How and what people throw in public

A photo study of garbage and littering behaviour in Mumbai

Sylvan Lobo



Guide: Prof. Purba Joshi • **Design Research Seminar** • M.Des (Interaction Design) • 2013-15 • Industrial Design Centre • IIT Bombay

Declaration

I hereby declare that this report has been written in my own words. I have appropriately cited and referenced the original sources of any existing ideas and work I have built upon or used to support my ideas.

I declare that I have adhered to all principles of academic honesty and integrity and have not falsified, fabricated or misrepresented data, idea, fact or source in my submission.

I understand that any violation of the above will be cause for disciplinary action by the institute and can evoke penal action from the sources which have not been properly cited or from whom proper permission has not been taken where needed.

Sylvan Lobo

(136330005)

Industrial Design Centre,

Indian Institute of Technology Bombay

Date:

Approval Sheet

The design research seminar project “How and what people throw in public - A photo study of garbage and littering behaviour in Mumbai” by Sylvan Lobo is approved in partial fulfilment of requirements for the degree of Masters of Design in Interaction Design.

Guide:

Internal Examiner:

Industrial Design Centre

IIT Bombay

Powai, Mumbai

Table of Contents

Introduction **9**

Background study **11**

- Litter and Behaviour-influencing sudies/approaches **11**
  - Persuasive messages **12**
  - Broken Windows Theory **13**
  - Tragedy of the Commons **13**
  - Self and the city—Incidental space, Self-displacement and Belongingness **13**

The photo study **17**

- Methods used (and key questions) **18**
- Findings (Set 1) Open-ended themes **21**
- Findings (Set 2) **51**

Conclusions **57**

References **59**

Appendix I - People in action **61**

Appendix II - A collection of aesthetic/interesting pictures **107**

Appendix III - Pictures in Panaji, Goa **133**

Introduction

Mumbai is always in a state of hustle and bustle, with people involved in constant flux of activity, business, commute or simply sightseeing. Mumbai is renowned for its vibe, character, liveliness and solidarity among its people. Yet it seems a shame to look around and notice all the filth and litter that is inescapable from view. Of late, along with the Swachh Bharat, a lot of campaigns and movements —such as the Ugly Indian, Hindustan Times Clean My Mumbai, Kachra Project—have risen up towards cleaning up; towards a cleaner city and India. It has been high time for a long time now. Yet cleaning up is not enough. A sense of responsibility and cleanliness has to be sustained. I feel, the approaches that are being taken by the government and organizations need to studied for their effectiveness and sustainability (in the sense of not fizzling out). One of the biggest success stories, Singapore, is still has criticisms/questions as to whether it is a clean city or a cleaned up city, whether the attitude of people have changed at all or is still dormant. Swachh Bharat itself has its criticisms [1], although it is a commendable effort.

To look closely at the condition in Mumbai, I undertook a photographic study of various spots around Mumbai – around Mumbai CST, Girgaum Chowpatty (the beach and around), around Andheri station, Bandra, Powai and also in a mall in Ghatkopar. Considering photography as a means to communicate, document and collect data, I observed public spaces like the stations and around monument and observed how people littered, the kind of litter itself, the infrastructure, etc. I then attempted to categorise, study and analyse the photographs

with some questions in mind related to understanding littering behaviour—the who, why, how, what, when...in the hope of coming upon ideas and insights to deal with the issue of littering. I also explored it as photography as a method of study.

In this report, I first present background study of theories and thoughts about what influences littering behaviour. It looks into architectural notions, community aspects and a study of existing approaches to manage litter that have been tried. The next section discusses the methods utilized in this study and the key questions driving the study. Then I present the analysis of the photographs followed by thoughts, ideas and insights. Selected photographs are presented in the appendix.

Background study

What makes people litterbugs? What are the factors that influence them towards such behaviour? This sections looks into studies and theories about littering and related aspects.

Litter and Behaviour-influencing studies/approaches

Wever [2] uses this definition of litter: *"Those forms of trash that either originate by people throwing away or leaving behind artifacts they consider functionless in places not officially intended or designated for such a purpose, or that end up in such places by indirect action or inaction of people"* (as translated by Wever from Terpstra et al, 1979).

Wever recognizes litter as an environmental and social problem, and is closely related to packaging of products. He explains that there are three aspects to the act littering: the environment, the littered item and the litterer. There are different approaches to influence littering behaviour that addresses the environment and the litterer, but little attention has been given to the littered object itself. The focus has generally been on manipulating behaviour through general campaigns, strategic placement of prompts/messages, litter bins and cleaning up litter. Wever highlights that it is also important to design the packaging to influence its chances of being littered. He has formulated 15 guidelines to for package design [2].

Wever discusses strategies that influence behaviour to prevent litter:

- Existing litter at a location influences littering (keep the place clean to avoid littering)

- Design and placement of trash bins (place as less as possible).
- Communication (most widely used strategy) and involves phrasing of messages and signage.
- General public campaigns (city- or nation-wide, but there are doubts on their effectiveness).
- Educational programs (at schools).
- Consequence strategies (rewards and punishments, may not have long lasting effects).
- Laws (which are not actively enforced and considered too authoritarian).
- Norm activating design (to influence behaviour – explicitly through prompts or implicitly through design characteristics).

Persuasive messages

Caldiani [3,4] discusses various experiments on littering and approaches for message construction and other studies towards influencing peoples littering behaviour.

When it comes to public resources, there is a lot of damage don't to it by public (littering in the context of this project). There are direct and indirect strategies to prevent damages including:

- Information and education (most common)
- Resource hardening (improving the infrastructure and adding mechanisms like pavements, railings, etc.).
- Visitor restrictions.

There are two ways in which messages on public signage/ brochures can be presented to influence people's actions- prescriptive or proscriptive. Prescriptive messages encourage positive conduct (e.g. "Please keep our environment litter free"), and proscriptive discourage negative conduct ("Please don't litter our environment"). Prescriptive messages are encouraging and viewed as more effective. Correctly worded messages can lead to positive behaviour but poorly constructed signs can be counterproductive. Threatened punishments can impact visitor enjoyment, as well as lead to negative reactions.

Reno and Caldiani also discuss social norms, i.e. what is typically done and accepted in a given situation. The motivation towards specific behaviour is based on social approval or disapproval. The authors have conducted experiments where they assess whether people litter in various situations (where the norms of the place are different). There are two types of norms: descriptive and injunctive. Descriptive is about what most people do in a given situation (and the motivation for action is that the people are informed about what is done typically). Injunctive norm specifies what is typically approved by society/culture in a situation (and the motivation for action is a promise of social sanction for normative or counter-normative behaviour). The authors conclude that social norms are powerful in influencing behaviour, and injunctive norms are more effective (even in situations where the norm seems to be negative). E.g. if one observes someone pick up litter in a place where there is already quite a bit of litter, one may not feel encouraged to litter, despite the litter that is around.

Broken Windows Theory

The Broken Window theory [5] is a theory from criminology which describes vandalism and antisocial behaviour in public space. Here, social psychologists agreed that if a window in a building was broken and left unrepaired, then it would invite people to break other windows too. Such untended property is a signal that no one cares and people would vandalize the property just for fun or plunder. This can lead to proliferation of graffiti, crime, etc. and can also go so far as to deteriorate the community too and a breakdown of community controls. This process is known as "urban decay".

