured(Soemarso, 2006:295). Cost of goods manufactured containt of manufacturing cost plus beginning work in process goods minus ending work in process goods. To calculate cost of goods manufactured is used standard cost system. Determination method of cost of goods manufactured is determination or manner calculate all of cost component into cost of goods manufactured. There are two approach is used, that is : (1).Full costing, that is determination method of cost of goods manufactured by calculate all of production cost into cost of goods manufactured that is variable cost and fixed cost. On that condition, cost of goods manufactured containt of : raw material cost + direct labor cost + variable factory overhead cost + fixed factory overhead cost; and (2) Variable costing, that is determination method of cost of goods manufactured by calculate just cost production which characterize variable into cost of goods manufactured. In this research, the method used was full costing method. The calculation of cost of goods manufactured is very useful for company. Mistake into calculation of cost of goods manufactured can caused financial loss for company, so that the calculation of cost of goods manufactured very help manager into decission making Arizona, 2014:79). The information of cost of goods manufactured can became measurement into determine cost price exactly to consumer, its mean it can get profit and can continue company life (Normal, 2013:84).

In small company cost price often been decided by essence management, not by marketing department or sales department (Ahmad, 2005:143). While, in big company cost price has been

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decided by division manager or product line manager. Determination method of cost price according to Mas'ud (2005:133) were : (1) Gross margin Pricing : exact used by trading company or the company which not make self the product will be sold. Its manner by determination special percentage up the product cost was purchased. Ths percentage called mark on percentage atau mark up. Cost Price = Product Cost + (% Mark Up x Determination base of Mark Up); (2) Direct Cost Pricing (Marginal Income Pricing), based oncosts which proportional with volume/sales, so result the marginal income. Cost Price =(Variable Production Cost+Others variable Cost)+(% Expected x Profit Detremination Base); (3) Full Cost Pricing : calculate all of cost kinds, variable or fixed. All production cost plus expected profit percentage to cover operation cost and expected profit. Cost Price = Total Production Cost +Margin(Total Production Cost)+ Operation Cost; (4) Time and Material Pricing : cost price is determined from direct labor and other tariff from raw material then it collected be one plus special amount from indirect cost and expected profit.Cost price = ((Material + % Markup (Material) + ((Labor + % Markup (Labor)) + ((Services + % Markup (Services)); and (5) Return on Capital Employed Pricing : base on special mark up percentage from capital employed, that iscapital (Assets) assumed has function in produce of goods. Cost price = ((Total Cost + (% x Fixed Asset)) / ((Sales Volume in Unit)). The research has been acted by Ariana (2013:18) shew that cost price influence significantly to customer satisfaction. The method of feaseable cost price determination be applied on glazur is time and material pricing, because on this production process of glazur be used raw material as production process from weighting stage until storaging stage, and direct labor is used on weighting and storaging finished goods (Normal, 2014:140).

There are four methods to determine inventory, that are : specific identification, first in first-out, last in first-out, and weight average (Wiagustini, 2014:169). Spesific identification method is used by identify cost physically adhere on inventory. First in first-out method assumed that first in inventory replaced with new inventory. So that, cost of goods manufactured is determined by old inventory and a part of new inventory. Last in first-out contrary with first in first-out. Cost of goods manufactured is determined by last in inventory, while ending inventory containt of first in inventory. Weight average method is determined by multiply weight average with each kinds of inventory. The judgment of inventory valuation give inventory valuation alternative First In First Out (FIFO), average, or Last In First Out (LIFO). On inflation condition company which apply Last In First Out (LIFO) will result lower profit relatively compare with First In First Out (FIFO) (Utomo and Hadian, 2013:912).

RESEARCH METHODOLOGY

The materials are used in this research activity are : RRC feldspar (calium/potassium feldspar), Belitung kaolin, quartz, lime, oxyde titan (TiO_2), and red pigment. The equipment are used are : AND analitical balance which SR-200 type, grinder mortar and mixer, water spite, electric stove, and color rider which Konica Minolta CR-10 type. On the big scale into production process of red glazur use any kinds of fixed asets, such as : ptoduction plant, balance, potmill, car, table, chair, material room, and others.

The step are acted in this research application follow by : (1) Be balanced materials which prepare the glazur according to calculation; (2) Be mixtured materials until homogeny with mortar grinder and be gived water enough until expected viscosity; (3) Be tried that glazur on

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test piece of stoneware; (4) Be fired that test piece on temperature of 1200^{o}C; (5) Be observed results which be got; (6) Be determined L*, a* and b* value of glasir by color rider CR-10; Be analized financial variable base on financial and management accounting theory; and (7) the 4 until 5 and 7 steps are repeated for temperature of 1225^{o}C and 1250^{o}C. The material composition are used to produce red glazur (GM) base on red pigment are 0,50 until 2,50, and there are shown in 1 Table.

Table : Red Glazur CompositionWhich GMR (GMR-0, GMR-1, GMR-2, GMR-3, GMR-4, GMR-5) Code

Raw Material	Weight Percentage ofComposition					
	GMR-0	GMR-1	GMR-2	GMR-3	GMR-4	GMR-5
RRC Feldspar	46,60	46,60	46,60	46,60	46,60	46,60
Lime	19,42	19,42	19,42	19,42	19,42	19,42
Quartz	11,65	11,65	11,65	11,65	11,65	11,65
Kaolin	19,42	19,42	19,42	19,42	19,42	19,42
TiO_2	2,91	2,91	2,91	2,91	2,91	2,91
Red Pigment	0,00	0,50	1,00	1,50	2,00	2,50

Sources : BTIKK-BPPT, 2018.

Research results about influence of red pigmnt addition to glazur colour characteristic, then used to determine financial variable of the five red glazur composition did research on.

Kinds of data is used into characteristic research of red glazur and financial variable, are : (1) qualitative data, containt of : historical BTIKK, fixed assets, production process, and kinds of raw material; and (2) Quantitative data, containt of : cost of fixed assets which used into production process, material quantity, material price, electrical expense, telephone expense, water expense, direct labor cost as long production process, material composition, production, machine hours, man hours, and Denpasar Minimum Wage.

