

Proposing provisions of Standard Repair Method of Painting Work Defect by Lawsuit Case Study

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Abstract

Defect dispute in apartment building has become a debating social issue. The system of defect lawsuit and the conciliation process are applicable to solve defect problems in South Korea. Among various defects, painting work defect is a critical issue because it requires large area works and entails a lot of cost. Accordingly, disputes on work procedure and cost calculation are argued oftenly between residents and housing providers. This study reviewed detailed main issues of painting work and propose relevant systems and standards. In this analysis, the main issues are categorized into pre-works, main work, and others. The most recent cases are compared and analyzed for each issue. After the analysis, following conclusions are obtained, (1) In defect lawsuit system, even though surface treatment work in pre-work step is part of main work, it has been separated and regarded as a separate work. (2) Although the main painting work are not significantly different from two systems, it is still necessary to achieve a consensus to close the gap in the methodology of painting area calculation and determining whole painting or partial painting. (3) In addition, unlike the profit rate of general construction works, that of painting work remained the maximum rate and additional charge rate for works carried out in higher place are different among cases. Therefore, it is determined that establishing consistent standards is urgent.

Keywords : Painting Defect, Defect Dispute, Standard Defect Repairing Method, Defect Lawsuit

I. Introduction

I-1. Background

In these days, comfortable and reasonable residential environments are additionally required in apartment buildings widely supplied for highly intensive land use in Korea. Also more attention is drawn on improved consciousness of occupants and increases in the asset values of apartment buildings. Accordingly, occupants have more actively raised claims and disputes over defects in apartment buildings, including quality defect

[1].

That is because there is no scientific and objective criteria and relevant logical system of defects in apartment building. In particular, it is necessary to accumulate data of defects and obtain enough analysis information, and thereby to achieve expert's consent [2]. In Korea, defect dispute has yet to come to an end, for there is absence of consistent technical standards and legal system. Diverse disputes over defects in apartment buildings are categorized into legal perspective which emphasizes procedures necessary for dispute settlement and into technical perspective which focuses on details of each defect [3]. Aside from that, what matters

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greatly is a defect examination to survey actual defects in a site and judge defects [4].

From the legal perspective, the issues arising in the step prior to defect lawsuit are starting point of disqualified term, clam of defects repair, defects liability and liability period, overtaking right of warranty against defects, and disqualified term. The issues arising in the step of defect lawsuit are clams for defects repair and damages, defects liability, defect repairs completion agreement, and subrogation right of defects repair [5].

From the technical perspective, defects are classified into defects occurring in reinforced concrete work and into others. That is because cost for defects repair is calculated mostly in terms of reinforced concrete work. A great amount of defects repair cost for reinforced concrete work is subject to painting work. That is because repair of reinforced concrete work or reinforcement work inevitably requires painting work for functional and aesthetic supplementation.

Unlike reinforced concrete work which needs to be approached in the structural and mid-and long-term aspects, painting work has a strong tendency of accessorial function, and its lifespan is short, or 3-5 years. Therefore, it requires short-term maintenance often. In addition, from the aesthetic standpoint, there are wide variations in individuals, and thus it is hard to make an objective judgment. In other words, the matters which should be processed in the dimension of maintenance of apartment buildings happen to be mistaken for defects.

I-2. Purpose

In defect dispute, painting work has been considered to be part of reinforced concrete work, and consequently has been a critical issue from the technical perspective. However, painting work rarely causes safety or functional problems and can be managed enough by a usual long-term maintenance plan. This study looked into dispute

issues arising in painting work, and draw up the main issues of technical system and cost calculation system in actual cases. Based on the analysis, it can be provided a base of reasonable defect repairing method for painting work.

I-3. Methodology and Scope

This study conducted a literature survey to draw the main issues related to painting work. To find specific problems and actual conditions of each issue, this researcher collected and reviewed 100 law cases of defect dispute, which were chosen on the basis of written judgments of lawsuits from 2010 to 2012. To compare the reviewed matters with recent trends, the 17 new materials (appraisal reports) surveyed and reported in 2013 were used.

In this study, painting work is generally referred to as the work of surface painting after the work of using and installing concrete, wood, and steel. In particular, it accounts most for the role as the work following repair and reinforcement of reinforced concrete work. Although there are many different types of multi-unit dwelling in Korea, this study focused on apartment buildings, the main subject of defect dispute. The technical matters in this study were based on architectural construction standard specification [6]. The cost calculation criteria complied with cost estimating standard for construction work [7].

