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Use and Abuse: Reading the Patina of User Actions in Public Space

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ABSTRACT

One of the most aggressive agents influencing change to built landscapes is the user. This usage is influenced by many factors such as the activities and functions available, climatic factors, the time of day, the day of the week and seasonal variations. In structural terms, usage is a form of mechanical loading which can be static or dynamic and exerts force upon the structure. Repeated cycles of use therefore lead to wear and tear; the intensity and frequency of these interactions dictate the impact of these forces over time.

This paper will explore the conflicts between the built landscape and its users by analysing the evolving signs and symptoms of various forms of use, abuse and use appropriation throughout the city of Berlin. Abuse refers to the impact of wilful destruction which is a form of criminal vandalism. In addition, 'passive' vandalism in the form of use appropriation or unintentional destruction can occur.

The visible traces of use and abuse are embedded in the form of wear, erosion, organic sediments, pollution, dirt and vegetation growth on the surfaces of built works. By applying the principles of construction pathology this patina can be 'read' and deciphered, the influencing factors determined and optimisation strategies established. Current research at the Technische Universität Berlin is based on the hypothesis that it is possible to optimise design, detailing, construction and maintenance techniques through continued analysis of project development at regular intervals after completion. The data resulting from the research enables a detailed interpretation of the impact of use and abuse as well as a deeper

understanding of the causative processes involved. Case studies from the research project will be presented, illustrating and analysing the conflicts between user actions and the built landscape.

INTRODUCTION

'Science has not enabled us to predict the behaviour of people; which very many designers need to be able to do. ... We design failures chiefly because we cannot make reliable predictions about responses.'
(David Pye 1995: 27)

The actions of users are one of the most aggressive agents influencing change to built landscapes through time and are particularly difficult to predict. Many factors influence the patterns of use of public space such as the activities and functions available, climatic factors, the time of day, the day of the week and seasonal variations. In structural terms, usage is a form of mechanical loading which can be static or dynamic and exerts force upon the structure. Repeated cycles of use (cyclic loading) therefore lead to wear and tear. The intensity and frequency of these interactions dictate the impact of these forces over time.

Current research at the Technische Universität Berlin is developing a system for monitoring the development of built landscapes through time. A low-threshold anticipatory method is currently being developed to optimise future landscape projects already during the design and detailing phase. The processes of patination and subsequent deterioration highlight weak points of the design as well as deficiencies in detailing, construction and maintenance. Through comparisons between the original state and successive recordings process-dependent changes become visible and frequently occurring points of weakness can be pinpointed. The data resulting from the research

enables a detailed interpretation of the visible signs of deterioration and a deeper understanding of the causative processes involved.

This paper will explore the signs and symptoms of various forms of use throughout the city of Berlin.-Case studies from the research project will be presented, illustrating and analysing the impact of user actions on the built landscape.

RESEARCH RESULTS

‘Products and spaces, which - according to the criteria of professional design and its definition of meaningful use - are ‘misunderstood’ or ‘abused’, have a great potential for innovation and various new, other, multi-functional options of use’ (Brandes et al. 2009: 13)

The many problems associated with use such as **overuse**, **underuse**, **misuse**, **alternative use** and **appropriation of use** are difficult to predict and can lead to erosion, damage or destruction. In many projects, **imbalances of use** lead to the intense use or misuse of certain areas or objects whereas others remain disused.

Misuse refers to the impact of **wilful destruction** (criminal vandalism) and **appropriation of use** (usage of an object for a purpose or in a manner other than intended) breaking either legal regulations or social norms. Vandalism is defined by Maren Lorenz as a deliberate, anonymous and norm-violating act causing damage or destruction to third party property, which occurs without an apparent motive. (2009: 10). A student field study took place at the TU Berlin aimed at defining the main categories of misuse of open space in Berlin and evaluating user acceptance of the resulting condition. The signs of misuse in parks and city squares were mapped and five main categories were established:

Categories of Misuse

- Damage and wilful destruction
 - to materials and objects [Fig. 1a, b]
 - to vegetation [Fig. 1c]
- Street-art and guerrilla advertising:
 - Street-art and graffiti [Fig. 4a,b]
 - Street-advertising, billposting, stickers [Fig. 4c,d]
- Littering:
 - trash, rubbish [Fig. 2a, b]
 - dog and human faeces [Fig. 2c]
 - chewing gum and cigarettes [Fig. 2d]
- Appropriation of use:
 - alternative usage [Fig. 3a, b]
 - appropriation for sports e.g. skating [Fig. 3c, d]
 - alternative site circulation e.g. desire paths [Fig. 5c]
- ‘Guerrilla gardening’ [Fig. 1d]

Tessin claims that a tidy image of the open space gives its visitors a feeling of security and increases the awareness of users to care for the space: *‘Due to the concrete design, facilities and maintenance of the park, a standard and role- conforming behaviour is to be at least suggested. The more intensively designed, maintained, and more elaborate, for example the park, the more civilised the behaviour of users’* (Tessin 2011: 46). Furthermore, the principle of the ‘Broken Windows Theory’ dictates that a damaged or untidy area will lead to further occurrences of wilful damage in the future. Kelling and Wilson (1982), the founders of this theory, found through empirical studies that vandalism and other kinds of damage to property increase and accelerate in areas where signs of vandalism are already present. According to Tessin, *‘... Vandalism is best reduced by immediate repair and a generally high maintenance standard and, of course, by a vandal-resistant, robust equipment and design’* (2011: 16).



Figure 1: Forms of misuse. a) Wilful destruction: year 01/ year 07. b) Wilful destruction, littering: year 08. c) Wilful destruction to vegetation. d) Guerrilla gardening.

Various forms of misuse can be observed throughout Berlin ranging from physical damage to street furniture, to soiling by chewing gum, sticker tags and sticker art, graffiti, littering, desire paths, theft and skater damage. From a constructional viewpoint, misuse may lead to surface erosion, damage and destruction and therefore needs to be addressed in the design and detailing phase. Other factors, such as graffiti or stickers, form an additional surface protection layer and are not detrimental to the construction itself. All forms of misuse may however contribute to the 'Broken Windows Theory' and therefore may lead to a downward spiral of decline. Designers can address surface disorders (e.g. graffiti, stickers) by implementing appropriate materials with easily maintainable protective surfaces and coatings (Ross 2016: 399). Many research projects have focused on the prevention of misuse and vandalism in public space, strategies include:

- **Opportunity reduction measures:** e.g. improve design, aesthetics and maintenance; design in order to reduce opportunity (e.g. vandal-proof materials, anti-graffiti coatings, planting of dense vegetation in front of vulnerable surfaces, lighting and fences)
- **Enforcement measures:** e.g. prohibitive signs, visible security patrols, surveillance cameras

- **Collaborative measures:** stakeholder engagement and participation. According to Oscar Newman's 'defensible space' hypothesis (1972) offenders are discouraged from action if they perceive the space as being controlled by its users and residents.
- **Education measures:** e.g. education programmes in schools, community initiatives, mass media campaigns directed at high-risk audiences. (e.g. Barker & Bridgeman 1994: 6-13; Havârneanu 2017: 1081-1085)

Research indicates that the most effective approaches employ a combination of strategies (Barker & Bridgeman 1994: 37). The main focus for landscape Architects therefore lies in improving design, aesthetics and maintenance together with stakeholder engagement and participation in these processes.

'There are two types of objects in public space that are popular targets for destruction: objects which seem to be dispensable or whose purpose is not understood, and authoritarian objects that only allow for one prescribed kind of use'
(Brandes et al. 2009: 168)

Similar to Brandes et al (2009: 168), our research shows that authoritarian objects such as prohibition signs are especially subject to wilful destruction [Fig. 1a]. Stickers (sticker tags and art) have become an extremely popular means of spreading information in urban open spaces and are particularly difficult to remove [Fig. 4d] (Ross 2016: 398). Guerrilla gardening is the unauthorized act of gardening in public or private spaces often as a response to urban problems or as environmental activism [Fig. 1d] (Adams & Hardmann 2014: 1103-1116).



Figure 2: Misuse. a) Littering: year 05. b) Littering within a structure: year 07. c) Faeces and urine: year 5. d) Chewing gum trodden into surface: year 15.