Source of data, containt of : (1) Primary Data, that is : fixed assets, telephone expense, water expense, electrical expense, machine hours, man hours, material composition, raw material used, maintanance expense, and amount of direct labor; and (2) Secondary Data, that is : Denpasar Minimum Wagefrom Depnakertrans. The method used in thisresearch analysis are : (1) Identify production process and characteristic of glazur colour (GMR-1, GMR-2, GMR-3, GMR-4,and GMR-5). Collect financial variable which be base business decision making (raw material cost, cost of goods manufactured, cost price, operating expense, and inventory value); (2) Calculatechanging of glazur colour characteristic, financial variable, and inventory valuecaused of composition variousthe glazur compositionGMR-0, GMR-1, GMR-2, GMR-3, GMR-4 and GMR-5;and (3) Make a profitable decision.

Analysis technic of data used are : (1) Laboratory analysis, is used to determine the characteristic of GMR glazur colour GMR (GMR-0, GMR-1, GMR-2, GMR-3, GMR-4,and GMR-5), containt of : a) The determination oflighting level line equation (L value), b)The determination of red intencity line equation (a value), and c)The determination of yellow intencity line equation (b value); and (2) Financial variable analysis, contain of : a) Standard cost systems by full costing method is used to calculate cost of goods manufactured, by formulas : cost of goods

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manufactured = raw material cost + direct labor cost + variable factoring overhead cost + fixed factoring overhead cost. Raw material cost standard = raw material used standard x raw material price standard. Raw material used standard = raw material used percentage x raw material need/liter. Raw material price standard = average price of each expected raw material. Direct labor cost standard = tariff each hours x time standard each liter glazur. Tariff each hours = (Direct labor cost monthly) / (effective work time monthly). Time standard each liter glazur = Time work for production glazur in once time process / Amount of glazur produced in once time process. Tariff standard of factoring overhead cost is calculated by divide budgeted on normall capacity. Variable factoring overhead tariff = variable factoring overhead budgeted monthly / glazur unit in normall capacity. Fixed factoring overhead tariff = fixed factoring overhead budgeted monthly / glazur unit in normall capacity; b) Full cost pricing method (Mas'ud, 2005:113) is used to calculate cost price, its formulas : cost price = Total Production cost + margin (Total production cost) + Operating cost; and c) Special identification method is used to calculate inventory value, its formulas : inventory value = cost of goods manufactured in unit x scrap unit on ending period of accounting.

RESEARCH RESULTS AND DISCUSSION

The Influence of Red Pigment Addition to Glazur Colour Characteristics

1. The Influence of Red Pigment Addition to Glazur Colour Lighting Level

This research result about red colour glazur which its observation acted manual-vissual and use equipment is called color reader Konica Minolta type CR-10. All of the glazur trial tested is acted on test piece of stoneware with cream basic colour. The observation results of white stoneware test peace with coated GMR (GMR-1, GMR-2, GMR-3, GMR-4 and GMR-5)glazur is shown in 2 Table.

The Observation Results of White Stoneware Test Peace with Coated GMR (GMR-1, GMR-2, GMR-3, GMR-4 and GMR-5) Glazur andFired at Temperature of 1.250ºC

No	Characteristic	Glazur Code				
		GMR-1	GMR-2	GMR-3	GMR-4	GMR-5
1.	Colour	Very youngred	Near youngred	Young red	Red	Near darkred
2.	Dissolution	Dissolved	Dissolved	Dissolved	Dissolved	Dissolved
3.	Shine	Shine	Shine	Near shine	Semi shine	Little shine
4.	Close character	Good	Good	Good	Good	Good
5.	Colour smoothing	Smooth	Smooth	Smooth	Smooth	Smooth
6.	Tecsture	There is not	There is not	There is not	There is not	There is not
7.	L* value	74,8	65,5	60,1	58,5	57,0
8.	a* value	14,6	21,0	23,7	24,8	26,4

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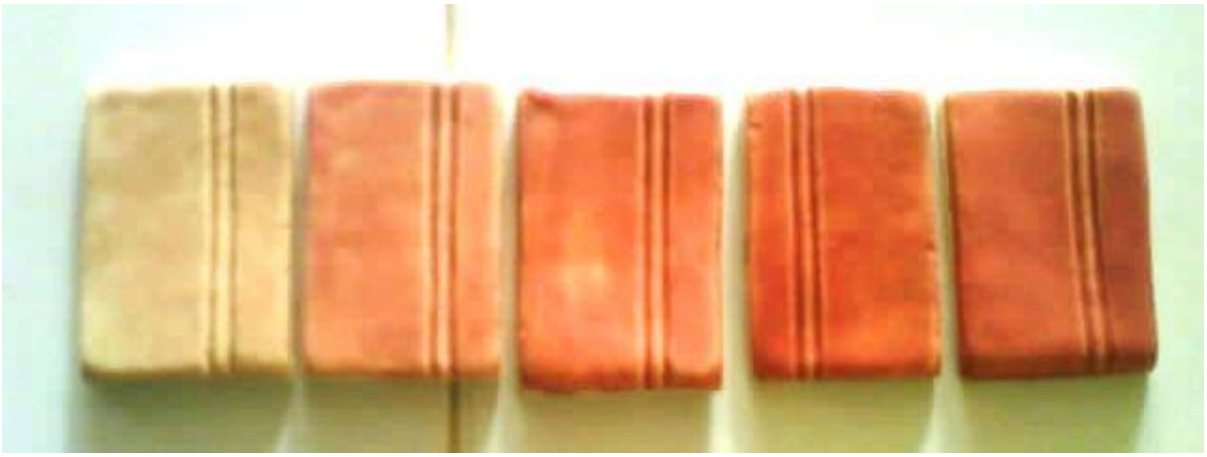
9.	b* value	15,0	14,6	13,2	12,3	10,8

Source : Research Results, 2018.