II. Literature Review on Defect of Painting Work

II-1. Systems and Standards related to Defect Dispute

The main issues related to painting work were drawn from representative studies and standards. When it comes to a defect dispute in Korea, it is settled in two ways: defect lawsuit and defect

dispute conciliation. A defect lawsuit is resolved by the court, and its final judgment has legal force. Defect dispute conciliation is made by defect dispute mediation committee. In this case, its final conciliation draft had no legal force, but is given legal force after the revision of relevant standards. Institutionally, defect lawsuit system began earlier, and most defect lawsuits are class-action ones. Later, defect dispute conciliation was introduced, and most of it is related to personal disputes.

The systems have and use their unique standards. In the case of defect lawsuit, Seoul Central District Court set out its own standards named construction lawsuit practice which is used by judges and appraisers [8]. In the case of defect dispute conciliation, survey on defects in apartment buildings, calculation method of repair cost, and defect judgment standards notified by Ministry of Land, Infrastructure and Transport are performed [9].

Based on the two systems and standards, main issues related to painting work were drawn as follows: The first issue is the decision as to whether surface processing work conducted for repair of painting and reinforced concrete work should be separated independently, or should be considered to be part of painting work. The second issue is the standards of painting range, the number of painting times, width, and tools at the time of painting work. The third issue is the decision of a profit rate and an additional charge rate as high place work, the standards to calculate painting work cost. In chapter 3, the issues are described in detail.

II-2. Characteristics of Painting Defect: Classification of Defect and Detailed Types

General painting work is a type of finishing work in accordance with Housing Act. However, in the dispute over defects in apartment buildings, painting work, as a process following repair and reinforcement of reinforced concrete

work, is a very critical matter. According to previous studies, the acceptance of a painting range, one of detailed issues of painting work, is the main factor affecting defect repair cost. In the case of partial painting on cracked regions, painting range was 4,890 KRW/m². However, in the case of whole painting regardless of repair, it was 6,617 KRW/m²[1].

According to the analysis on 100 legal cases, finishing work including painting work accounted for 18.4%, and if reinforced concrete work (60.5%) is included, the repair cost of 78.9% was related to painting work, directly and indirectly.(figure 6)

Painting work is aimed at improving function and aesthetic view through painting on existing materials. Like other special housing works, painting work also has the limitation of durability. However, in the aspect of defects, there are different provisions depending on laws. According to Attachment 6 of Paragraph 1 of Article 59 of Enforcement Decree of Housing Act, the defect liability period of painting work is one year, whereas according to the subparagraph C of paragraph 2 of Article 2 of Enforcement Decree of Act on the Aggregate Buildings (Paragraph 2 of Article 9), the liability period of painting work is 2 years.

In maintenance of buildings, Housing Act stipulates that the outside of buildings should be painted once every 5 years.

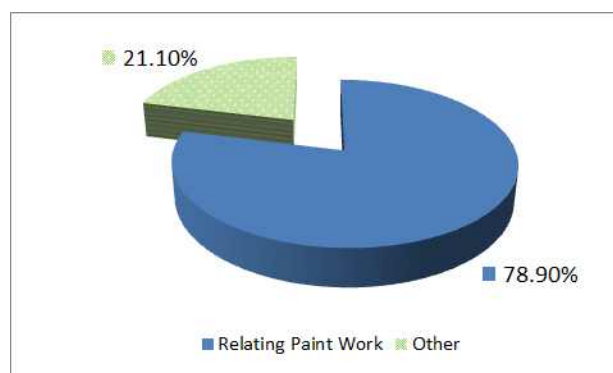


Figure 1. Distribution of painting work in defect dispute

III. Critical Issue of Defect Dispute

III-1. Critical Issue

The Critical issues of painting work defect were drawn by reviews on previous studies. They were categorized into three things: pre-work, main work, and others (Table 1).

Table 1. Main issue of paint work in defect dispute

Part	Critical issue	Detailed argument
A. Pre-Work	A.1 Preparation surface for painting	A.1.a. Including in main work A.1.b. Separating in main work
	B.1 Painting range	B.1.a. Whole surface B.1.b. Partial surface
B. Main work	B.2 Painting number	B.2.a. Once B.2.b. Twice
	B.3 Painting width	B.3.a. 20cm B.3.b. 30cm B.3.c. 40cm B.3.d. 50cm
	B.4 Painting tool	B.4.a. Brush B.4.b. Roller B.4.c. Spray
	C.1 Profit rate	C.1.a. Average profit rate of construction work C.1.b. Maximized rate in legal(15%)
C. Other	C.2 Additional charge rate as high place work	C.2.a. Using a prefabricated steel pipe scaffolding C.2.b. Nonuse

Pretreatment includes the work of filling in cracks and damaged regions on surface and removing residues prior to main work, and the work of making the surface level for smooth painting work. Main work means the work of painting on surface, and the detailed dispute matters hereof are a painting range, the number of painting times, a painting width for repair, and painting tools. When painting work cost is estimated after the decision on matters about pretreatment and main work, the acceptance of a proper profit rate and an additional charge as high place work becomes a main issue.