In the context of this study, the Broken Windows theory is related to the social norms discussed by Caldiani (in the previous paragraphs) and applies to the notion that litter begets more litter. Existing litter and (unkempt) non-cleanliness in a place is a signal that it is accepted to litter in the given place, which can quickly escalate to an unsightly garbage dump. It teaches that there should be routine monitoring of the public space so that disorder does not grow.

Tragedy of the Commons

The tragedy of the commons refers to a social dilemma that arises when individuals use a common shared resources with self-interest and benefit with profit, but at a larger scale they deplete the resource which is not in their long-term interest. This notion popularised by Garett Hardin [Garett Hardin. The Tragedy of the Commons] has had its share of criticisms (and is also considered a myth [6]) that the demise of the commons (the shared resource) could also have other factors involved rather than simply the behaviour of the commoners (owners of the shared resource). Still, it seems relevant to an extent in the context of modern commons and the littering of public space (which can be considered as a commons resource that is being harmed with self-interest (for immediate convenience), but affecting the long-term interests of the commoners).What is relevant is that people's short term selfish interests are detrimental to the long-term group interest. Hardin said that there is no (technical) solution to this dilemma (which demands little or no change in human values or ideas of morality). It has been argued that commoners have come up with solution. The solution seems to be to have some form of authority regulating control (which is actually some loss of freedom). He also says that it is not sufficient to appeal to the conscience, as it favours the selfish individuals (or freeloaders). He says that the solution lies in recognizing the commons as a commons and managing its utilization, thus nurturing and preserving freedom. On a related note is Game theory that deals with such conflict resolutions. Hardin discusses what is called the CC-PP Game [7]—where the objective is to Commonise Costs and Privatize Profits.

In my current understanding, a solution lies in a fair balance of regulatory control and freedom, and a (socio-politic-economic) CC-PP game.

Self and the city—Incidental space, Self-displacement and Belong-ingness

Incidental spaces (an architectural term) refer to built environments that are formed by chance and do not have designed features. They are moulded by culture, habits and

chance, and usually go unnoticed; but influence and have an effect on the how we feel about where we are. It provides a certain character to the place. These places are usually transient. It could be taken down or left to deteriorate. Often such places may be spots that are not planned for any specific use, which leads to transient activities like market places, and sometimes misused, even smelling of urine. They are the unplanned corners in buildings, fences, cracked vases, mailboxes, cars, pavements, abandoned cars, etc. all which give the sense and character to the city. One simply needs to look beyond all the clutter and activity [8].

Lakshmi Rajendran [9] speaks about 'self displacement'. Human cultures and settlements have always had a subconscious need to reflect their selves the environment they lived in. People need that 'spatial identity or 'orientation' to 'be aware' in a place. The 'who' and 'where' are intimately linked. (Quoted phrases are from Rajendran's paper [9], and their references are mentioned the paper). Contemporary architecture is accused to only focus and cater to the visual sense. It seems to suppress the other senses. There is a risk that this might lead to a sense of detachment of people from the environment. Along with it is a rise in the individualist and materialist lifestyle in modern culture. This seems to be leading to an increasing divide between the self and the city. Rajendran feels that there is a need to study the self and the spaces in the city, especially the incidental spaces, to understand what the deeper factors are that influence our experiences in the built environment.

In his book, Christopher Alexander [10] speaks about a related idea—belongingness, where he investigates what makes people feel a sense of joy, the right to be there, a belongingness in public spaces. Individual private space and public spaces should be directly connected in a way that enables social participation. He says that the trends in architecture and design usually focuses on only the visual aspects, making the spaces beautiful, clean, spotless, seemingly well designed, but lose on this aspect of belongingness. He goes on to explain what processes of architecture and development go on to make such a space. He speaks about living processes, which is a slow process, where people are involved in the planning slowly over time, contributing their individuality. It is an unfolding process. The designed buildings and spaces may not be perfect/well designed to look at, but they have individuality, a charm, a character... These processes and sense of belongingness were common in traditional villages but it is missing in modern society. This makes us lose our connection with the society. In a sense we feel the spaces do not really belong to us, deeply. The public land needs to be a living room for everyone. The neighbourhood (doors, windows, buildings, fences, gardens, etc.) should reflect individuals, families, passions, making everyone feel at home. It need not be perfect. The private and public space should interlock. This all leads to solidarity. The place should feel natural, and belong to people. It should not be like a faceless agency. People should be in control of their own environment.

There should be a certain looseness. A comfort. Freedom, in spirit and emotion. This is where harsh and clean although seeming like an efficient system, leads to the problem of removing the

sense of belongingness.

It is difficult to construct such a world, and needs what Alexander calls 'living processes'—a loose, unfolding process, where individuals contribute and are in control of the development at small scales.

* * *

I felt these were relevant sources to read, as I was feared about how the transformation (along with the methods chosen), in the long run, might affect the spirit and culture of existing (and been) Mumbai. While we clean up Mumbai, we should not take away its lively spirit and freedom (that does exist currently) along with it. It is in a way like studio recorded music versus live music. The beauty and connect lies in the imperfections. In my opinion, the imperfections should exist. A clinical antiseptic polished cleanliness is not natural, and we should not go that way.



The photo study

I selected some public places in Mumbai for observations. The public spaces included areas near public monuments, markets, the beach, near residential areas, near railway stations and also inside a mall. The areas included around Mumbai CST railway station towards Dhobi Talao (Metro Cinema), Girgaum Chowpatty beach and nearby parts of the neighbourhood, around the Gateway of India towards Arthur Bunder, Bandra (including the market, bandstand promenade, Carter road promenade, and around some residential areas near St. Andrews College, Talao Pali and the footbridge from the station), around Andheri railway station (the east and west sides and bridge), Powai (market area to Hiranandini area), Dharavi slum area, along a Central railway stretch (LTT to Kalwa), and also in a mall at Ghatkopar. I also spent some time in Goa and documented the condition in Panaji city (but have not included an analysis in this report. I have however included pictures in the appendix section).

I used a compact camera (28mm to 100mm) and a DSLR with a fixed 40mm lens (crop sensor) (Sony RX100 and Canon 1000D with 40mm pancake lens).

Methods used

Observation and data collection:

This was primarily a **photography based** observation study, collecting qualitative data and can be categorized as covert-non-participant observation approach [11]. The observed were not directly aware about the intent and that they were being observed. There was minimal interaction with people. As far as possible I maintained confidentiality in (unacceptable) situations by not including the face. Observations were unstructured, without predetermined criteria (or they developed when I saw patterns on the fly). Observations were made in an open ended manner (with a few questions in mind such as what is littered, where, what influences the littering, and what are the patterns). I let my observations guide me towards the next steps. I generally parked myself at places that I intuitively found interesting or anticipated activity (as generally practiced in **street-photography**). At times I observed particular people (or groups) from a distance, or shadowed people (usually people with eatables, packaging, bottles, cigarettes, or *paan*.

I also tried to draw from **Visual ethnography** [12,13]. Photos are a useful tool in social research (and in presenting research) and can be used both as data and data generators. As photos can both be art or precise records, I acknowledge that there can be a bias in terms of the accuracy of the subject, as photographs depend a lot on the vision of the photographer. Using photos as objective evidence can be challenge, due to processes involved in both, image making and the interpretation – which can be influenced by social context, conventions and group norms. A useful way to generate data from the photographs is **photo-elicitation interviews** where viewers are interviewed to understand how they understand the photographs [13]. I have not tried this extensively with the entire data set, but have tried the method with a small set of photos for a selected location.