The Phisical Performance for the five glazur made and acted on that stoneware ceramic test pieceshown in 2 Picture follows :

Gambar 2 : The Phisical Performance for the Five Glazur Made and Acted on that Stoneware Ceramic Test Piece at temperature of 1.250ºC



GMR-1 GMR-2 GMR-3 GMR-4 GMR-5

The glazur is made from basic glazur which white colour, then added red pigment 0,5% until 2,5%, by addition interval 0,5%. The white glazur is used on this research is a dop glazur with spectrum value L* 87,80, a* 1,30 and b* 5,90. Besides of this white glazur which can close test good face well, its smooth colour (there is not tecstur), its favor characteristic well, the amount of pinhole was little relatively, and it has full temperature 1.225ºC – 1.280ºC. The glazur has clear white colour and can close face caused in its composition contanit of opacifier zink oxyde amount of 2,91%. The research results about the influence of red pigment addition to lighting level of glazur (L*) is shown in 3 Picture.

Picture : The Graph of The Relation between Red Pigment (%) and Lighting Level (L*value)Red Glazur Code of GMR(GMR-1, GMR-2, GMR-3, GMR-4, and GMR-5)

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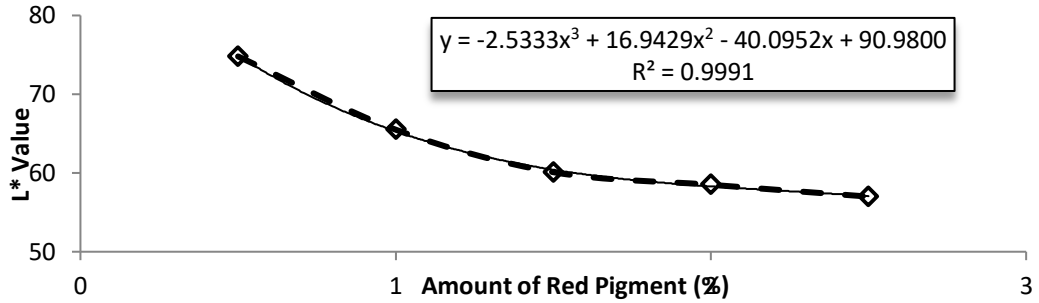


Source: Data Production Results, 2018.

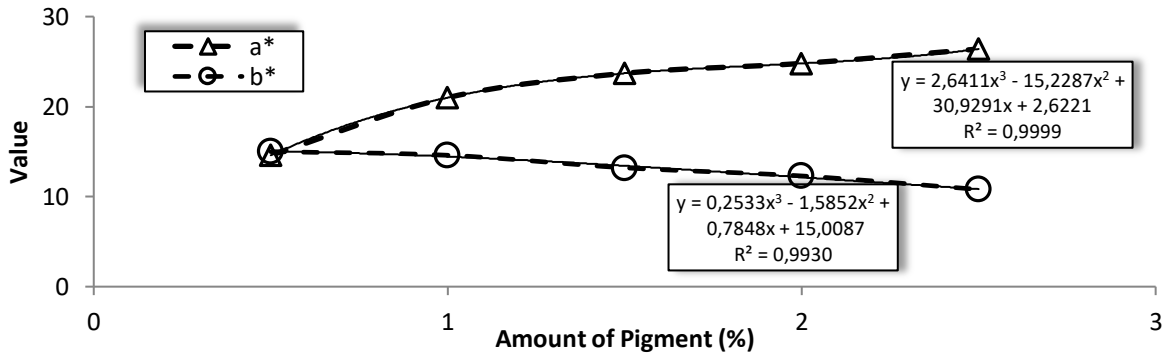
The addition amount of red pigment influence of glazur colour performance. The glazur which white colour before changes its colour becoming young red until near dark red, these are : very young red (GMR-1), near young red (GMR-2), young red (GMR-3), red (GMR-4), and near dark red (GMR-5). The addition amount of red pigment influence of glazur ending colour resulted too. By manual visual shew that the biger red pigment is added on basic glazur, so red colour results would be dark according to 2 Picture before.

A dark colour of a glazur is marked by decreasing of its lighting level and increasing of its colour. The glazur lighting will decrease caused of its colour was real or strong. All of the colour if it is strongly, so it will tend to black colour. Black colour has not lighting colour. The lighting on this research is represented by L* value. If the glazur colour is dark more, so L* value of the glazur was low more until at the time near 0 value (L* for black colour). The beginning glazur is white colour, L* value is very high near 100 value if the white glazur absolutely. The addition of pigment, colour will change be come red and its lighting will decrease.

2.The Influence of Red Pigment Addition to Red SpectrumIntensity Level

The red pigment addition influence of red spectrum intencity level too. The beginning glazur which white colour change its red colour intencity become young red until near dark red, that is : very young red (GMR-1), near young red (GMR-2), young red (GMR-3), red (GMR-4), and near dark red (GMR-5). The influence of red pigment addition to red spectrum intencity level shown in 4 Picture.

Picture : The Graph of The Relation between Red Pigment (%) and Red Spectrum Intencity Level (a*value) Red Glazur Code of GMR (GMR-1, GMR-2, GMR-3, GMR-4, GMR-5)



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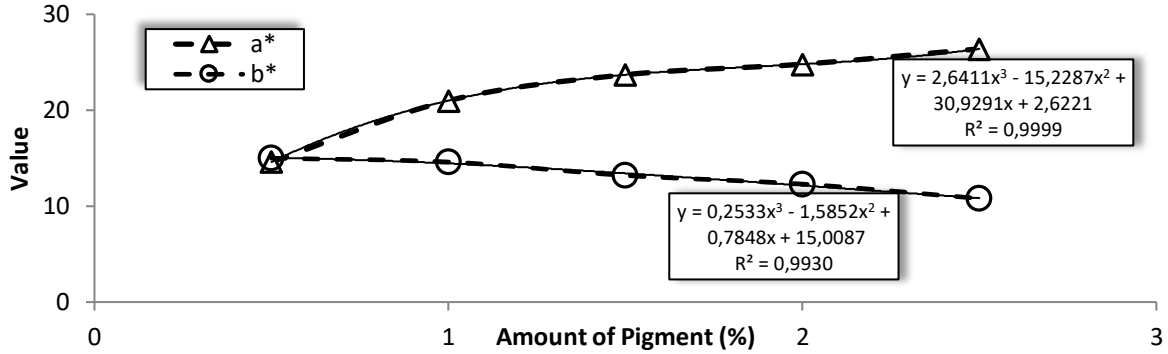
Source : Data Production Results, 2018.