The responses to guerrilla gardening are very mixed; most of these works take place without public consultation which can result in adverse impacts on the surrounding community (Adams et al. 2015: 1-16). Many forms of misuse, such as graffiti or billposting are controversial; on the one hand this can be seen as a form of positive cultural expression, social exchange, protest, or users simply identifying with the site. On the other hand, some may associate these works with deterioration or find the works visually offensive.

Littering, the behaviour of improper litter disposal, poses environmental, social and aesthetic problems. It occurs not only due to the behavioural characteristics of user's but may also result from an insufficient number of waste containers, insufficient emptying, poorly located containers or an existing presence of litter. [Fig. 2a, b] (Schulz et al 2011: 47-48). Receptacles without covers are particularly susceptible to storms, wind, birds, dogs, vermin and other animals. Large-scale research shows that the farther away the receptacles are, the more likely you are to litter (Ibid 2011: 35-59). Cigarette butt littering can be significantly reduced by providing additional ashtrays, especially in close proximity to building entrances where smokers gather due to indoor smoking legislation (Liu and Sibley 2004: 373-384).

In addition to the active form of

wilful destruction, 'passive' vandalism in the form of 'appropriation of use' or 'unintentional destruction' can occur. Appropriation is a form of misuse in which an object is used for a purpose, or in a manner other than intended which may result in conflicts between users, unintentional soiling, damage or destruction [Fig. 3, 4]. Psychologists Costall and Dreier (2006: 10) argue for '... the need to think of design not as a separate stage prior to the use of things, but as a continuous process within the context of their actual use' which can change and adapt through time. They explain that certain types of usage are foreseen by the designer and catered for in the design and detailing through employing specific affordances (characteristics that imply how an object should be used) (Ibid.: 46). Users are under normative pressure to use these objects for these 'proper' functions according to the designer's intention (Ibid.: 17, 32). The user, however, may recognise the objects 'accidental functions' and utilise built elements creatively in a non-standard or 'improper' way (Ibid.: 32). This creative **appropriation** of objects can therefore be viewed as part of the design development process which extends the functional diversity of the object (Ibid.: 24). For instance, a park bench may be viewed by a child as a playground element, by a homeless person as a bed, or by a teenager as a fitness device (Tessin 2011: 34-37). Each of these uses are mutually exclusive and may cause physical damage, soiling. These appropriated uses may also discourage others from using the bench for its intended purpose as a seat.

Appropriation of use and unintentional damage can also occur as a result of **failures or misjudgements in the design, detailing and realisation**. A few examples are listed below:

- Objects with very acute angles



Figure 3: Appropriation of use. a) Use as a bench or bed: year 5. b) Tree or bike rack: year 06. c) Tree or slackline support: year 4. d) Wall or skater ramp: year 8.



Figure 5: Damage due to design and detailing. a) Damage to acute edging: year 1/year8. b) Damage to bike stand: year 06. c) Visible signs of use: desire paths: year 7. d) Visible signs of use: year 9



Figure 4: Appropriation of use. a) Graffiti/public art: year 4. b) Public art: year 05. c) `Guerrilla advertising`: year 5 d) Sticker tags, sticker art: year 8.

results in an increased rate of surface erosion, damage and deterioration [Fig. 6a, b. Fig. 7]. Too intensive loading through use can cause structural or mechanical damage, deformation, ground movement or the displacement of a structure. The overpopulation of public space can also result in conflicts between individual users or groups for differing activities. The `eventisation` and `festivalisation` of public space for outdoor special events and festivals is increasingly becoming part of urban culture, generating intense periods of wear [Fig. 7] (Jung 2013: 50). This can provoke unintentional damage by multiple users who, for example, are then forced to walk on the grass adjacent to hard surfaces, thus causing compaction, physical erosion and damage [Fig. 6a]. These events and the resulting damage disrupt the patterns of usage by regular users which often

often become chipped or broken through use [Fig. 5a].

- Surface coatings for bike stands that are not impact resistant often become chipped through use (e.g. powder coatings) [Fig. 5b].
- `Desire paths` through grass areas (created by surface erosion) are often found due to a lack of paths in the preferred direct route (`short cut`). These paths follow fluid flowing routes that generally branch off at roughly 45° angles with rounded corners [Fig. 5c, d] (Loidl-Reisch 2013: 16).