Other methods that could have been useful to explore are (but are not done in this study): Word-concept association, A day in a life, time lapse video, behavioural archaeology and behavioural mapping [14][15].

Analysis:
The pictures were then analysed in two phases:

1. An open ended **card-sort**-like approach where 648 pictures were printed on small cards (around 1x2 inches), sifted through and **categorised** according to emerging **themes**, similarities, with notes taken down for interesting aspects and patterns.
2. A subset of cards were analysed location wise with the following **driving questions**:

- Why (what for/what is causing them to litter) are the people littering?
- What are they doing (that is leading them to litter)?
- How (manner in which) are the people littering?
- Where (place) do the people litter?
- When (time) do the people litter?
- Who (about the people) are the people who litter?

I also tried using **Qualitative Data Analysis (QDA) software Atlas.ti** for coding and analysing a small set of photographs (I was unable get a full version of the software which would have enabled to analyse a larger set of data).

Ideation:
I listed down ideas and insights generated duing the analysis of the photos. Insights and key observations are highlighted in yellow in the following pages, and ideas are presented in light red.

Certain street-side objects (street furniture) scream "I am a dustbin"/"Spit here" even if they are not for that purpose

Openings in street furniture attract litter

- Openings for electrical work in lampposts; Vases; Traffic cordons,

Street furniture shaped like bins attract litter

- Abandoned construction material.
- Some street furniture look like bins and at the same time look decent, so that it is ambiguous. eg. Is this a bin, a post box or the remains of a lamppost? Whatever, it has an opening for throwing waste, so...

Red transformers seem to signal that the spot can be used for dumping garbage

- Around or under the space beneath.

Poles or walls are be spat on with paan.















Litter along footpaths

It seems like people inherently want to keep the sidewalk (somewhat) clean, so they throw stuff on the road at the side, where the drain usually is. Litter accumulates there at the side of the road. Sweepers also sweep and pile up litter there. Ill maintained spots in the sidewalks also attract litter and spitting.

- Ill maintained sidewalks where mud is visible are spat on and littered.
- Litter accumulates at the side of the sidewalk along walls
- People spit along the walls and corners.

Litter swept and piled for pickup on road sides

- By shopkeepers and dwellers at Dharavi slum area (at staircases)
- Shop keepers sweep up their vicinity and pile the litter in a place
- Some shop keepers sweep and store waste in plastic bags.

- Litter is thrown or accumulates around the sides of the footpath. Especially if there is mud visible, or plants or some sort of enclosure.
- or into the sea/rocks,
- or into plants along the sides,
- from shops into the street,
- while having tea,

People seem to attempt the keep the immediate path clean but by throwing the litter across the path either on the sides onto the road/drain or across the fences.







Drains, holes and and loose bricks in the footpath attract litter and spitting.

Holes in the footpath

- Ill maintained footpaths-with small holes showing mud or holes leading into the drains
- Drain holes/pipe openings (even in well maintained locations)

Ill maintained footpaths

- Bricks and construction material lying around, attracting filth. Gutters/drains exposed and badly made .
- Bricks from the footpath have been removed exposing the mud, attracting dirt.
- Hospital stuff – gloves, tablet strips, etc.



Across Railings and fences

There is a tendency to throw things across fences or boundaries rather than dirtying the immediate path.

- Tendency to throw dirt across the fence. The path is usually clean, the other side of the fence isn't.
- Also into the drainage paths.
- Or into the water.
- Banana peels, litter, paan spit, fruiti packs, tea cups thrown across railings on skywalks, overbridges, foot paths...ie. Seemingly trying to keep the path clean so throwing over. Or left on/at the railing.
- Litter accumulates within the crevice between the railings and walls (usually of metal) .
- **Idea: Invisible dustbins**
  (Like Naoto Fukasawa's umbrella stand [15])







Enclosures for plants/trees along the road/footpath

- Litter thrown in enclosures/demarcations for trees along the footpath.
- Around trees even if there is no enclosure.
- Vases and construction stuff (pipes) along the path.
- Areas marked for plants on the road side.
- Sitting raised spots (squares/circles) around plants in larger footpaths.

Enclosures attract litter and act as bins.

- **Idea: would 2 dimensional closed patterns (circles, squares) attract dirt? Can there be 2 dimensional bins?**



Stuff thrown on the road/path

- Ghutka, tambacoo chunna, Candy wrappers, Medicine bottles, Tablet strips (near hospital), Biscuit wrappers (everywhere..just too many), Tea cups/cutting chai, Bottle caps/seals, Ice cream cup caps/sticks, Juice packets, Chips /chocolate packets, Plastic bags, Small plastic wrappers, Plastic cups, Cigarette packs, Envelope/ packaging, Crumpled paper/newspaper and paper strips, Train ticket (coupon booklet), Bottles, Bag of tea/food, varied stuff (photographs, watch dial, slippers, ceramic tea cup etc. Sometimes people pick them up for use, Tissue near food stall, Plastic spoon, Sauce sachet, Coconut fronds in residential area at Bandra, Orange peels...







Drain covers

- Metal bars attract spitting paan, litter, ice cream stick, small bits of paper/packaging etc.
- On side of roads along footpaths.
- Throwing liquid/water.
- Covered by a gunny sack in the Bandra market lanes.
- The ones with more metal and narrower slits rather than bars bit cleaner (but still dirty).

Drains in slum areas (Dharavi)

- Thre is a drainage gutter along every path in the dwellings, the paths themselves are clean, but some litter accumulates in the drains.
- The drainage is cleaned up regularly (bottom right picture).
- **Idea: bins under the drain covers to allow cleaning the drain more easily**



Paan

- Paan stalls have a bin around for spitting, but it's not designed right nor utilized well. People spit on it, over it, around it and rarely inside it and even then partially.
- They prefer to artfully spit around wherever they are. Spitting is almost a style statement.
- Sitting on the parked vehicles or standing where they are, out of the side walk into the road or on the sidewalk itself.
- **Idea: Can spitting be made fun or game-like, so that people are influenced to spit into a spitoon rather than spitting on walls and around the street?**

Cigarette butts

- Where they sit at the tea stall.
- No means to dispose other than drop on the floor and stamp on it to extinguish.

It is not easy to dispose cigarettes safely into a bin (can cause fire). The most natural way is to drop it on the floor and throw it on the floor and crush with the feet. I observed people crush the stub on the metal sides of the newly installed wet and dry bins before putting the butt into the bin. But mostly cigarette butts are left on the floor.





Abandoned property

- Issues in the court (in residential areas) becoming spots to dump garbage.

Around parked vehicles

- Litter swept and kept between vehicles.
- Bottles, plastic wrappers, chips packets, orange peels.
- Cars parked for long duration.

Abandoned property become garbage dumping spots (Broken Windows theory)

Corners

- Garbage dumped in corners that are not frequently accessed

Setback spaces

- In the generally inaccessible setback spaces/gaps between buildings/ fences and buildings.
- Space between fences/foot paths and walls of corrugated metal.
- Spaces in bad fences.

People look for a convenient corner to keep the bottles/teacups which is out of the way.

























Paper tea cups everywhere

- Usually left along sitting places
- Paper cups thrown around in public spots.

Dirty looking spots

- Corners, fences, walls, ill maintained paths.

Garbage dumps

- Food for street cats and dogs.
- Burnt.

Paper tea cups and biscuit packets seemed commonly littered everywhere

Benches/promenades

- Spilled drink on bench gets sticky; no way to clean.
- Food and drinks are forbidden on the Bandra seaside promenades, but people do have soft drinks and on the benches in the promenade (but some people seem to throw the remains in the dustbins).
- Many people also leave behind the bottles, etc. on the benches.
- Tea-cups are usually left behind.

