INTRODUCTION
Street-design in urban spaces has to consider all the activities of all users. Context Sensitive Design (CSD) especially should offer enough space for the unmotorized users. In narrow urban spaces this aim is often very difficult to reach. That’s why a new method has been developed: Urban Design Street Dimensioning (UDSD), a process which weighs the dimension requirements of the roadway against those of the sidewalk.

My lecture consists of the following parts:
1. Much: The project which set up the idea of “Urban design street- dimensioning” (UDSD)
2. The method UDSD
3. UDSD as one of the aims of CSD
4. The consequences of UDSD for urban street design: Traditional and modern street design
5. Conclusion

1 Much: The project which set up the idea of “Urban design street- dimensioning” (UDSD)

The project which set up the idea of “Urban design street- dimensioning” (UDSD) was the redevelopment of a street with about 8,000 cars per day. The Projekt began in 1986, the construction was finished in 1992. In this street parts were built in which the roadway is only 5 m wide. The traffic flows in this street until today almost without problems.

The whole street through the little town of “Much” (near the former capital Bonn) stretches over a distance of 3 km. Most parts aren’t difficult, but in the middle of the town is a segment which is about 200 m long, and in parts of which the space-room is only 7 m wide. At the beginning of the project the sidewalks in these parts were only 50 cm wide, so pedestrians had to walk on the roadway. This situation was very dangerous and many shops, which were on both sides of the street, closed down and several houses were left empty.
Fig 2 Much: Before the redevelopment a street almost entirely for cars

So the road administration thought about a bypass road. But the landscape around the town is very nice and had to be saved. Besides, the shop-owners were afraid of losing customers because of such a bypass road. So a bypass road was neither possible nor could it be enforced. Another plan was to demolish all the houses on one of the edges of the street. But the whole centre of the town is a listed environment, so demolishing the houses was out of the question. In this situation the road-administration asked us for unusual ideas for a special redevelopment of this difficult and seemingly hopeless street.

We were a young office and we were very courageous. We thought: What’s the problem? The problem was the widths of the sidewalks. So we had to make the sidewalks wider. We drew a plan in which the sidewalks were wider and the roadway was smaller. In parts the roadway was only 4.75 m wide, so 2 cars or one car and one truck could pass each other but not 2 trucks. Our civil-engineer calculated the probability of the case in which 2 trucks meet each other on one of these 4.75 m parts. The result was: we could expect that those cases happen 8 times per day. In these cases one truck had to be wait before the narrow part of the roadway. We discussed this result with the road-administration and the head decided that our plan was feasible.

Important: the view through the narrow part!

Fig 3 Much: Central Segment which is 7m wide with the supposed 4.75 m Roadway

But the biggest problem was still to be dealt with: the residents didn’t believe us. They were afraid that the traffic would break down after the redevelopment. So we made a big model with all their houses and with the final shape of the new street. But they still didn’t believe us. In the end we built a temporary roadway with provisional...
curbstones pasted on the existing roadway. After half a year they finally believed us and so we could draw the construction plans. At the end of the construction they were very happy and opening the new street was a great event.

In the meantime the traffic has increased. Now about 10,000 cars go through that street every day. And now the former calculation isn’t correct anymore. But we can still say that the width which we built in Much is enough for traffic-volumes under 8,000 cars per day (with about 5% delivery-traffic) regarding the circumstances explained above.

Fig 4 Much: The situation before (bottom) and after (top) the redevelopment

Fig 5 Much: Flowing and delivery traffic in the 4.75 m wide roadway
2 The method “Urban design street-dimensioning” (UDSD)

Fig 6 Sidewalks in narrow Streets: often too small

UDSD is a procedure that questions the dimensions of the roadway that have been declared necessary for motorized traffic in favour of larger dimensions of the sidewalks. The street is designed not from its middle but from its edges:

1. Main consideration for edge uses, residents and street users: Between sidewalk and the outer-edge of the street-room an area is necessary in which the claims of the residents, shop-owners, restaurant-owners and customers are satisfied (lounge-areas, areas for offering goods, areas for providing a distance between the houses and the users of the street, for example front gardens)

2. Main consideration for the circulation of pedestrians and cyclists: The spaces for pedestrians and cyclists can be defined as well as the spaces for the cars. In the past, when planning a street, every civil-engineer considered the fact, that a car needs a space of about 3 m, but they never thought about what a pedestrian needs. That’s why they simply gave the pedestrians and the cyclists the rest of the space. But we can do the reverse: first we ask the
question how much space the pedestrians and the cyclists need and then we know how much of the space is left for the cars.