4 Picture shew that the red pigment will increase red colour intencity addition. This red colour intencity additionis shown by its increasing of a* value of the glazur, such as shew in line glazur equation, Y = 2,6411 X^3 – 15,2287 X^2 + 30,9291 X + 2,6221.

3.The Influence of Red Pigment Addition to Yellow SpectrumIntensity Level

The red pigment addition influence of yellow spectrum intencity level too. The beginning glazur which white colour change its red colour intencity become young red until near dark red, that is : very young red (GMR-1), near young red (GMR-2), young red (GMR-3), red (GMR-4), and near dark red (GMR-5). The influence of red pigment addition to yellow spectrum intencity level shown in 5 Picture.

Picture : The Graph of The Relation between Red Pigment (%) and Yellow Spectrum Intencity Level (a*value)Red Glazur Code of GMR (GMR-1, GMR-2, GMR-3, GMR-4, and GMR-5)



Source : Data Production Results, 2018.

5 Picture shew that the red pigment will decrease yellow colour intencity addition. This yellow colour intencity additionis shown by its decreasing of b* value of the glazur, such as shew in line glazur equation, Y = 0,2533 X^3 – 1,5852 + 0,7848 X + 15,0087. The yellow colour spectrum will change and move to blue, this condition is marked by decreasing of b* value more. This moving can announced because yellow colour is light colour. If the colour lighting more so L* value was increase and b* value was increase too, while the blue colour is a colour or parth of dark colour, so if the lighting level decrease so L* and b* would decrease too.

4.The Making of Red Glazur Composition Use Glazur Line Equation

The L*, a* dan b* value for the five glazur made is a function of amount of pigment added. The Pattern which followed did not linear or logaritmis pattern, but polynomial pattern. This condition is marked by smallest deviation value (r^2) frompaterns is tried. From calculation on 4 and 5 Picture above can wrote tend equation of L*, a*,and b* line, that are :

L* : Y = -2,5333 X^3+ 16,9429 X^2- 40,0952 X + 90,9800 R^2 = 0,9991

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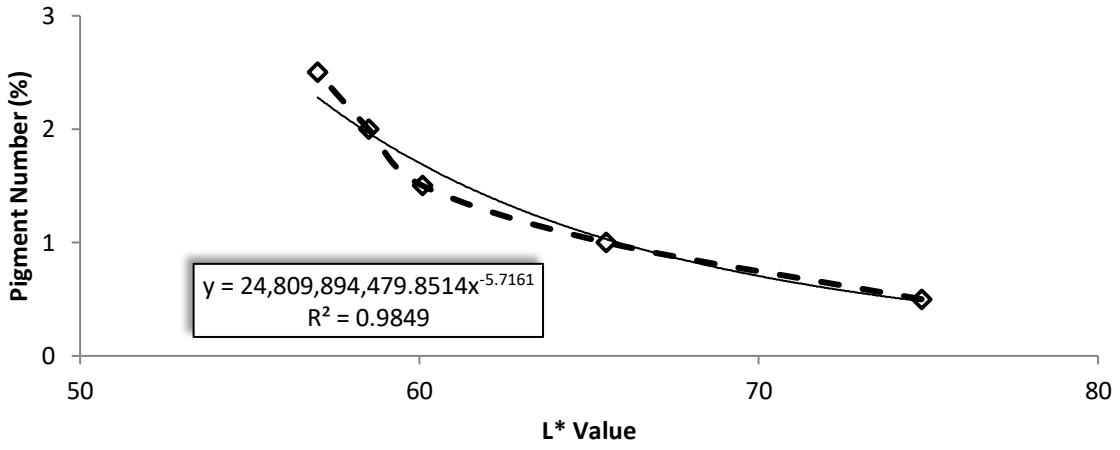
a* : $Y = 2{,}6411\ X^3 - 15{,}2287\ X^2 + 30{,}9291\ X + 2{,}6221$ $R^2 = 0{,}9999$

b* : $Y = 0{,}2533\ X - 1{,}5852\ X^2 + 0{,}7848\ X + 15{,}0087$ $R^2 = 0{,}9930$

Once of the goal from this research is to facilitate red glazur composition (formulas) making if there is a sampel. The sampel is measured its spectrum value(L*,a*,and b*). The addition of a certain red colour pigment will cause lighting decrease with certain size. Decreating of b* value into size of certain too. Beside that, the addition of pigment will add colour intencity so a* value will increase certain too. Therefore, L*, a*, and b* are function of pigment number added. If it knew L*, a*, and b* value from red colour glazur so it would be prepare its composition more base on its equation. The 6, 7, and 8 picture are sampel of this case.

Picture : The Using of Glazur Line Equation Base on Pigment Number VS Lighting Level (L*) to Determine New Red Glazur Composition



Source : Data Production Results, 2018.