People don't seem to bother or notice all the dirt and are one with it.

Sitting places (raised spots around gardens/fences etc)

- In the shade
- Leave tea cups, bottles etc.
- Leave stuff behind. Keep in the plants. Across the wall.

Stuff like tea cups and eatables/packaging is usually left at spots where people sit, or are thrown into the plants behind the sitting spots, or simply forgotten.
















Large green bins

- A lot of big bins placed around the city (these can be attached to the pickup van for unloading).
- People sort out garbage from these bins into sacks.
- The bins are picked up in the morning and various times in the day
- Placed where people otherwise dump.
- People bring their smaller bins and put it in them (shop keepers and nearby residents)

The large lids of the bins make it uncomfortable for people to put garbage into the bins because of the lid. Also people may find it dirty to use their hands to open the lid. This can lead to garbage accumulating around the bin instead.

- Localities own them. People write their community/society/sponsorer name on it.
- Housing Societies may also have their own bins placed near the entrance.
- Sometimes big garbage bags are collected and kept near walls
- Placed prominently in public places (chowpatty eating stalls).
- Sometimes ignored because of placement (bottom left picture).

There are a lot of bins lined up on the Chowpatty beach which mars the beauty of the beach horizon. They seem just a little bit far from where the crowd is (so that they are not washed away with the tide?). Only motivated people walk out of their way to dispose waste. Many litter on the beach.

- **Idea: could there be floating/moored bins at the beach nearer to the people?**

- Some bins are confusing and don't really look like bins (top left picture).

The newly installed pairs of wet waste and dry waste bins around do not appear effective for seggregating waste at the initial stage. Both bins are often full to the brim with mixed waste. There is probably more of dry waste in public places.

- Some bins are located in places that are out of way from people
- Flaps for bins are a little more comfortable than full lids.
- Partially open covers (people need to walk around it to find the opening, difficult to spit in, so people spit on and around them).
- Some bins that can be rotated to empty them.
- Short box like bins in public spaces can be moved around easily and are easy to spit in and throw stuff in from a distance
- Some bins have a small curved cover over the bin (again hampers spitting) (at Galleria, Powai).
- Stuff thrown around the bins,





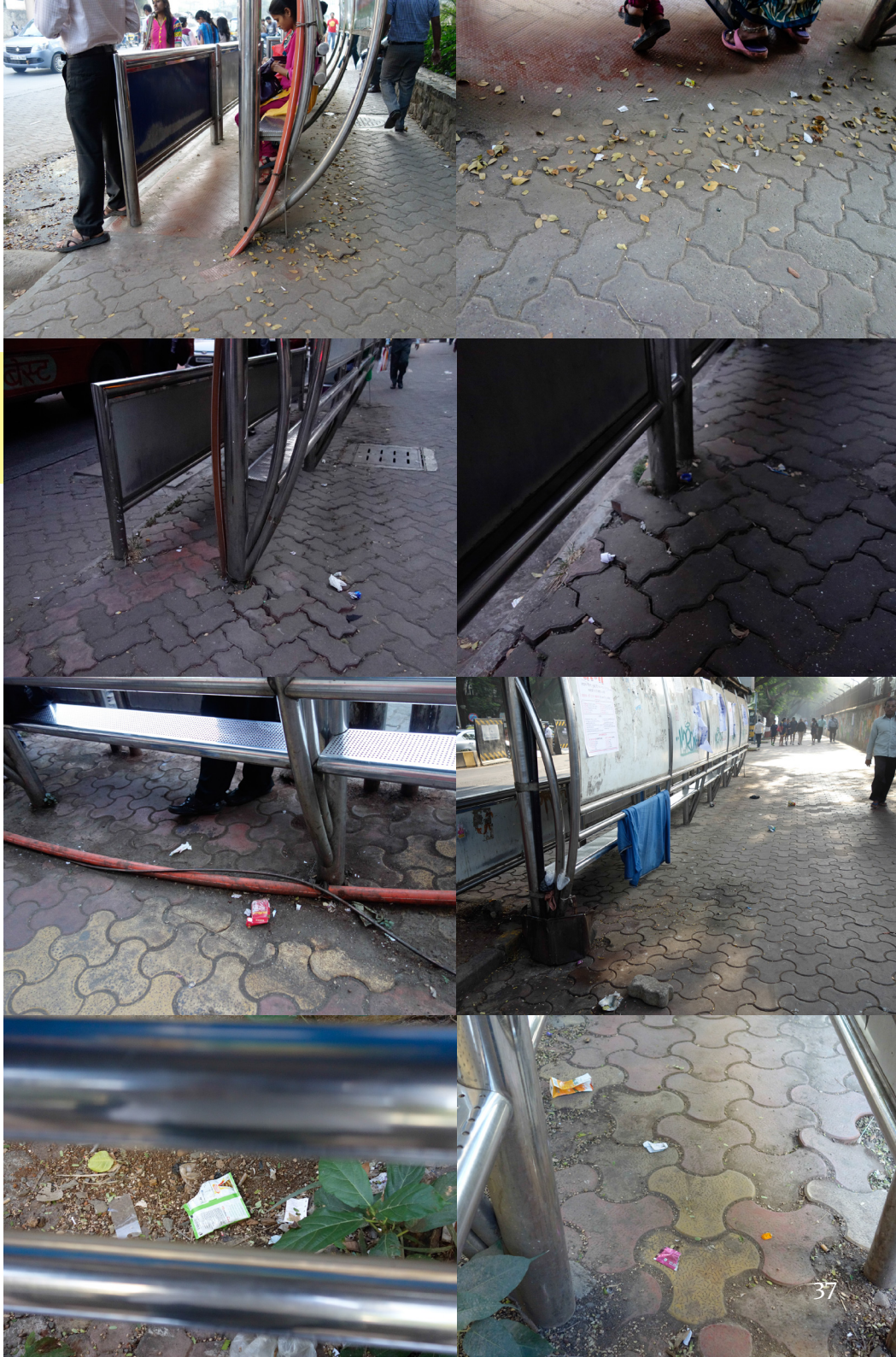
Makeshift bins

- Makeshift bin (in cycle bracket) for bottles
- Buckets/bucket-like makeshift bins used
- Boxes/box-like/milk trays
- Big cut plastic cans

Bus stops

- Small bits of paper, wrapping, plastics, chocolate wrappers, fruities, etc...
- Abandoned, not frequently used stops gather garbage

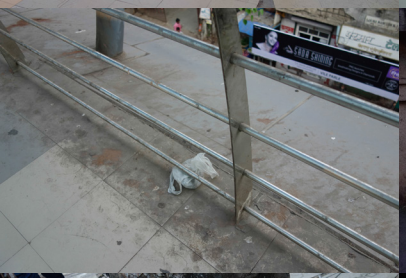
Bins that are placed near most bus stops don't seem to have many bus tickets in them. Where do people dispose bus tickets then? Somewhere later at their homes/destinations?

