Both **overuse** or **underuse** are problematic, each can lead to accelerated deterioration. **Overuse** leads to an increased frequency of loading and a greater intensity of wear, littering and soiling, which often



Figure 6: Overuse and Underuse. a) Visible signs of overuse: year 7. b) Erosion due to overuse: year 15. c) Increased succession due to underuse: year 01/year 07. d) Underuse: year 6.



Figure 7: Overuse in Berlin. a) Erosion due to a street food market in Preussen Park. b) Music event in Tiergarten Park.

leads to further conflicts. Damage through overuse is seldom ‘repairable’ through maintenance and often requires the increased stabilisation of surfaces and facilities. Therefore protective or preventative design and construction measures need to be taken in advance of events in order to limit damage. New projects can be implemented according to the requirements for specific events that are appropriate for the site (Jung 2013: 50).

Underuse accompanied by insufficient maintenance generally leads to an increased rate of soiling, spontaneous growth and material deterioration. For example, a reduced rate of trampling of paved surfaces through use results in the reduced suppression of surface growth which can lead to an increased rate of spontaneous vegetation growth (Lundholm 2014: 96). This needs to be counterbalanced by increased maintenance in order to avoid accelerated deterioration [Fig. 6c, d]. The underuse of a space also results in reduced social control which can increase the subjective feeling of being unsafe, which in turn can lead to a further decline in use (Tessin 2009: 18). Therefore, in an optimal situation, maintenance and repair operations need to be adjusted over time to the type and level of usage on site.

Usage is also an ‘indirect’ form of maintenance and should therefore be considered as a key aspect in optimising the long term development of the project. For example humans suppress spontaneous growth through trampling, oil wooden handrails through contact with their hands (Tanizaki 1998: 11) and remove dirt from benches

by sitting. This becomes especially apparent through the visible patterns of use that become evident through insufficient maintenance over time [Fig. 8].

DISCUSSION

‘It is safe to predict that during the life of the park, the program will undergo constant change and adjustment. The more the park works, the more it will be in a perpetual state of revision. Its ‘design’ should therefore be the proposal of a method that combines architectural specificity with programmatic indeterminacy’ (Koolhaas et al. 1995: 923)

Objects and spatial arrangements are not neutral. They demonstrate restrictions by allowing for certain uses by certain users and excluding others (Frers 2009: 177-191). Therefore a multifunctional design approach is preferable, allowing varying users multiple ways to use and adapt the object. Ideally, all possible forms of use need to be thought through and taken into consideration by the designer in the design and detailing stages. However, the **type and intensity of use** is difficult, if not impossible, to foresee in advance, especially when the whole project lifecycle is considered. The designer needs to gather a breadth of knowledge about the existing site with its specific context in order to make a judgement,



Figure 8: Use as an indirect form of maintenance. a) Year 2/year 9. b) Year 03. c) Year 6. d) Year 5.

including:

- Accessibility
 - site access and circulation
 - distance from user groups
 - catchment areas
- Urban quality (density etc.),
 - Surrounding land use
 - Living conditions
 - Spatial distribution of facilities within the region (e.g. public space)
- Climatic data
- Demographics (crime statistics etc.)
- Indicators such as:
 - existing signs of care or degradation provide an expectation as to the extent of use induced deterioration
 - the presence of women in public space - because women react more sensitively to 'unsafe environments' (Tessin 2009: 15)
- Possible future forms of use and events.
 - Events: Parameters need to be set for future events on the site e.g. type of events, maximum capacity, risk assessment, vehicular access, maximum weight of vehicles, protection measures and the provision of necessary equipment (Jung 2013: 50).
- It is also essential to know the level of maintenance and the skills of the available maintenance staff in the planning phase in order to achieve optimal maintainability.