Picture : The Using of Glazur Line Equation Base on Pigment Number VS Red Glazur Intensity Level (a*) to Determine New Red Glazur Composition

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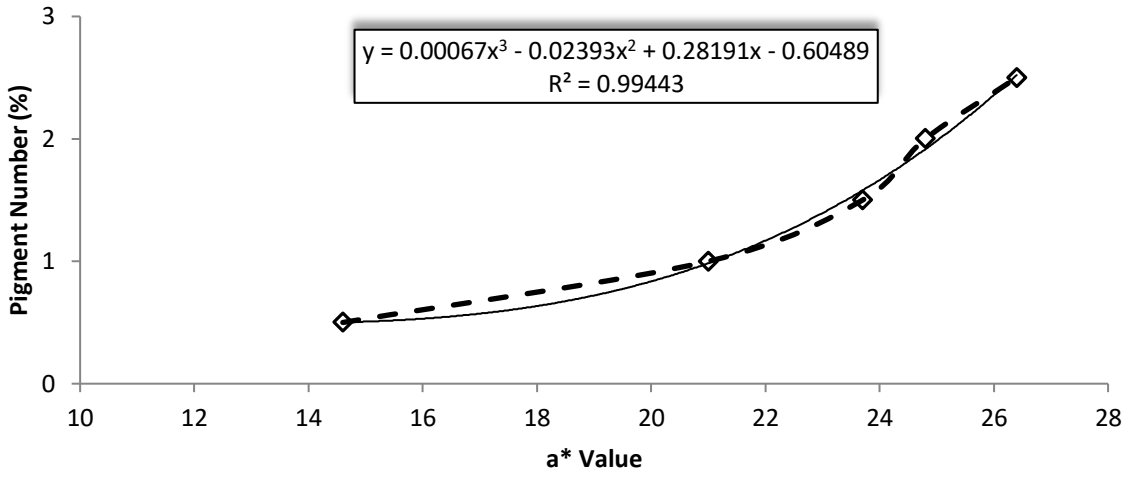
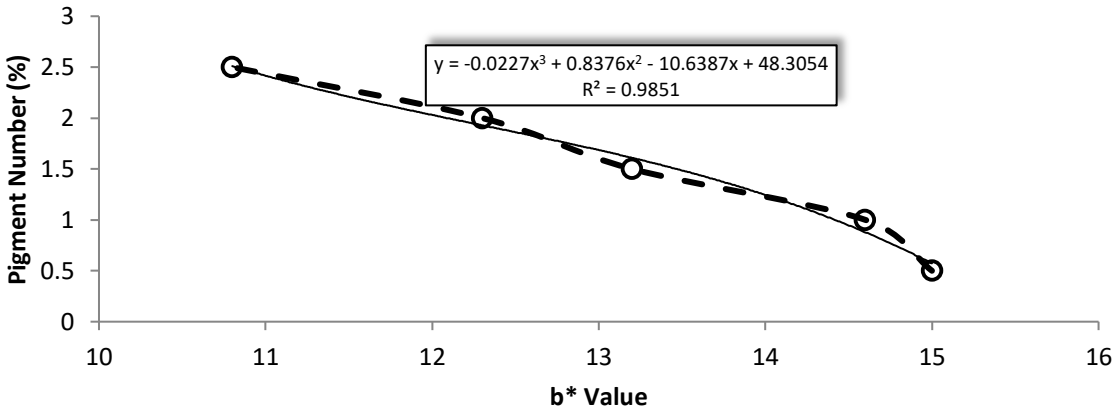


Source : Data Production Results, 2018.

Picture : The Using of Glazur Line Equation Base on Pigment Number VS Yellow Glazur Intensity Level (a*) to Determine New Yellow Glazur Composition



Source : Data Production Results, 2018.

After got value of expected red glazur spectrum, that value can interpolated on 6, 7, and 8 Picture. On this case we will see how many colour pigment must be added into white basic glazur. The three equation can calculated glazur number, but the results is got will a little different, because trend line did not coincide exactly 100 % with line of measurement according to 6, 7, and 8 Picture. Or we can see its R^2, that is There is not line has R^2value = 1,0000. There

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is not line which has the actual case same as the measurement case. The calculation results about pigment number is added to produce red colour glazur base on 7 Picture can saw in 3 Table, follows :

3 Table : The Pigment Number Must be Added to Produce Red Colour Glazur

Number	a* Value	Pigment Number (%)		Different (%)
		be Calculate	Actual	
1.	14,6	0,50	0,50	-
2.	21,0	0,97	1,00	3,00
3.	23,7	1,55	1,50	3,33
4.	24,8	1,89	2,00	5,50
5.	26,4	2,49	2,50	0,40
			Average	**2,45**

Source : Data Production Results, 2018.

3 Table saw that there are little different pigment number added between calculation and actual. The second data series are compared use couple t test. Its results shew in 4 Table.

4 Table : The Calculated and Actual Pigment Numbar from Glazur Line

Calculated	Actual	Variance
0,50	0,50	0,0000
0,97	1,00	-0,0300
1,55	1,50	0,0500
1,89	2,00	-0,1100
2,49	2,50	-0,0100
Average (x) =		**-0,0200**
Deviation Standard (ds) =		**0,0583**

Source : 7 Pictureand 3 Table, 2018.

t value is calculated by equation follow : $t_h = x\sqrt{n}$ /sd. By that equation, t value can calculated follow t_h = -0,0200$\sqrt{5}$ /0,0583 = - 0,7670. But its critical value (table t) is 2,7764 (df = 4 and significant level 95%).Cause t_h value (t calculation) < critical t, so we can called that the second series of data did not show different significantly.

If the calculation results about that pigment number inclusive on equation of 2 Picture and 3 Picture, so it will got calcucated and actual L*, a*, and b* value as follows (5 Table) :

5 Table : The Calculated and ActualL*, a*, and b*Value of Red Glazur (GMR)

Calculated	Actual

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L*	a*	b*	L*	a*	b*
75,0	14,5	15,0	74,8	14,6	15,0
65,8	20,7	14,5	65,5	21,0	14,6
60,1	23,8	13,4	60,1	23,7	13,2
58,6	24,5	12,5	58,5	24,8	12,3
57,1	26,0	11,1	57,0	26,4	10,8

Source : 2 Picture, 3 Picture, and4 Table

The different between calculated and actual value is small enough, so that different can tolerance. The calculation result about red colour pigment must added to make the same glazur with sampel glazur did not exact 100%, but it can used to base making other red glazur composition and decrease range of trial and error at BTIKK.