Skywalks and spitting paan

- Similar to footpaths, people throw litter and spit across the railings.
- If there is a wall instead of railing, then there are graffiti and posters, and again paan spat on the wall.
- Some footover bridges have gaps outside the railing in which garbage accumulates.
- Paan spat on sides of gates (pillar-like areas), subway walls, poles (pillars), path
- People try to spit in bins, but it is not easy and gets messy

Throw from a height (or up)

- Liiter thrown from above, from flyovers, staircases, stairs in slums, windows
- Into construction nets
- Or up into a tree, up a high fence (shoes)
- From windows, which ccumulates on ledges or roofs below
- From skywalks (into roofs from the stairs)





Steps of foot over bridges/subways

- The foot over bridges are good secluded spot to drink alcohol and leave the bottle behind
- Litter like pieces of paper, tickets, etc are thrown along the stairs (also subways)
- A lot of garbage gathers in spaces under the staircase (also along roofs at the side of the staircase)

The footover bridges and stairs are ideal places to sit and relax for a while. Quite often bottle of liquor, water or wrappers of eatables are left behind or kept in to nooks and corners.

Street vendors/hawkers

- Shops have their own bins.
- Vendors that are on the move selling water bottles, tea, etc. cannot
- Idea: is there some way (ecosystem) that can enable (and make it profitable) to people to participate in putting litter in bins?





































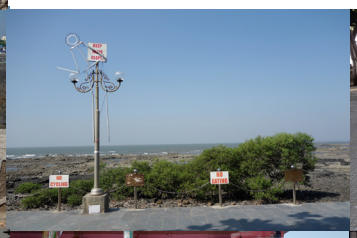


















Messages and signs

- Messages painted all over Bandstand promenade, which seem very authorative and negative. It feels overdone, seeming to take away freedom.
- Messages of fines for littering
- Many signs are ignored, often signalling the opposite and accumulating garbage.
- Good humuourous graffiti messages.
- People have created installations out of waste.

There are many messages around, and very proscriptive ("Do Not ...") in nature. This feels a bit negative, especially in popular publics space. But then the messages are also ignored, and don't seem effective.

People behaviour on beach

- Throw fruit peels, ice cream sticks, and small pieces of wrappings of eatables
- Many do throw stuff in the bins and are conscious of cleanliness (e.g. One man took efforts to wal all the way to the bins in the distance to dispose ice cream stick; A member in a group picked up bottle that another group member flung; Other such incidents are noted later in this section)

Plastic water bottles on the beach

- A lot of water bottles on the beach
- A lot of people carry empty bottles back putting them in their bags.

If the bottle drifts away (in the wind) and gets dirty, it is left there.










Stuff thrown on the beach

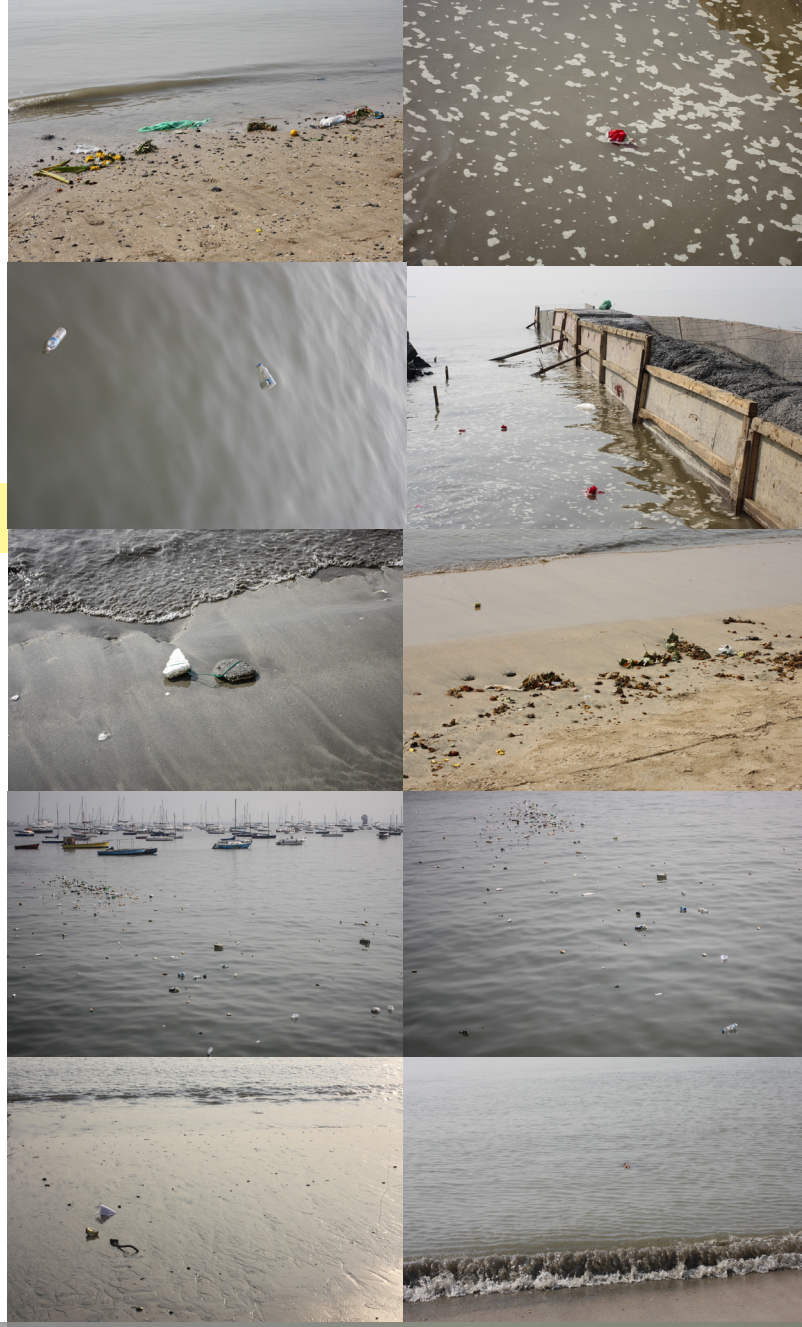
- Small bits mostly to do with eatable – paper wrappings, plastic wrappings, Ice cream, corn stubs, plastic bags that contained tea, stuff swept and clustered/piled for pickup later, teacups, varied clothing items, ghutka wrappers, small wrappings paper/plastic, bottles, plastic bags, religious flowers…

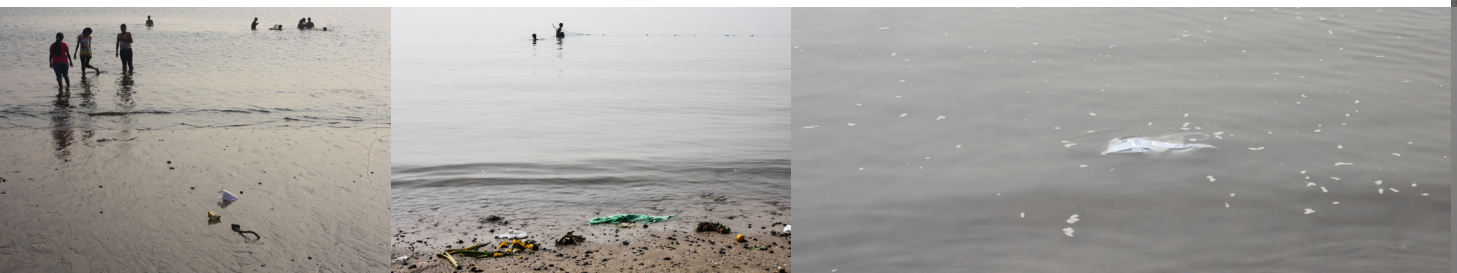


The sea throws back

- A lot of waste dumped into the sea
- A lot of garbage thrown inot the sea is thrown back on the shore.
- A lot of it is flowers (religious), plastics, bottles, etc
- People scavenge for some interesting useful items like plates/spoons along the shore

The dirty sea/shore doesn't seem to prevent people from enjoying the water.