3. Considered proportioning of vehicular and non-vehicular areas: For the well-being of the pedestrians and the cyclists the sidewalks have to be in a comfortable relationship to the areas for roadway (comprising all areas for private- and public-transportation); people feel that a relation of 30 : 40 : 30 between sidewalks and roadway is comfortable. In order for the pedestrians to feel good the proportions within the sidewalk have to be balanced.

![Diagram showing Width of Sidewalks and Street-Space](image)

**Fig 8 Widths of Sidewalks determined by UDSD**

For the width of the sidewalks determined by UDSD three different sections are discernable:

- In street-spaces over 33 m wide the sidewalks can be 10 m, this width is enough for all activities.
- Between 10 and 33 m the section can be the result of UDSD (the width of the sidewalk has to be 30% of the width of the street-space).
- In street-spaces which are less than 10 m wide the width of the sidewalks has to be 3 m, the roadway is what’s left over (I know that’s a courageous sentence, I’ll come back to this idea later).

<table>
<thead>
<tr>
<th>Traditional Street-Design</th>
<th>Modern Street-Design</th>
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<tbody>
<tr>
<td>Dimensioning of the roadway depending on the <strong>traffic volume</strong></td>
<td>Dimensioning of the roadway depending on <strong>Urban-Design-Street-Dimensioning</strong></td>
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<tr>
<td>Result: <strong>Necessary roadway</strong> The width of the roadway that is necessary for the traffic</td>
<td>Result: <strong>Possible Roadway</strong> The width of the roadway that is possible</td>
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<tr>
<td>Sidewalks: <strong>What’s left over</strong></td>
<td>Sidewalks: <strong>Determining factor</strong></td>
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</table>

**Fig 9 Traditional and modern street-design: the result of the Urban-Design-Street-Dimensioning**
Based on the three above named factors, we can determine the required width of the sidewalk, and based on that the possible width of the roadway in relation to the total street-width. So UDSD is – in contrast to the traditional street-design - “design from the edge inwards”.

In consequence the roadway will become narrower.

In correlation to the width of the space of the street we can determine the possible width of the roadway. In that example the roadway in several parts can be as narrow as 2 m. We all know that such a roadway isn’t possible. So we have to work out a compromise. But for doing this we as the town-planning side have a point that is as strong as the points of the civil-engineers.

Fig 10 The compromise between the aims of traffic and town-planning

It is necessary to bring the possible breadth of the roadway that is determined by UDSD in the political procedure of balancing the various claims. Historical und regional or local factors have to be included in this procedure.

In the meantime the method is implemented in guidelines for street design in Berlin, Bremen and Brandenburg.

3 Context Sensitive Design (CSD): More than UDSD: Important aims of csd

In my opinion UDSD is the most important element of CSD but not the only one. Other important elements are:

3.1 Design, safety and function (the “cube of CDS”)

The design of the street has to be urban designed. In that process spaces have to be designed in which different and changed functions can be integrated.

Design is not the opposit of safety or function. The skill of street-design is to reach beauty, safety and function together.
3.2 Development of the Identity, based of local and regional traditions

The network of the street-spaces stamps the identity of the town essentially, it makes the town – in combination with special buildings – unconfoundable. Street-design has to be oriented on the special elements of the town, especially its historical bases and local traditions. If historical elements still are present the street-design has to complete these elements.

In contrast to urban spaces the materials are simple and more local. For example in many East-German villages the material of sidewalks is sand.

Residents nowadays would like to have more comfortable sidewalks especially during wet conditions. But they demand something that is very inappropriate. So we have to find solutions which optimize the comfort but conserve the charm of the special situation.

In order to preserve the special character of those spaces we have to continue using the traditional materials.