The using of Red Pigment to Produce and Increase Art Value of Ganesha Statue

Ganesha is a knowledge idol which has four hands. Ganesha has many title, include ganapati and wigneswara. Every name have contains different mean and symbolize some character aspect of ganesha. Ganesha name is a compound word in Sanskrit language, containt of gana word which mean is group, many people, or grouping system and isha word which mean is in outhority or leader. Ganesha is illustrated by thing which has head of elephant and has pot believed. Ganesha becomingimportant symbol of many institute, schools, or studying centre as symbol knowledge and judgement. Ganesha has big head, big nose, and slanting eyes. Big head symbolize that we becoming human being must use more mind than physic into problem solving. Slanting eyes symbolize concentration. Thought must directed positive thing to repair think power and knowledge

For interest and give art value on ganesha statue, that product often given special colouring exactly. There are many glazur which match for produce ganesha statue, so its art value can increased, such as : white, yellow, green, red, balck, and blue. Red glazur on this research is applied on production process of ganesha statue, because it has more art value tha others. The giving red glazur on production process of ganesha statue means to increase art value, increase economic value, increase sales, and others. The ganesha statue is produced on BTIKK has measure : lenght 14 cm, wide 9 cm, and high 17 cm. The picture of ganesha statue base on red glazur shew in 9 Picture.

9 Picture : The Ganesha Statue Base on Red Glazur (Length 14 cm, Wide 9 cm, and High 17 cm)

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The Influence of Red Pigment Addition to Financial Variable

1. The Influence of Red Pigment Addition to Cost of Goods Manufactured Red Glazur (GMR)

Raw material is used to produce red glazur (GMR) are RRC feldspar, lime, quartz, kaolin, TiO_2, and R338 red pigment. Each of red glazur (GMR) has self composition which different raw material percentage of each kinds. The defferent of raw material saw in R338 red pigment weight. The R338 red pigment weight increase more from GMR-0, GMR-1, GMR-2, GMR-3, GMR-4, and GMR-5. The using percentage of R338 red pigment (in 100% raw material for GMR-0 is 0%, GMR-1is 0,50%, GMR-2 is 0,99%, GMR-3 is 1,48%, GMR-4 is 1,96%, and GMR-5 is 2,44%. By use trend analysis technic, it be got increasing level of R338 red pigment on production process of red glazur (GMR) as follows (3 Table) :

Table:The Increasing of R338 Red Pigment Percentage into Production of Red Glazur (GMR) at BTIKK in 2018th

Raw Material Name	Red Glazur (GMR)						Expl
	GMR-0	**GMR-1**	**GMR-2**	**GMR-3**	**GMR-4**	**GMR-5**	
R338 red pigment	0,0000	0,0050	0,0099	0,0148	0,0196	0,0244	
Increasingfrom 100% raw material	-	0,0050	0,0099	0,0148	0,0196	0,0244	

Source : BTIKK, 2018.

3 Table shew that there were increasing of R338 red pigment using into produce red glazur

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(GMR), that is GMR-0, GMR-1, GMR-2, GMR-3, GMR-4, andGMR-5. Its increasing percentage are : 0,50% forGMR-1, 0,99% forGMR-2, 1,48% forGMR-3, 1,96% for GMR-4, and 2,44% for GMR-5.Cost of goods manufactured red glazur (GMR) on addition of R338 red pigment are : Rp 44.311,14 each liter for GMR-0, Rp 52.881,15 each liter for GMR-1, Rp 54.523,39 each liter for GMR-2, Rp 56.171,64 each liter for GMR-3, Rp 57.680,18 each liter for GMR-4, and Rp 59.388,75 each liter for GMR-5. The increasing of R338 red pigment using on production process of red glazur (GMR) from GMR-0, GMR-1, GMR-2, GMR-3, GMR-4, until GMR-5with assumption that the cost price of R338 still constant, soit would influence to cost of goods manufactured red glazur (GMR). The influence of R338 red pigment increasing to cost of goods manufactured red glazur (GMR) shown in 4 Table.

Table : Cost of Goods Manufactured Red Glazur (GMR)Caused Increasing of R338 Red Pigment Percentage at BTIKKIn 2015th

Description	Red Glazur Which GMR Code						Expl
	GMR-0	GMR-1	GMR-2	GMR-3	GMR-4	GMR-5	
The using of R338 red pigment Increasingfrom GMR-0	0,00 -	0,0050 0,0050	0,0099 0,0099	0,0148 0,0148	0,0196 0,0196	0,0244 0,0244	- -
Cost of goods manufactured Increasing from GMR-0	44.311, 14 -	52.881, 15 0,1934	54.523, 39 0,2305	56.171, 64 0,2677	57.680, 18 0,3017	59.388, 75 0,3403	- -

Sources : 1 Table and Appendix 1, 2018.

4 Table shown that addition of R338 red pigment percentage on production process of red glazur (GMR) would increased cost of goods manufactured red glazur (GMR). The weight addition of R338 red pigment 0,50%, cost of goods manufactured GMR-1 increased 19,34%. The weight addition of R338 red pigment 0,99%, cost of goods manufactured GMR-2 increased 23,05%. The weight addition of R338 red pigment 1,48%, cost of goods manufactured GMR-3 increased 26,77%. The weight addition of R338 red pigment 1,96%, cost of goods manufactured GMR-4 increased 30,17%.The weight addition of R338 red pigment 2,44%, cost of goods manufactured GMR-3 increased 34,03%. This thing mean, if the Technology Service of BTIKK want certain red glazur (GMR-1, GMR-2, GMR-3, GMR-4, and GMR-5) according to its lighting intencity which followed by increasing of cost of goods manufactured, it can acted by add weight percentage of R338 red pigment on each GMR composition according to their weight. On the contrary, if the Technology Service of BTIKK want certain red glazur (GMR-1, GMR-2, GMR-3, GHR-4, and GMR-5) according to its lighting intencity which followed by decreasing of cost of goods manufactured, it can acted by decrease weight percentage of R338 red pigment on each GMR composition according to their weight.

