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Transportation Planning as effective mean to rejuvenate a pilgrimage Town

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Abstract - *The success and failure of every dynasty, country, city and a town largely depends upon sustainable urban planning focusing on Transportation processes taking place in it as it has been doing it for decades whether it would be a road network, drainage pattern or its role to compliment the Architecture and Planning of the city. Sustainable planning measures in transportation need to be taken into account from a single lane for an individual residence to the broad national highways connecting the city through the entrance gateways to realize the dreams of contemporary Indian sustainable cities.*

This paper focus on Katra town of India (a celebrated pilgrimage destination, holding ten million pilgrims annually), its present concerns pertaining to transportation with the help of case study. Pertinently, a model shall be attempted for its possible management through re-planning based on the sustainable transportation measures and potentials of its satellite areas. The model shall be highlighting mainly the guidelines pertaining Transportation and Traffic management based on successful urban models of 20th & 21st century in order to redevelop it as a unique sustainable pilgrimage city as Govt. of India owes of it.

***Key Words*: Katra, Transportation, Planning, Traffic, Redevelopment, Sustainable, City, Contemporary.**

1.INTRODUCTION

Global transformation & smart city development is quite evident everywhere nowadays. This is promoting information & communication technologies more than the sustainable & eco-friendly environment. So, population & Traffic density is the mirror of pollution rate of a country. More the population density means more urbanization, & higher consumption of electricity, water, fossil fuels & the pollutants like Green House Gases, organic wastes, inorganic wastes, industrial wastes, electronic waste promoting climatic change.

Today's development of a city means the development of infrastructure, everyone wants to make his/her property as a landmark but not an NZE (Net Zero Energy) development, which is a cause of concrete jungle in a city. In the Process, this continuous quest for Landmark structures coupled with the digitization is taking the present cities land morphology towards a grey terrain (paved terrain) i.e. greenery is compromised to endure the innumerable vehicles (carriers of Landmark development and digitalization).

We cannot ignore the importance of digitalization for an easy, convenient & better future but above this, there is need of sustainable development which will generate energy, water solutions for us & also reduce every type of pollutants through the eco-friendly environment. This integration of digitalization & sustainable environment can save our mother Earth & we are creating poison like concrete jungle & pollutants for her. Needs always prove to be successful at the end, whether it would be a need for a person or for a country but our need has to be bound before the destruction of a person or a place.

2.PRESENT KATRA TRANSPORTATION NETWORK

Fig -1: Present Infrastructure & Location, Hill Town- Katra

Transportation is the part which falls under the framework of routes. Routes can be of various types, it can include the routes of services/amenities or it may be the connectivity between the two junctions. Here we are considering the connectivity pattern of transportation in Katra town. It plays a major role in the success of a city or town, particularly for services like importing and

exporting materials, solid waste management etc; in such a town in addition to holding town to three major districts of J&K state. First one is Katra- Domail- Jammu road, which connects this town to the Jammu City via NH-1a. The second one is Katra- Panthal- Tikri road which connects Katra town with Tikri via NH-1c road & primarily connects

Katra town with Tikri via NH-1c road & primarily connects Udhampur, Poonch & Rajouri districts. The third one is Katra-Reasi Road Which Connects Katra to Reasi.

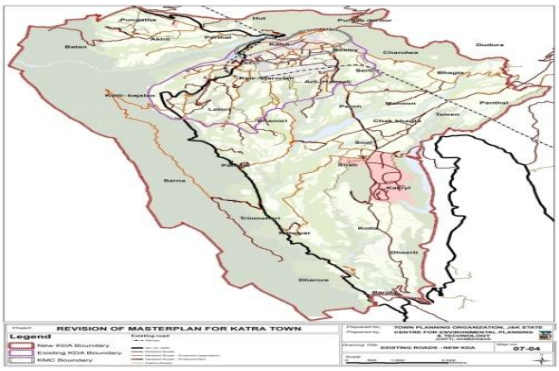

Fig – 2: Road Map of Katra

The Rail Network of this town was long demanded & is well known for the infrastructure of Katra Railway Station, inaugurated by our present PM, it opened from 4 July 2014. If we detail out the transportation scenarios then we can touch these following points:

2.1 Roads

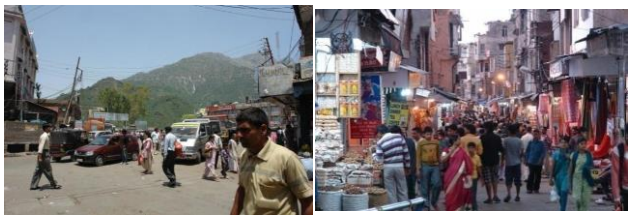

Fig – 3: Katra-Domail Road and Bus Stand -Uppar Bazaar Road.