Installations and movements by people concerned

- Advertisments regarding Hindustan Times Clean my Mumbai, a city-wide campaign (area-wise),
- Interesting installations set up, provoking thoughts on cleanliness.









Train (Long distance travel, inside)

- There are no bins in the 2nd class sleepers.
- People fling stuff out of the window: usually tea cups, bits of plastic wrappers, cups, bags, sachets, etc. (whic accumulate into the drain paths, at railway stations, and along the tracks)

Along tracks

- Some spots along the suburban railway track are quite clean This is usually where there are long stretches of walls with no dwellings
- Some stations' tracks too are relatively clean.
- There are many people cleaning up (employed, making a living)
- Garbage dumps have formed along the railway besides most dwellings
- People live their daily live among the garbage (Kalva sixth image)
- When there are flyover across the railway, garbage is often dumped along the ends.
- **Ideas: Make fun game-like dustbins along the railway where people are encouraged to throw litter out of the window into the bin (basketball-like). At least litter will accumulate in designated spots.**



Even in the clean mall

Unexpectedly, people do litter in very clean areas like malls, but there are people employed to constanly clean up, so it is not very noticeable.

- Bit of paper, bottle seals, pop corn quite often found on the floor across the mall.
- Tissues under the table (fallen but not picked up, left to the cleaners),
- People miss the opeing in the bins, but do not bother to pick up.
- There are bins at at escalator ends (but are not very visible)







People working constantly (the whole day)

There are a lot of people (employed or otherwise) working on cleaning up, picking rags, sorting and seggregating, sweeping, throughout the day trying to make a living. The whole garbage scene is actually quite a source for employment.

- Roadside sellers/Shop keepers sweep and keep dirt on the pavement.
- The beach is cleaned up constantly, and is quite clean unlike earlier times
- The people cleaning work almost unnoticed.
- Residents and shop owners seem seem to know the schedule of the garbage picup vans and they come their garbage bags/bins and throw it into the van.















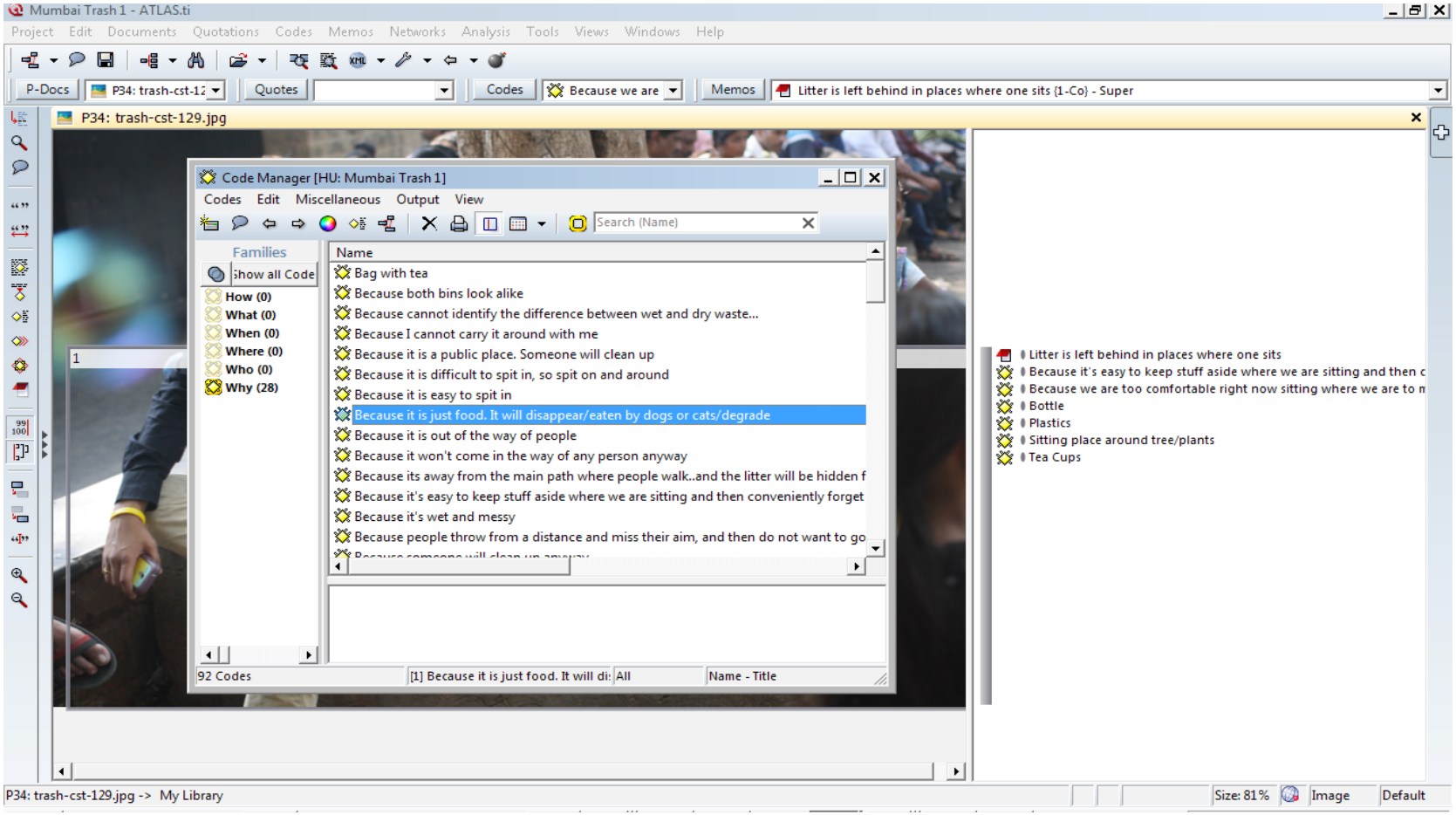


Scavenge

- People pick up useful litter like plates and spoons
- Street children find things to play with.

Findings (Set 2) (Question based)

A subset of photos (around CST Mumbai) were analysed and coded using Atlast.ti keeping in mind the questions mentioned on page (). Following is a screen shot of the coded data in Atlas.ti, followed by some network diagrams that emerged.

