## Workshop: A Case Study on a Human Rights-Based Approach to Engineering and Inclusive Transportation.

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**BACKGROUND**: In recent decades, researchers and policymakers have increasingly recognized how transportation affects social inclusion for individuals with disabilities and the aging population. A human rights-based approach to engineering— grounded in principles of distributive justice, participation, accountability, the indivisibility of rights, and responsibilities of duty-bearers (Chacon-Hurtado et al. 2024)—can inform transportation infrastructure design. We will explore strategies to incorporate these principles into the public and private sector dimensions of transportation systems design.

### CASE STUDY CONTEXT (Adapted from Patrick et al., 2023)<sup>i</sup> - 5 minutes

A mid-sized Latin American city with a population of 2.4 million is working	Key Facts:
to improve accessibility and inclusivity in the built environment	Population:
surrounding a main transit corridor as part of an Inclusive Infrastructure	2.4 million
programme for people with disabilities. The corridor faces challenges,	
including a complex terrain, low-income settlements in mountainous	People with
areas, and a transit system operated by private companies that	Disabilities:
sometimes skip stops during peak hours. Physical accessibility barriers—	78,000 (~3%),
like the lack of elevators, ramps, and accessible public spaces—affect	
residents' ability to use the transit system effectively. Although the city is	Aging Population
committed to inclusivity, budget optimization is essential.	(65+): ~11%,
Your team has been hired to make recommendations on the paramount	
considerations that should guide this process to ensure that people from	Poverty: 9%,
all walks of life can access and benefit from the transit system.	
Persons with disabilities were interviewed and these are some of the	Unemployment
quotes <sup>1</sup> that were shared.	Rate: 11%
<ul> <li>"I complain about the bad ramps here, but at least there are some; in other areas, there's no accessible public transport. The city has offers, but if there is no transport for us, there is nothing for us."</li> <li>"There is also a debt with people with psychosocial disabilitiesAccessibility goes beyond having a ramp. Language and information must also be accessible, but people with psychosocial and cognitive disabilities are being left out of this conversation."</li> <li>"Today, the only obligation is to have platforms in vehicles, and in terms of legislation we are lacking a lot in the city. We need more support from authorities and clear parameters for accessible infrastructure."</li> </ul>	
<ul> <li>-"The attitudinal barrier is the main barrier—drivers might skip stops with ramps to stay on schedule. Maintenance is often neglected, and poor service leaves us feeling overlooked, especially during peak hours."</li> <li>-"Accessible spaces are essential not only for people with disabilities but also for older adults. Accessible spaces make life easier for all of us</li> </ul>	
and support our independence, proving that inclusive design benefits everyone."	

<sup>&</sup>lt;sup>1</sup> Full quotes can be accessed in the original case study, please see endnote "i" for citation.

#### I: Explore key considerations – 15 minutes.

(**ONLINE**: Please complete the cell for question 1 and any two additional questions)

- The case study presents barriers in different categories (e.g., physical, financial, how the system operates). As a group, list the most important barriers and brainstorm additional barriers that people with disability may have in this system. How do they prevent the mobility and accessibility for people with disabilities in this corridor and surrounding areas?
- 2. How can we learn about other impacts not listed above?

3. List two consequences for people with disabilities resulting from these barriers.

4. Are there any other vulnerable groups in society who are affected negatively or positively from this project during construction or implementation?

Positive:

Negative:

5. Who do you think are key stakeholders? Rank their level of **responsibility** for making the system inclusive and accessible (e.g., low, medium, high, unknown).

### Part II. Concepts – 15 minutes.

(**ONLINE**: Please write your answer in the online document for one or more of the questions below)

- Based on your answer to question 1, are there specific disproportionate challenges that people in certain areas or from certain groups might face? Now, in your own words, write one or two sentences that your project design must consider in order to ensure that the project is equitable.
- Reflecting on your answer to question 2, would insights from diverse groups help improve the project design? If so, please summarize this in one statement that captures the essence of what the design must prioritize.

8. Think about the challenges of maintenance and ensuring service reliability for everyone under inclement weather. What practical steps can the transit company take to maintain accessibility consistently? Write one statement.