One possibility is the solidification of the historical material, so that the areas do not appear changed while at the same time their functionality is improved and they are more comfortable. It is always important to use no more than two or three different materials: for example asphalt for the roadway and parts paved with regional stones and waterbound surfaces.
3.3 Integration into the urban network (Hierarchy and orientation)

For recognize the urban pattern und for orientation in the city the network of the streetspaces has to be clearly organized and composed by streets of different urban importances.

Fig 12 The network of the streets stamps the town

3.4 Elements of separation (Differentation between rural and urban streets)

Rural streets differ from urban streets by several elements: Originally rural streets are multifunctional areas, plants are depending on the special type of space and on the position of the houses, the surfaces are more simple than in the town, and –especially – the elements of separation are soft.

In the rural street the road is smoothly integrated into the space. This is the most important difference to urban streets. The road hasn’t got edges made of curbstones. Using or not using curbstones is the best way to define the character of a street.

The rural element for bounding the road are gutters, made by 3 to 5 rows of paving-stones. The paving –stones should be regional stones so that the identity of the street will be stressed.
Elements of soft separation such as gutters take over some other functions too: it makes it clear to all users that they are in a special situation in which for example children may suddenly be running onto the road, so especially car-drivers realize that it is necessary to drive carefully here.

3.5 Unity and segmentation (Continuity and Variety)

Every street is special but all streets are parts of one special network. That’s why all streets have to have elements of the character of the town and at the same time own elements. For example: all streets of a town have the same materials but the composition of these materials is different.

Fig 14 Variety in the continuity: Surfaces and lighting for the B1/5 in Berlin
3.6 Sufficient sidewalks (Social usefulness)

The special character of an urban street is based in the urban life: in contrast to the rural street there are many pedestrians, goods, deliverers, parking cars, cyclists, promenader in the urban street. All these people need space and so an urban street only can be an real urban street, if it is enough space on the sides of the street, between roadway and borderline. The urban street only can be social useful if the sidewalks are enough wide.

Fig 15 Only wide sidewalks can guarantee urban life

3.7 Open for changes of usings (Flexibility)

Functional demands often change, the streetspace has to be the continuous frame for all the demanded functions. So if the space is persistent and strong it can be open for all the demanded changes of usings.
3.8 Trees (Quality for staying)

Trees are the most important elements for the quality of staying in urban streets. I disagree the frequently used reason, that trees would be impossible because many mains are under the sidewalks. Although in the most streets that we planned there were many mains, in almost every project we could plant trees. There are many possibilities to save the mains and the trees for each other.

Fig 16 Trees: Depending on Special Situations

Normally we try to plant trees along a street in regular rows, in a symmetrical space on both sides of the roadway. But in rural streets trees have to be arranged less regularly, they have to be planted depending on special situations. In this example the reason to plant trees is to mark a little brook which crosses the street.
3.9 Minimal furniture (austerity)
Streets have to be spaces for many different activities. For all these activities different elements are necessary. If we try to place special furniture for all possible activities, the street space would be full of different elements which would disturb events which need the area occupied by that furniture. That’s why we use public furniture in all streets very sparingly and if we set up any elements these things have to be multifunctional.

Fig 17 Minimal furniture on the Potsdamer Straße in Berlin
In rural streets we use public furniture even more sparingly, because these spaces are multifunctional areas. Here the rules mentioned above apply even more. The only traditional element in rural streets is a bench like this one under a great tree on the village green, again today an important meeting-point, especially for children and young people.

Fig 18 The Central Tree in the Middle of a village
3.10 Harmony and proportions (Beauty)

The proportions between the roadway and the sidewalks and the proportions between the different parts of the sidewalks (pedestrian-lane, cycle-lane, parking-slots, areas for offering goods, areas for sitting in a bistro) have to be balanced. All the parts of the street have to be in the best possible harmony.

![Fig 19 Proportions in the street-space](image)

3.11 Attractive and safe streets in the night (Criminal prevention)

The most important cause of lighting is not the safety of the flowing traffic. The well-being of the pedestrians and other users is like so important. In the night lighting has to create new safe and interesting spaces. The elements of the lighting have to compose a nightly exciting network of spaces.

![Fig 20 Lighting plan of the area Potsdamer/Leipziger Platz in Berlin](image)
3.12 Participation (Identification)

Only if the civitants have the impression that they had decided the design (together with the government and the specialists) they can identify themselves with the street. Only in this case they will have a look after “their” street.