Cost of goods manufactured reflect expense which expenditure to produce red glazur (GMR) on

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a certain period. Cost of goods manufactured is got from adding raw material cost, direct labor cost, and factory overhead cost (fixed and variable). The system used is standard cost system. Cost of goods manufactured which include in product sold is the element of cost of goods sold. Cost of goods sold is a component of income statement on accounting period that minus of sales to get gross profit. Cost of goods manufactured red glazur (GMR) include on product which do not or before sale at the ending period of accounting is called ending inventory which component of current assets. Ending inventory is a component of balance sheet which located on the three rank of current assets under account receivable. To get cost of goods manufactured red glazur (GMR) smaller, it can acted by choose reddish intencity of red glazur young red more, because on the red glazur which its reddish intencity young more need a little R338 red pigment more so its cost price was cheaper.

2.The Influence of Red Pigment Addition to Cost Price Red Glazur (GMR)

Cost price on red glazur (GMR) research is determined by full cost price method with formulas Cost price = total production cost + margin (total production cost) + operating cost. The cost price of the six composition GMR-0, GMR-1, GMR-2, GMR-3, GMR-4, and GMR-5 are Rp 57.600,00 each liter for GMR-0, Rp 68.750,00 each liter for GMR-1, Rp 70.900,00 each liter for GMR-2, Rp 73.000,00 each liter for GMR-3, Rp 75.000,00 each liter for GMR-4, and Rp 77.250,00 each liter for GMR-5 (5 Appendix). The weight increasing of R338 red pigment can increased cost price red glazur (GMR). That cost price increasing can saw on 5 Table.

Table: Cost Price Red Glazur (GMR)Caused Percentage Increasing of R338 Red Pigment at BTIKK In 2018th

Description	Red Glazur WhichGMR Code						Expl
	GMR-0	GMR-1	GMR-2	GMR-3	GMR-4	GMR-5	
The using of R 338 red pigment	0,00	0,0050	0,0099	0,0148	0,0196	0,0244	-
Increasing from GMR-0	-	0,0050	0,0099	0,0148	0,0196	0,0244	-
Cost price	57.600,00	68.750,00	70.900,00	73.000,00	75.000,00	77.250,00	-
Increasing from GMR-0	-	0,1936	0,2309	0,2674	0,3021	0,3411	-
	-	0,1936	0,2309	0,2674	0,3021	0,3411	-

Sources : 1 Table, 4 Appendix, and5 Appendix, 2018.

5 Table saw that the weight increasing of R338 red pigment that is 0,50% for GMR-1, 0,99% for GMR-2, 1,48% for GMR-3, 1,96% for GMR-4, and 2,44% for GMR-5into production process of red glazur (GMR) can increased cost price red glazur (GMR), with cost pricestrendare : 19,36% for GMR-1, 23,09% for GMR-2, 26,74% for GMR-3, 30,21% for GMR-4, and 34,11% for GMR-5.

The cost price research of red glazur (GMR) at BTIKK indicate that if the manager of the Technology Service of BTIKK want to increase cost price with certain goal such as : increase bigger sale, increase capability of raw material cost, adjust price base on market price, and others, so one of the ways can acted by increase weight percentage of R338 red pigment into

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each composition red glazur (GMR). On the contrary, if the manager of the Technology Service of BTIKK want to decrease cost price with certain reason, such as : act economization, increase product competitiveness, and others, so one of the ways can acted by decrease weight percentage of R338 red pigment on each red glazur composition according to glazur colour is needed. Red glazur (GMR) which its reddish level young more need a little of R338 red pigment more, so result the cost price cheaper. This is caused that red glazur which reddish level young more need a little R338 red pigment more that is cost price cheaper. Cost price depend on cost of goods manufactured red glazur (GMR). The high cost of goods manufactured red glazur (GMR) more so cost price tend to high more.

Cost price reflect the price which agree requested by seller and available payed by purchaser as equilibrium price. If the price equilibrium is become, purchase-sale transaction will become. Cost price multiplied quantity of red glazur (GMR) sold result sales. Sales become base for a company (organization) to get income. On the accounting side, at the tome of its sales must acted recording into journal. Its recording that is , Debit : Cash or Receivable and Credit : Sales amount of Cost price multiplied quantity sold. On the same time, it must acted recording to cost of goods sold red glazur (GMR). Its recording that is, Debit : Cost of Goods sold and Credit : Finished good inventory. This concept obtain for all red glazur GMR (GMR-0, GMR-1, GMR-2, GMR-3, GMR-4, GMR-5). Sales become base profit loss calculation. Sales is located on the first row on income statement, which is followed by cost of goods sold to get gross profit.

3.The Influence of Red Pigment Addition to Ending Inventory Red Glazur (GMR)

The ending inventory on the red glazur (GMR) research is determined by formulas Ending inventory = (Beginning inventory quantity + Quantity produced – Quantity sold) x Cost of goods manufactured each unit. The ending inventory of each red glazur GMR (GMR-0, GMR-1, GMR-2, GMR-3, GMR-4, GMR-5) are Rp 886.222,80 for GMR-0, Rp 1.216.266,50for GMR-1, Rp 1.254.038,00for GMR-2, Rp 1.291.947,70for GMR-3, Rp 1.326.644,10for GMR-4, and Rp 1.365.941,30 for GMR-5 (6 Appendix). The weight increasing of R338 red pigment can increase ending inventory red glazur (GMR). That increasing of ending inventory can saw on 6 Table.

6 Table : The Ending Inventory of Red Glazur (GMR)Caused Percentage Increasing of R338 Red Pigment at BTIKIn 2018th

Description	Red Glazur WhichGMR Code						Expl
	GMR-0	GMR-1	GMR-2	GMR-3	GMR-4	GMR-5	
The using of R338 Red pigment Increasing from	0,00	0,0050	0,0099	0,0148	0,0196	0,0244	-

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GMR-0	-	0,0050	0,0099	0,0148	0,0196	0,0244	-
Ending inventory	886.22 2,80	1.216.2 66,50	1.254.0 38,00	1.291.9 47,70	1.326.6 44,10	1.365.9 41,30	-
GMR-0	-	0,3724	0,4150	0,4578	0,4970	0,5413	-

Sources : 1 Table, 4 Appendix, and5 Appendix, 2018.