If the type or intensity of usage is different to the prediction of the design team, the built landscape works may need to be adapted or optimised during occupancy. It is therefore necessary that Landscape architects monitor their built works at regular intervals after completion and report on project development. The current research shows that many problems related to use become visible within the

initial 2 years after completion, some however become evident over longer periods. In order to improve operation, optimise maintenance and to measure and optimise performance we would suggest a 4 step post completion monitoring system over a period of 5 years. We recommend that this should be implemented in year 1, 2, 3 and 5 after completion and cover the following topics:

- Technical analysis:
 - the identification existing and developing problems related to usage, design, construction etc.
 - the identification of performance issues
 - assessment of the consequential damage/effects if not improved or repaired
- Remedial works:
 - adjustment and or optimisation of maintenance regimes
 - planning of remedial works
- Optimisation suggestions
 - suggestions for design and/or constructional changes

The results of this monitoring also need to be published in order to provide feedback to the profession and thus optimise future projects.

*'As a spatial and temporal terrain, a landscape is continuously changing in an unpredictable way, steered by the relations of the site with its specific context - an evolving system instead of a static image.' ...
'Evolutionary processes are not exactly predictable. Thus, evolutionary design has to deal with uncertainty'
(Prominski 2005: 25, 33)*

As a response to the conflicts associated with use an evolutionary design, maintenance and strategic development approach seems appropriate, which is able to respond to

user demands through time.

The above mentioned student field research showed that, generally speaking (the results are not scientifically valid however show a distinctive trend), different user groups such as children, adolescents and elderly people, unemployed and employed people, cyclists, skaters, sprayers and homeless people, have very differing opinions in what is perceived as misuse and vandalism. User participation in site management from the initial conception through to the post occupancy phase allows for the development of a specific development strategy focussing on local views regarding the level of cleanliness (level of maintenance), tolerance towards 'vandalism' and deterioration, and for making design changes. This can lead to increased acceptance of the users and a focusing of resources.

A new system of long term development called 'process-oriented project completion' is being tested for the 'Park am Gleisdreieck' in Berlin. This is based on a planned withdrawal of part of the project budget in order to be able to react to changes and optimise operational performance after the completion of construction works. A 'User Advisory Board', consisting of elected local representatives, neighbours and members of the administration, represents the interests of the community and enables continual public participation throughout the project lifecycle, from the design phase to the post completion phase. The close contact between the management and the user advisory board ensures that the park's amenities develop close to the needs of the population, and that conflicts of use are recognised and minimised. An additional strength of this concept lies in the formation of a social network, thus increasing local identification and social control within the park. Insights from the initial usage of the park have led to the implementation of many concrete

optimisation measures including the construction of further facilities and additional maintenance measures needed to correct the damage caused by intensive use. (Park am Gleisdreieck 2017; Grün Berlin GmbH 2013)

The initial 'process-oriented project completion' period has now been extended to incorporate further unforeseen adaptations and extensions to the park due to park internal and external development factors (Endter 2018). In discussion with the park manager David Endter, an optimal processual completion period for all projects is not possible to define due to the specific individuality of projects. However minimum processual completion duration of 3 - 5 years is suggested (Ibid.).

CONCLUSION

Many factors influence the type, frequency and intensity of use of public space. Some forms of misuse lead to damage and destruction whilst others such as graffiti or stickers, form an additional surface protection layer and therefore can enhance durability. Non-destructive misuse may be viewed on certain sites as a positive indication of the appropriation of public space, highlighting the participation of citizens in shaping their environment. All forms of 'misuse' however contribute to the 'Broken Windows Theory' and therefore can result in further misuse and decline. The consequence of both **overuse** and **underuse** is accelerated deterioration which can be counteracted through increased maintenance or changes to the design, construction or maintenance regime.

The problems associated with use show a clear need for landscape architects to accurately foresee the intensity and frequency of use during project planning. However many factors are not accurately predictable, especially when considering the

complete project lifecycle. Therefore an adjustment mechanism is necessary during the post-completion phase in order to adapt to the actual situation of use through time. This research calls for the post completion monitoring of built works by the landscape architect in order for conflicts arising from the type and intensity of use or misuse to be addressed. The 'process-oriented project completion' model enables projects to adapt to changes by retaining part of the project budget for post-completion adjustment purposes. If accompanied by continual public participation, the needs of actual user groups can be incorporated into the further project development and in the optimisation of maintenance strategies. Therefore, regular monitoring of post-completion development together with the implementation of necessary maintenance and/or design improvements can assist in improving performance and extending project service life.

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