4 The consequences of UDSD for urban street design: Traditional and modern street design

<table>
<thead>
<tr>
<th>Street-Design in the Past</th>
<th>Street-Design in the Future</th>
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<tr>
<td>Traffic-Volume</td>
<td>UDSD</td>
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<tr>
<td>Width of Roadway</td>
<td>Width of Sidewalks</td>
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<td>Width of Sidewalks</td>
<td>Width of Roadway</td>
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<td></td>
<td>Compromise</td>
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Fig 21 Traditional and modern street-design

In the past streets were designed in the way you can see on the left hand side of this foil: the factor determining everything else was the traffic-volume. The width of the sidewalks depended on the space that was left over.

In order to improve the quality of the streets for all users, with the exception of the car-drivers, this process will have to be reversed in the future: the width of the roadway will be dimensioned in a new way, which we call UDSD. In this procedure the proportions of the individual elements of a street are all taken into account.

Although in end a compromise has to be worked out by the responsible political institution, they can make their decisions on a better basis than today because all factors - the traffic and the urban factors - are quantified during the planning process. That’s why we can now provide them with stronger reasons than before.
5 Conclusion

At the end let me conclude: in my opinion Context Sensitive Design has to discuss more than road-width, cross-sections or materials of the surfaces. The first object of Context Sensitive Design has to be the discussion of the space-structure, the edges of the space, the sections and parts of the space, the unity and the identity of the space. That’s why street-design is a job for an interdisciplinary team of architects, civil-engineers and town-planners.

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<th>Phases of the Project</th>
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<td>1 2 3 4 5 6 7 8 9</td>
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**Fig 22 Cut between architect and civil-engineer**

In this interdisciplinary process the cooperation between architect and civil-engineer has to be continuous. At the beginning the architect is the more important person but the civil-engineer assists in the process, and at the end it is the other way round. If they do their work one after the other, the result can’t be optimal. Only the permanent discussion and cooperation between the architect and the civil-engineer guarantees that the result is functional, beautiful and safe at the same time.

I’m sure that UDSD will be an integrated element of street-design in Germany because a new guideline, called RASi (Rules for street-design in built areas) is in the making. This guideline will regulate the design of built-up rural and urban streets in the future.
Fig 1 The first Example for UDSD: B55 Much (8.000/10.000 cars per day) .............................................................. 1
Fig 2 Much: Before the redevelopment a street almost entirely for cars................................................................. 2
Fig 3 Much: Central Segment which is 7m wide with the supposed 4.75 m Roadway ........................................... 2
Fig 4 Much: The situation before (bottom) and after (top) the redevelopment ....................................................... 3
Fig 5 Much: Flowing and delivery traffic in the 5m wide roadway ................................................................. 3
Fig 6 Sidewalks in narrow Streets: often too small................................................................................................. 4
Fig 7 Urban design street-dimensioning (Method) ................................................................................................ 4
Fig 8 Widths of Sidewalks determined by UDSD ............................................................................................. 5
Fig 9 Traditional and modern street-design: the result of the Urban-Design-Street-Dimensioning ........................................... 5
Fig 10 The compromise between the aims of traffic and town-planning ............................................................ 6
Fig 11 The cube of CSD ........................................................................................................................................ 7
Fig 12 The network of the streets stamps the town ............................................................................................ 8
Fig 13 New soft separation in a german village ................................................................................................. 9
Fig 14 Variety in the continuity: Surfaces and lighting for the B1/5 in Berlin .................................................. 9
Fig 15 Only wide sidewalks can guarantee urban life .......................................................................................... 10
Fig 16 Trees: Depending on Special Situations .............................................................................................. 11
Fig 17 Minimal furniture on the Potsdamer Straße in Berlin .......................................................................... 12
Fig 18 The Central Tree in the Middle of a village .......................................................................................... 12
Fig 19 Proportions in the street-space ............................................................................................................. 13
Fig 20 Lighting plan of the area Potsdamer/Leipziger Platz in Berlin ............................................................ 13
Fig 21 Traditional and modern street-design .................................................................................................... 14
Fig 22 Cut between architect and civil-engineer .......................................................................................... 15