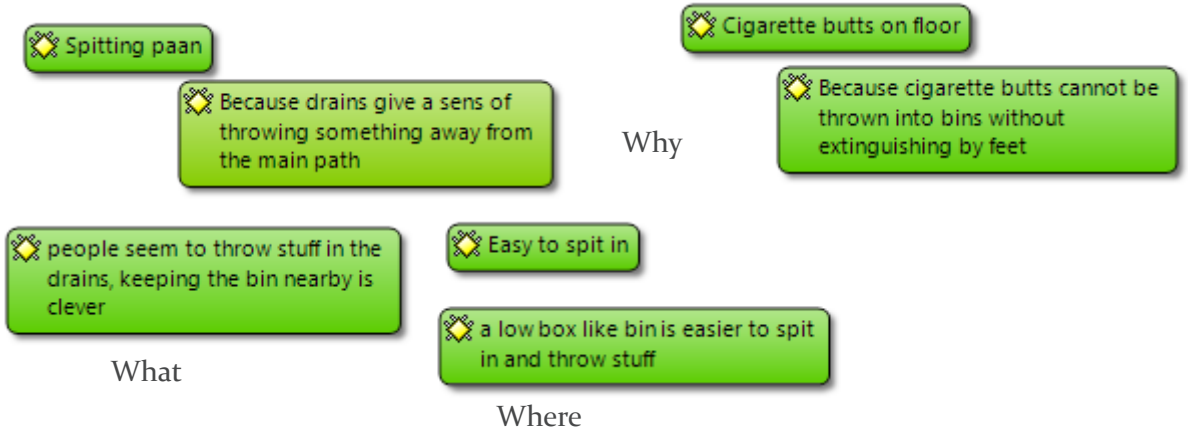


What

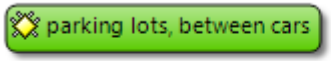
Where



Why

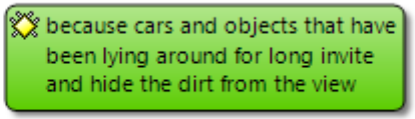

Spitting paan
Because drains give a sens of throwing something away from the main path
Cigarette butts on floor
Because cigarette butts cannot be thrown into bins without extinguishing by feet
Why
people seem to throw stuff in the drains, keeping the bin nearby is clever
What
Easy to spit in
a low box like bin is easier to spit in and throw stuff
Where

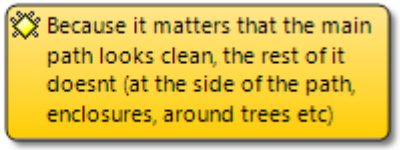
Where

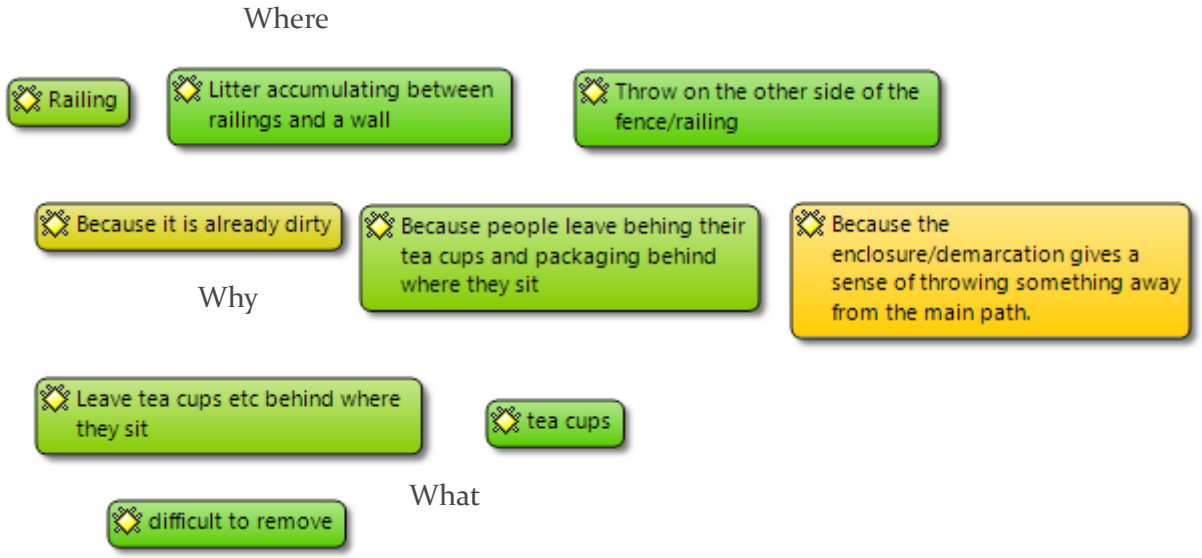

parking lots, between cars

Why


Because it is already dirty


because cars and objects that have been lying around for long invite and hide the dirt from the view


Because it matters that the main path looks clean, the rest of it doesnt (at the side of the path, enclosures, around trees etc)


Where
Railing
Litter accumulating between railings and a wall
Throw on the other side of the fence/railing
Because it is already dirty
Because people leave behing their tea cups and packaging behind where they sit
Because the enclosure/demarcation gives a sense of throwing something away from the main path.
Why
Leave tea cups etc behind where they sit
tea cups
difficult to remove
What

Conclusions

In this project, I have attempted to look at various theories that speak about what influences littering behaviour, which is mainly the environment, the littered object and the litterer. Different approaches to addressing the concerns are highlighted in the secondary study. My take is that while we clean up Mumbai, we should not take away its lively spirit and freedom (that does exist currently) along with it. A certain bit of roughness should remain to retain a sense of freedom and comfort, rather than a stark clean city that one feels alienated from. That being said, I would certainly agree that Mumbai does needs to be cleaned up, and our attitudes and behaviour towards cleanliness and littering to should be improved.

In the photo study, I have created a visual inventory of images that can be studied and analysed further. I have also noted my observations and have included ideas and insights where possible. I hope that the images and observations could be a source of inspiration and ideas for generating soultions that address the littering behaviour.

References

1. http://www.asianage.com/columnists/swachh-bharat-bound-fail-615
2. Rene Wever. Influence of packaging design on littering behaviour.
3. Raymond Reno, Robert Cialdini, Car Kallgren. The transituational influence of social norms
4. Robert Caldiani. Choosing to encourage or discourage: perceived effectiveness of prescriptive versus proscriptive messages
5. James Wilson and George Kelling. The police and neighborhood safety: Broken windows
6. http://www.skepticalscience.com/print.php?n=593
7. http://www.garretthardinsociety.org/articles/art_who_benefits_who_pays.html
8. Stuart Pertz. Incidental Architecture (Speaking of Places)
9. Lakshmi Priya Rajendran—Locating Self: Lived Experience of Incidental Spaces
10. Christopher Alexander—The nature of order-an essay of the art of building and the nature of the universe—A vision of the living world
11. Zina O'Leary. The essential guide to doing your research project
12. Using photography in qualitative research, Dona Schwartz
13. Alice Mah. Visual Methods-DTC Qualitative Research Methods.
14. http://designresearchtechniques.com/casestudies/behavioural-mapping/
15. 51 Ideo Method Cards
16. http://courses.washington.edu/readings/166/Wk7_optional_DesigningDesign.PDF
17. http://pngxn.weebly.com/haptic-design.html

Appendix I - People in action



Shop owner struggling to empty his bin into the larger bin with the cover. He ends up breaking the handle of his bucket.
At Girgaum Chowpatty



Boy puts an empty water bottle into his bag instead of discarding it in the nearby dustbin
At Girgaum Chowpatty







Lady drops empty teacup by the side of the sidewalk onto the road. A lot of teacups are already collected there.
Near Gateway of India





Guy from the same group discreetly drops his empty teacup on the floor.
Near Gateway of India









Guy on phone drinking a cola can, looks for a bin finds it and disposes the can .
Near Gateway of India







A group of youngsters leave a full bottle on the path. Some one ends up kicking it away later.
Near Gateway of India





Person uses opening in the electric light pole for throwing litter
(which is probably an opening for the electricals).
There is also a lot of paan spat on the pole.
At Gateway of India



Garbage stuffed into the opening of the light pole
Near Gateway of India



Workers sorting out wet and dry waste (probably from the tour/ferry services) *opp. Gateway of India*)



Tourists having a meal, which ends up into the remains of a pole,
which almost appears like a bin.
opp. Gateway of India)