III-2. Pre-Work step

Usually, in construction work, pre-work of painting work is part of the whole work so that

it is not separated as an independent process. However, as shown in some defect dispute cases, it was separated as an independent process and consequently relevant cost was claimed. In addition, it is different depending on a painting range (B.1) according to some appraisers and appraisal reports complying with construction lawsuit practice [8]. In other words, in the case of partial painting, preparation for surface is accepted as a separate work, whereas in the case of whole painting, it is not. As such, there are double standards.

Table 2. Preparation surface for painting in specification for Building

Job process		Job contents	Treatment	Drying time (hours)	Quantity of paint (kg/m ²)
1	Treatment of surface		Inspection of a heaving or swelling of surface		
2	Remove a refuse or extraneous matter		Remove a refuse or extraneous matter		
3	Primer	Acrylic emulsion paint 1 : Water ⁴		2	0.15
4	Putty	Acrylic emulsion putty or Plaster putty		24	1
5	Polishing				

According to architectural construction standard specification, surface-preparation work is made up of treatment surface, removal of a refuse or extraneous matters, primer, putty, and polishing in sequence, as shown in Table 2[6].

Detailed jobs of painting work are presented in Table 3. The above surface-preparation job is equivalent to the job process 1 in the below table. Accordingly, the statement that painting work is separated from main work, as shown in some cases, violates current regulations and work guidelines. Therefore, charging additional cost is found to be wrong.

Table 3: Painting specification for Building(18020)

Job Process		Job contents	Mixing ratio (Mass ratio)	Treatment	Drying time (hours)	Quantity of paint (kg/m ²)
1	Preparation surface for painting	P100~P160		Follow as 18015		
2	Primer (1)	Acrylic emulsion (Transparent)	100		More than 3	0.08
3	Putty	Acrylic emulsion paint	100		More than 3	
		Water	0~5			
4	Polishing			Follow as 18010.3		
5		Acrylic emulsion paint	100		More than 3	0.1
		Water	5~20			
6		Acrylic emulsion paint	100		More than 3	0.1
		Water	5~20			

* 18020, 18015, 18010.3 are codes of Korean Construction Standard

III-3. Main work step

With regard to a painting range, there is a confrontation between the argument of partial painting and the argument of whole painting. Generally, partial painting is applied to repaired regions. However, it is not good in aesthetic aspect. Therefore, occupants require whole painting. In fact, a painting range greatly affects all construction costs of defect repair, and thus it is hard to make a decision only in consideration of aesthetic aspect. As mentioned in section 2.2, since it is specified that whole painting is required every five years in accordance with long-term repair plan of housing, it is necessary to conduct whole painting with the cost of occupants regardless of defect repair. It is proper for a business entity to pay the cost of re-painting work caused by defects in painting work. However, in the case of defect dispute, there is almost no complaint about painting work, but painting work is caused by reinforced

concrete work. Therefore, such a case is quite complicated.

The number of painting times is never described in architectural construction standard specification. [6]. As shown in the table of section 3.2, it is determined on the basis of a painting amount used per unit area. General painting work is conducted once or twice. Initial painting is performed twice, and re-painting is done once. Therefore, occupants require two times of painting, whereas a business entity argues one time. In fact, since it is related to a painting range, it is hard to make a decision simply on the basis of the number of painting times. According to defect judgment standard notified by Ministry of Land, Infrastructure and Transport in 2014, the repaired regions induced by reinforced concrete work defect should have one time of partial painting, and if the repaired regions are subject to repair percentage standard (a repair area exceeds 20% of the whole area), whole painting should be applied [9]. According to case analysis, 80 out of 100 cases had the judgment of partial painting, and 20 cases had the judgment of one time of whole painting.

A painting width is determined after the repairing work of the cracks made by reinforced concrete work. Architectural construction standard specification stipulates painting tools, but fails to specify a painting width [6].