- 9. List **5 stakeholders** and briefly describe their role in making the system accessible (e.g., private transit operators, government, ICT companies). Why is it important to frame those responsibilities for all actors involved? Write one statement.
- 10. Given budget limitations, should access to schools and job centers be prioritized over parks and museums? Explain your answer in two sentences, considering the impact on quality of life and inclusivity.

Part III Principles – 5 minutes each, total 10 minutes

11. Can you identify **CRPD** articles that relate to your answers to **questions 6 to 10**? Please **See handout 2.** 

(ONLINE: Please write your answer with reference to your responses in Part II)

12. Similarly, do your answers to **questions 6 to 10** match any of the five **principles** of a human rights-based approach to engineering from **handout 3**?

(ONLINE: Please write your answer with reference to your responses in Part II)

### Part IV: Application – 20 minutes

Hypothetical case: Based on the successful implementation of their accessibility program, a new station for the tram line system in the city above will be added. As engineering professionals, you have been asked to provide input on the design to ensure it meets accessibility and inclusivity goals.

**ONLINE**: Please write your answers to all the questions below in the online document)

13. First, propose three solutions to the problems identified in **question 1**. Note their feasibility in terms of cost and technical challenges for implementation.

	Feature or design consideration	Level of difficulty
1		
2		
3		

14. Now, as a group, what features do you suggest (e.g., ramps, tactile paving, clear signage) in the design, and how do you justify them based on a CRPD article and human rights principles (e.g., Distributive Justice)? Use the table below:

Feature or design	ENG-HR	CRPD Articles	OPTIONAL: NSPE Code of Ethics
consideration	Principle		https://www.nspe.org/resources/ethics/code-ethics
Accessible Navigation	Participation	Art. 4	I.1. Hold paramount the safety, health, and welfare of the
hotspots			
Community Participation	Indivisibility of	Art 30.	
In Planning and Design	Rights		
Accessible Green and Public Spaces	Accountability		
Ramps, Elevators, and			
Accessible Entrances			
Your solution 1:			
Your solution 2:			
Your solution 3:			

15. Now, individually, reflect on utility of the CRPD and ENG-HR principles as foundational elements for designing infrastructure in your area of work. Can these principles help facilitate discussions about the dignity, autonomy, and quality of life for people with disabilities and other groups in your city? Please write your thoughts and share them with the broader group.

#### <sup>i</sup> References:

Patrick, M., Muldowney, A., Arrubla Palacio, M., Aguirre, M. and McKinnon, I. (2023) Inclusive Design and Accessibility in Medellín, Colombia. AT2030 Inclusive Infrastructure Case Studies. Prepared by the Global Disability Innovation Hub and partners for the UK Foreign, Commonwealth and Development Office.

Chacon-Hurtado, D., Kazerounian, K., Hertel, S., Mellor, J., Barry, J. J., & Ravindran, T. (2024). Engineering for Human Rights: The Theory and Practice of a Human Rights–based Approach to Engineering. Science, Technology, & Human Values, 49(4), 898-934. https://doi.org/10.1177/01622439231211112

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# Convention on the Rights of

PERSONS WITH DISABILITIES

Adopted in 2006, the goal of the convention is to promote, protect, and ensure equal rights and dignity for persons with disabilities.

### Article 4

States have the responsibility to ensure the rights of persons with disabilities.

## Article 8

There is a responsibility to promote awareness campaigns to combat stereotypes, prejudices, and harmful practices. Persons with disabilities have the right to be treated equally under the law and protected against discrimination.

Article 5

### Article 9

Ensures access to the physical environment, transportation, information, and communication technologies, removing barriers that prevent full participation.

### Article 6

Recognizes the challenges faced by women with disabilities, calling for measures to ensure their full development, advancement, and empowerment.

### Article 10

Affirms the right of persons with disabilities to life and obliges states to take all necessary measures to protect this right.

## Article 7

Handout 2

Children with disabilities have equal rights and are protected from abuse, promoting their best interest in all policies and actions affecting them.

## Article 11

States are required to protect persons with disabilities in situations of risk, such as conflict, natural disasters, and humanitarian emergencies.

## Article 12

Confirms that persons with disabilities have legal capacities on an equal basis.