Workers constantly cleaning up Girgaum Beach, all day long
Girgaum Chowpatty



Lady sorting out waste.
Near Girgaum Chowpatty







Man wants to dispose of an ice cream stick, asks where the bins are, finds them and walks all the way to dispose it.
Girgaum Chowpatty



Man peels of an orange on the beach.
Girgaum Chowpatty





Man cleaning up the beach, almost unseen.
Girgaum Chowpatty





Man wants to dispose of an ice cream stick, asks where the bins are, finds them and walks all the way to dispose it.
Girgaum Chowpatty



Lady at a flower stall sweeps and colelct waste and keeps in a plastic bag. Probably disposes it at the end of the day.
Powai Market



Person spitting into the plants
Powai







Worker at a shop attempts to dispose their bin into the common bin. The cover comes in the way and she struggles. A lot of the waste ends up on the floor.
Galleria, Powai



Person using a bin.
Andheri (E)





Cigarette butts throw on the floor or stubbed on the sitting places
Galleria, Powai



Worker sweeps the cigarette butts and litter left aroud by the people.
Galleria, Chowpatty



Bin at a vada pav stall
Andheri (E)

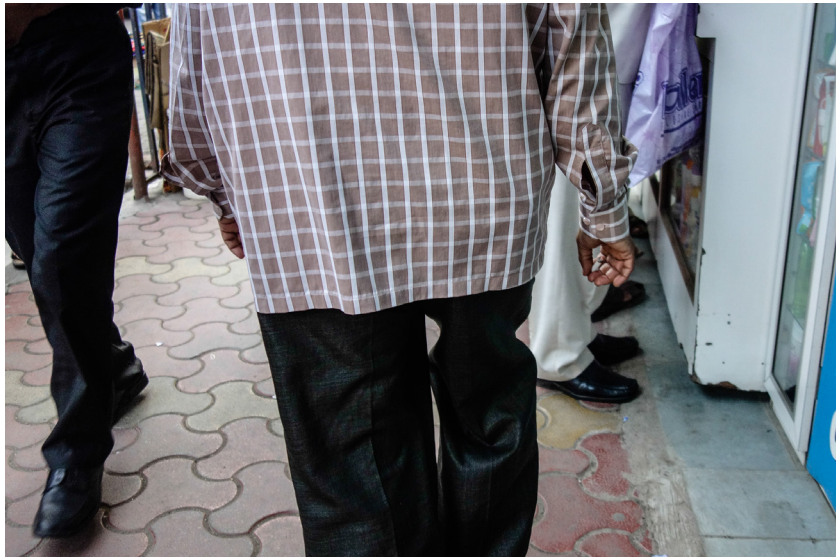


A rag picker foraging for plastic
Andheri (E)





Man wants to dispose of an ice cream stick, asks where the bins are, finds them and walks all the way to dispose it.
Girgaum Chowpatty









Man disposes his cigarettes and stubs it with his feet.
Andheri (E)



Street vendors block access to the bin (in fact using them as spitoons)
Andheri (W)







Man almost uses the bin to dispose a piece of paper but is distracted by friend and walks away without disposing the paper.
Andheri (W)



A kid drops his ice cream cone. A parent comes back, picks up the cone and throws it inot the rocks by the promenade, and not into the nearby bin.
Bandstand, Bandra



Man drops some litter at the side of the promenade
Bandstand, Bandra



Man done disposing garbage from his bin into the community dump
Dharavi



Hotel waiter disposes water directly into drain
Dharavi



Drain paths at Dharavi
Dharavi



Lady cleans up/uncligs the drains at Dharavi
Dharavi



People disposing waste direcly into the pickup van. The lady on the right sorts out the plastics before the van compresses the waste. She sells the waste to a nearby recycler, but has not been ablt to sell for many days and a lot of plastic has acccumulated nearby in bags.
Dharavi



Another person sorting out recyclable waste from being picked up by the van
Dharavi



Bin is attached to the pickup van and overturned automaticall to empty it into the van
Chowpatty







People come by one after the other during the period when the van is parked to dispose waste direcly into the van
Dharavi


sparx
GO FOR IT
CHETANA FOOT WEAR


STOP
SIGNAL
MH-02
CE-8390


HEIL
STOP
SIGNAL
MH-02
CE-8390






ON M.C.G.M. GOODS CARRIER SERVICES
MH.43.N.7346



Garbage dumping spot at Kalva
Kalva



Workers cleaning up along the railway tracks
Near Bhandup



A bottle of water blows away from the women who are sitting on the beach...and is forgotten. The empty bottle had remained protected for a long time in her hands.
Girgaum Chowpatty

Appendix II
A collection of aesthetic/interesting pictures



Good morning CST
Early morning, trash strewn along the sidewalks near Metro Cinema. Soon BMC workers will be along sweeping and clearing the streets, making way for yet another day of litter by the public.



Girgaum Chowpatty
The sea throws back the garbage, holy or not, while fishermen cast their nets in the murky waters where the sewage meets the sea.



Tourist attraction?
Plastic bottles and garbage dumped in the sea near the Gateway of India.


Shagun Art Gallery












Coca-Cola




Cone Ice Cream



One man's garbage…
A street kid plays with some litter.


DR. RESHMA
PHYSICIAN & SURGEO
डॉ. रेशमा एफ.
Timings: Morning - 10-00-1-00 pm. Evening: 6-00-9-30 p.m.
67, Bazar Road, Bandra (W), Mumbai-50.
NARANDAS DAYABHAI
ROAD
PIN 400050


HERO
Lady SLR BIKE
Lady SLR BIKE


NEW OPENING
Call Centre
Back Office
Shopping Mall
Theatre
Security
7506223711


ALM GROUP
9833060928


ECO




थूकना मना


NO
DRINKING
ALCOHOL
NO
COOKING
NO
SWIMMING


SINGAPORE






SUPARI CENTRE
WHOLESALER & RETAILER
AL-FAWAZ
LADIES TAILORS
MH 04 DK 4202

Appendix III
Pictures in Panaji, Goa

During this period, Panaji was hostage to a strike of workers, leading to a lot of unchecked garbage all over the city






PANJIM CITY STINKS
STOP IT, PLEASE






3G


NO URINATING






PLASTICS
CORPORATION OF THE CITY OF PANAJI
PLASTICS
CORPORATION OF THE CITY OF PANAJI
PLASTICS
CITY OF PANAJI
PLASTICS
CITY OF PANAJI


GEORGE
RESTAURANT & BAR
Specialised In
Goan Cuisine & Sea food
A Family Restaurant
KINGFISHER
PREMIUM
The King of Good Times
GA·07
F·3739


Nilkamal


AUTO PARADISE
The Print Shop
PRINTERS










BETHESDA LIFE CENTRE
SUPPORTS
स्वच्छ भारत अभियान
KEEP GOA CLEAN


BETHESDA LIFE CENTRE
SUPPORTS
स्वच्छ भारत अभियान
KEEP GOA CLEAN


CORPORATION OF THE CITY OF PANAJI
4-WAY SEGREGATION SYSTEM
PLASTICS
All types of Plastic Containers & Items, including Clean Plastic Bags & Wrappings.
PAPER & CARTONS
All types of Folded Cartons, Boxes, Newspapers, Magazines, Used milk & Juice Tetrapak Cartons, Food Plates etc.
GLASS & METALS
All types of Folded Cartons, Wires, Foils, Broken and Unbroken Glass items etc.
NON RECYCLABLE MATERIAL
Dirty Plastics, Ceramics, Cloth, Thermocol, Sponge, Leather and Rubber
GA-07
F-3237