Painting tools for brushing, rolling, and spraying have different standards (Table 4). According to cost estimating standard for construction work, brushing requires 0.022 person per m²; rolling 0.012 person; and spraying 0.027 person [7]. Since there is two-fold difference between rolling and spraying, different arguments arise at the time of cost estimation in defect dispute. General painting work is based on roller. However before various standards related to defect dispute were set out (year 2014), there were no legal grounds. As a result, the dispute of the issue has continued to be unsolved.

Table 4. Work Time comparison according to painting tools

Painting tool	Brush	Roller	Spray
Painter (man-day)	0.022/m ²	0.012/m ²	0.027/m ²

III-4. Others

In section III-2 and section III-3, detailed jobs of painting work were described. In this section, the matters of defect repair cost estimation are explained. The main ones are a profit rate and an additional charge rate as high place work. A profit rate is the basis to calculate a construction cost, and can be estimated up to 15% legally. But, it is limited to general new building construction so that it is not applied to defect repair. In fact, in the case of new building construction, there is fierce competition between construction companies. Therefore, there is almost no proposal of up to 15% in terms of profit rate. However, defect repair cost estimation is based on the maximum 15% profit rate. As a result, business entities raise a lot of opposition.

In the case of apartment buildings, painting work is mostly performed in high-story buildings

with 20-30 floors so that additional charge for the risk is specified in the estimating standard. However, the rule is applied differently depending on cases. For the reason, it is necessary to come up with a consistent standard.

IV. Case Study

IV-1. Overview

To find how to deal with the main issues of painting work which are described in the previous chapter, this researcher compared and analyzed the latest 17 cases (defect appraisal reports surveyed in 2013) in this chapter. The table 5 shows total repairing cost, surface area, and painting cost of the overall information on each case partial painting in the categories of partial painting and whole painting.

With regard to the total repairing cost of 17 cases, whole painting cost KRW 2,192 million on average and partial painting KRW 1,836 million, around 83.8% of whole painting cost. Regarding surface area, whole painting had 54,474m² on average and partial painting 4,022m², 7.38% of the surface area of whole painting. As for painting cost, whole painting cost KRW 395 million on

Table 5. Comparison of the cases

Case Number	Total repairing cost		surface area		Painting cost	
	Whole painting (Korean million won)	Partial painting (Korean million won)	Whole painting (m ²)	Partial painting (m ²)	Whole painting (Korean million won)	Partial painting (Korean million won)
1	487	396	20,315	2,130	100	10
2	480	383	21,466	2,856	108	14
3	889	816	15,427	1,685	72	21
4	1,383	1,165	49,196	4,059	57	275
5	2,681	2,348	70,122	8,009	332	42
6	4,215	2,190	85,612	6,103	732	88
7	2,443	2,143	64,616	1,955	391	91
8	1,894	1,780	29,369	3,823	1,203	1,089
9	3,479	2,651	87,407	9,070	1,247	418
10	740	638	23,900	882	113	11
11	7,656	7,307	107,777	13,753	546	197
12	1,355	1,283	19,695	1,443	90	17
13	434	369	24,741	1,162	140	13
14	1,312	1,148	37,935	1,603	184	20
15	261	227	11,356	886	80	47
16	2,882	2,478	85,185	4,699	476	72
17	4,678	3,893	171,937	4,263	841	57
AVERAGE	2,192	1,836	54,474	4,022	395	146

average and partial painting KRW 146, 37% of whole painting cost.

IV-2. Comparison of detailed arguments

The comparison of the latest cases related to the main issues described in chapter 3 is presented in Table 6. The contents of all cases but case no. 12 were identified.

According to review, partial painting of surface treatment was accepted as a separate job, but whole painting of it was not. However, as revealed in table 2 and table 3 in section III-2, surface treatment in pretreatment step is the same as surface treatment in main work step so that it is duplicated and calculated twice.

Therefore, it was unreasonable. Nevertheless, given that surface treatment is already done in partial painting step, the acceptance of whole painting is reasonable in the aspect that surface treatment is excluded to prevent duplication.

Regarding painting main work, in all cases but some cases with no clarification, a painting range was the same with one time of partial painting and one time of whole painting; the number of

painting times was two; a painting width was 30cm; and roller painting was based. That was because construction lawsuit practice was complied with [8]. Defect judgment standard [9] also includes the same criteria so that the matters are judged to have unified criteria. Calculation of a repair area which is omitted in this comparison analysis and the calculation based defect judgment standard to decide whether whole painting is performed or not have yet to be agreed. Therefore, that needs to be improved gradually by experts' discussion and academic research.