### Article 13

Guarantees access to justice for persons with disabilities, providing accommodations to ensure effective participation in all legal processes.

### Article 14

Protects persons with disabilities from arbitrary detention and deprivation of liberty based solely on their disability.

## Article 15

Prohibits any form of inhumane treatment and ensures persons with disabilities are protected from medical/scientific experimentation without consent.

Article 16	Article 17	Article 18	Article 19
Requires measures to protect persons with disabilities from all forms of exploitation, violence, and abuse, especially in their homes and institutions.	Ensures that persons with disabilities have their physical and mental integrity respected.	Recognizes the rights of persons with disabilities the freedom of movement, including the right to obtain their national identity and identity documents.	Supports the right to live independently, with choices equal to others, and access to community services and facilities.
Article 20	Article 21	Article 22	Article 23
Ensures access to affordable mobility aids and personal assistance to enhance independence and freedom of movement.	Guarantees the right to seek, receive, and share information in accessible formats and through all forms of communication.	Protects the privacy of persons with disabilities, including personal, family, health, and rehabilitation matters.	Recognizes the right to marry and start a family, with support to prevent family separation and respect family rights.
Article 24	Article 25	Article 26	Article 27
Ensures access to inclusive education at all levels, adapted to individual needs, and promotes lifelong learning for persons with disabilities.	Provides access to health services without discrimination and ensures that persons with disabilities receive the same quality/range of services.	Supports programs that enable persons with disabilities to attain and maintain maximum independence, ability, and participation in society.	Secures the right to work in an inclusive environment, with support for career advancement, equal pay, and freedom from workplace discrimination.
Arti	cle 28 Arti	icle 29 Art	icle 30
Guarant to a standar includi clothing and ass cases o	ees access decent d of living, ing food, g, housing, istance in f poverty.	es the right to ticipate in cs, including standing for ction, and lvement in olic affairs.	arantees al access cultural, reational, l sporting ctivities.

#### FIVE PRINCIPLES OF A HUMAN RIGHTS-BASED APPROACH TO ENGINEERING

#### **Distributive Justice**

**Definition**: Ensures that resources, opportunities, and burdens from engineering projects are fairly distributed among all members of society, especially marginalized or vulnerable groups.

**Application**: Engineering decisions should prioritize equitable access to infrastructure, technology, and services, addressing the needs of people with disabilities, low-income communities, and other underrepresented groups.

**Example**: Designing transit systems with accessible stations and affordable options to connect low-income neighborhoods to employment, education hubs, and recreational areas.

### Participation

Definition: Emphasizes the involvement of affected communities and stakeholders in the planning, design, and implementation of engineering projects.

Application: Community input should be actively sought, especially from affected groups not typically involved in decisionmaking. Participation ensures that the voices of vulnerable populations are heard, respected, and incorporated into the project. Example: Holding public forums or focus groups to gather feedback on accessibility features for a new public transportation system with images that include alternative text in all visuals.

### **Duty-Bearers**

**Definition:** Identifies the responsibilities of stakeholders (e.g., governments, ICT companies, and engineers) in ensuring the rights of all are respected, protected, and fulfilled through their projects. **Application:** Duty-bearers must be accountable for adhering to human rights standards and ensuring that their actions and decisions support inclusivity and equity. **Example:** Construction engineers are responsible for implementing accessibility features. This should be done without violating labor rights (e.g., ILO 138 on child labor).

### Accountability

Definition: Requires mechanisms to monitor, evaluate, and enforce the commitments of stakeholders to uphold human rights standards in engineering projects.

Application: Accountability systems ensure that engineering practices meet accessibility, safety, and inclusivity goals. Example: Establishing regular audits and user feedback mechanisms to assess the accessibility and performance of a newly built transit system. Installing feedback kiosks at stations for passengers to report accessibility issues, with designated teams for follow-up and resolution.

### Indivisibility of Rights

 Definition: Recognizes that human rights
 are interconnected and that engineering projects impact multiple aspects of life simultaneously (e.g., health and employment).

**Application**: Design decisions should consider the broader impacts on all rights and aim to enhance multiple dimensions of quality of life.

**Example**: A well-designed transit system not only improves access to education, healthcare, and employment, but also recreational opportunities, supporting a holistic approach to community well-being.



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