6 Table shew that weight increasing of each R338 red pigment are 0,50% for GMR-1, 0,99% for GMR-2, 1,48% for GMR-3, 1,96% for GMR-4, and 2,44% for GMR-5 into production process of red glazur (GMR) compare with GMR-0 can increase ending inventory red glazur (GMR), with the ending inventory trend are 37,24% for GMR-1, 41,50% for GMR-2, 45,78% for GMR-3, 49,70% for GMR-4, and54,13% for GMR-5.

The concept ending inventory on this research saw that if the manager of the Technology Service of BTIKK want to increase assets value mainly on inventory side with certain goal, such as expect to : see current assets better, get current ratiohigher, see cost of goods manufactured lower, get gross profit higher, and others, so one of the ways can acted by increase weight percentage of R338 red pigment on each red glazur (GMR) mixing. The contrary of this, if the manager of the Technology Service of BTIKKwant to increase ending inventory with certain reason, such as : get inventory turn over higher, decrease storehouse rent cost, and others, so one of the ways can acted by decrease weight percentage of R338 red pigment on each red glazur (GMR) mixing according to red colour expected. The red glazur (GMR) which its reddish level young more results ending inventory lower. This is caused that red glazur which its reddish level young more needed a little R338 red pigment cheaper. The ending inventory depend on cost of goods manufactured red glazur (GMR). The cost of goods manufactured red glazur (GMR) higher, ending inventory tend to higher.

Ending inventory is a component of balance sheet. Ending inventory is one parth of asset that is current asset. Ending inventory is located on the four series of current asset under account receivable. That location is prepared according to liquidity series of asset. The more and more speed an asset is changed become cash, the more and more liquid that asset. The most liquid series is cash, followed by marketable securities, continued by receivable, and then inventory (including red glazur (GMR)), and others. Recording ending inventory with physical method is acted by make adjusting journal with Debit : Ending inventory and Cost of goods sold, and Credit : Beginning inventory and Cost of Goods manufactured. Ending inventory is minused of Beginning inventory and cost of goods manufactured to get cost of goods sold on income statement.

CONCLUSION AND SUGGESTION

Base on research results and discussion, I can concluse : (1) The addition of red pigment influence of red glazur (GMR) production. The more and more many of red pigment, more and more dark of red glazur (GMR) resulted, that is : very young red glazur (GMR-1), near young red glazur (GMR-2), red young glazur (GMR-3), red glazur (GMR-4), and near dark red glazur (GMR-5).The more and more many of red pigment, thelighting level will decrease which marked by dereasing of L* value of glazur. The more and more many of red pigment, red spectrum intensity will increase which mark by decreasing of a* value of glazur. The more and more many of red pigment, yellow spectrum intensity will decrease which mark by decreasing of b*

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value of glazur. The decreasing of L* and b* value and increasing of a* value caused increasing of red pigment folowing a special form. The graph form about red pigment vs L8 value, red pigment vs a* value, and red pigment vs b* value are polinomial form with three derajat and deviation (R^2) more that 99%. The red glazur composition (GMR) can made by graph form available, that is L*, a*, and b*. The red glazur (GMR) is resulted containt of dop glazur which match applicated on firing temperature of 1.225 and 1.250^{o}C. The red glazur can applied on castle mass, body mass, colouring stoneware, and uncolouring stoneware (white). The addition of red pigment can used to produce various of expected red glazur. Red glazur can increase art value of ceramic product, which its application can acted on production of ganesha statue ; and (2) The addition of red pigment influence of red glazur (GMR) financial variable (cost of goods manufactured, cost price, and ending inventory). The weight addition of red pigment 0,50% (GMR-1), 0,99% (GMR-2), 1,48% (GMR-3), 1,96% (GMR-4), and 2,44% (GMR-5) can increase cost of goods manufacruted red pigment 19,34% (GMR-1), 23,05% (GMR-2), 26,77% (GMR-3), 30,17% (GMR-4), and 34,03% (GMR-5). The weight addition of red pigment 0,50% (GMR-1), 0,99% (GMR-2), 1,48% (GMR-3), 1,96% (GMR-4), and 2,44% (GMR-5) can increase cost cost price red pigment 19,36% (GMR-1), 23,09% (GMR-2), 26,74% (GMR-3), 30,21% (GMR-4), dan 34,11% (GMR-5).The weight addition of red pigment 0,50% (GMR-1), 0,99% (GMR-2), 1,48% (GMR-3), 1,96% (GMR-4), and 2,44% (GMR-5) can increase ending inventory red pigment 37,24% (GMR-1), 41,50% (GMR-2), 45,78% (GMR-3), 49,70% (GMR-4), dan 54,13% (GMR-5). If the Technology Service of BTIKK want to increase certain red glazur (GMR-1, GMR-2, GMR-3, GMR-4, and GMR-5) according to its red intensity, which followed by its cost of goods manufactured, cost price, and ending inventory, so it can acted by increase of red pigment percentage of each red pigment composition.

Base on conclusion, I suggest : (1) To act laboratory test accurately and variatively for test sample, so physical characteristic of GMR red glasir is resulted can fulfill all standard of material and colour test parameter standard; (2) To use colourer material which cheaper price with more percentage as long as fulfill glazur standard; (3) To increase economy, effectiveness, and efficiency colour material of R338 red glazur & GMR red glazur so can increase art value of ceramics product and decrease cost price, to get profitability more than current sales which on just research stage; and (4) To use equation of colour line into determine lighting level, red spectrum intensity, and yellow spectrum intensity into make glazier colour expected to increase art value of ceramic product.

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