A profit rate, which is used to estimate a repairing cost, is also up to 15% legally, the same as the rate in construction lawsuit practice [8].

In fact, it is lower because of bidding competition for construction work, but the actual rate is not applied. An additional charge rate as high place work was different depending on cases, ranging from 29.83% to 45%. That seems to be because apartment buildings have a different number of floors and a different height in the cases. Since it is uncertain to apply the estimating standard to the rates [7], it is

Table 6. Comparison of detailed argument in painting

Case Number	Base surface for painting		Painting method				Other	
	Partial painting	Whole painting	Range	Number	Width (cm)	Tool	Profit rate	Additional charge rate for higher place work
1	O	Unknown	Unknown	2	30	Roller	15	42.5
2	O	Unknown	Unknown	2	30	Roller	15	45
3	O	X	P1+W1*	2	30	Roller	15	32.2
4	O	X	P1+W1*	2	30	Roller	15	40
5	O	X	P1+W1*	2	30	Roller	15	Unknown
6	O	X	P1+W1*	2	30	Roller	15	Unknown
7	O	X	P1+W1*	2	30	Roller	15	Unknown
8	O	X	P1+W1*	2	30	Roller	15	30
9	O	X	P1+W1*	2	30	Roller	15	42
10	O	X	P1+W1*	2	30	Roller	15	30
11	O	X	P1+W1*	2	30	Roller	15	29.83
12	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown
13	O	X	P1+W1*	2	30	Roller	15	30
14	O	X	P1+W1*	2	30	Roller	15	42.1
15	O	X	P1+W1*	2	30	Roller	15	43
16	O	X	P1+W1*	2	30	Roller	15	47.31
17	O	X	P1+W1*	2	30	Roller	15	54.7

*P1+ W1 : A partial painting is once, and an whole painting is once

necessary to make a revision in consideration of actual defect repair conditions.

IV-3. Results and Implications

The case analysis revealed that there was a great difference in a painting area depending on a painting type: whole painting or partial painting. A partial painting area reached only 7.38% of a whole painting area, but its repairing cost accounted for 37%. Therefore, the cost of partial painting was higher than that of whole painting. That seems to be because surface treatment is considered to be a separate job in the case of partial painting. However, given work types in architectural construction standard specification [6], that is a duplicated job so that double calculation occurs.

Regarding main work type of painting work, both construction lawsuit practice and defect judgment standard are based on past performance data so that they have no difference. Such a point is found in latest cases. Nevertheless, the methods of calculating and tallying repair amounts, and the methodology of choosing partial painting or whole painting are not consistent. Therefore, constant discussion is required to be made.

With regard to a profit rate, unlike general construction work whose cost is estimated in the competition bidding way, defect dispute experiences the reduction procedure by the limited liability ratio in court. Therefore, it is judged that there is no any special restriction to a profit rate. However, an additional charge rate as high place work needs to be calculated differently depending on actual site conditions. Therefore, it is different in each case and its standard needs to be supplemented.

The case analysis in this study was limited to defect lawsuits, and thus it was hard to compare with defect dispute conciliation in terms of treatment methods. It was relatively easier to collect defect lawsuits data from relevant

cooperative organizations. The cases of defect dispute conciliation were not open so that it was impossible to collect their data.

V. Conclusions

In defect dispute, painting work includes follow-up jobs of reinforced concrete work so that it has a wide range and requires a lot of cost. Since it is a very critical issue, there are many disputes over work procedure and cost calculation between occupants and a business entity.

This study reviewed detailed issues of painting work, and relevant systems and standards. As a result, defect lawsuit system and defect dispute conciliation system have some equal rules and suggest some different standards. Such points were examined in the categories of pretreatment, main work, and others. In defect lawsuit system, in the case of pretreatment work, surface treatment, though part of main work, was accepted as a separate job. Main work was not greatly different in both systems. However, it is necessary to make a series of consent processes to narrow the gap in the methodology of estimating a painting area and determining either partial painting or whole painting. In the category of others, unlike general construction work, painting work accepted the maximum profit rate, but an additional charge rate as high place work was different depending on cases.

Therefore, to relieve the argument between residents and housing provides, it is necessary to revise relevant standards on the base of this study result.

But, in this study, as just 17 lawsuit cases of painting work defect are analyzed, broader case studies should be followed to fix the relevant standard repairing method in painting work.

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