With the passage of time Katra developed its pattern in linear Shape, Urban Sprawl took place at various areas & it developed many junctions which allow the main roads to transit from the center of this town. It has three major links of the road which we have discussed earlier Katra-Domail-Jammu road, Katra-Panthal-Tikri road & Katra-Reasi road. The three major authorities which maintaining these roads are - State Public Works Department (PWD), National Highway Authority of India (NHAI) & Border Roads Organization (BRO). These are serving inter & intracity traffic movement with 24-30 mt. wide with the pucca-metalled surface.

The existing master plan tells us that the total length of the road network is 72 K.M. (within the local area limits of municipal authority) & the major roads which fall in this category are having road width varies from 12-18 mt. and these roads are as follows:

- Bus stand - Banganga road - Darshini Darwaja
- Bus Stand - Upper Bazar
- Bus Stand - Panthal Road

2.1.1 Problems Related to Road Network:

• The condition of the road surface is very poor. Somewhere it is pucca (metalled) & somewhere it is cemented, inner lanes of the town, made with pavement blocks, are also in bad condition. Heavy Rainfall & overloaded traffic damaged the road surface.
• Chaos is created on the streets & the lanes of Main town Center, the Commercial areas (road width 3 m.). The ongoing road excavations, repairing of roads at various junctions cause the congestion & jams.
• Roads, Lanes & Sub-Lanes are without footpath but it has drains along with it with drains are open, choked with solid wastes at many places. At the peak monsoon time, it can create health problems.
• Due to illegal construction, there is no walking space & also the absence of footpaths create an excess of footfall on the road means there can't be flexible vehicular movement on the streets, roads, and the stalls on the road make this condition bad to worst.
• Improper distribution of commercial areas created chaos on the streets because of the small stalls and dhabas on the street side.

Fig - 4 : Ban-Ganga Road (Darshini –Darwaja)

• There isn't any display board of master plan on roadsides or any proper site plan banner so that pilgrims can easily achieve their aim without confusion. Parking is near the Central Square of Katra Town & it is not well managed by the authority. Drivers park their buses and cars without any proper formation or pattern which leads to a congested parking space. According to official data, 1740 vehicles enter in Katra but there is no organized parking for them.
• There are total 700 auto-rickshaws in the town with parking space only for 200 auto-rickshaws, remaining

three wheelers park at the side of road and streets which makes the condition worst.

• No sustainable measures have been taken to reduce the electricity cost because of traffic lights and other traffic equipment.

2.2 Traffic Composition and Volume:

As we observed that maximum composition of 3 wheelers, 2 wheelers & 4 wheelers (lightweight) can be seen on the main roads of Katra, if we talk about narrow lanes then only 2 wheelers & pedestrian movements are there. At the morning time, the maximum composition of 2 wheelers can be seen, and all of these riders are the local people who always go to stalls, shops, dhabas, restaurant & offices for their work. At the meantime, we can observe a constant movement of buses in parking from Jammu-Katra & vice versa & at the same time, water tankers & minibuses can be seen on Asia Junction, bus stand & Udhampur road.

At Banganga road in the evening time more of the 3 wheelers and private cars & jeeps can be observed and it is because of pilgrims who are going for Darshan and coming from darshan, at this time chaos is created by these vehicular movements.

Type of Vehicles	Bus stand		Asia mode		Banganga road		Udhampur road	
	No. of vehicles passed (counted absolute number)							
	10.30-11.30 am	6-7 pm	10.30-11.30 am	6-7 pm	10.30-11.30 am	6-7 pm	10.30-11.30 am	6-7 pm
Car /Jeep	403	447	441	477	47	80	50	77
2 wheeler	183	114	145	148	26	18	23	50
Auto-rickshaw	477	416	185	159	148	315	15	28
Tempo	27	14	40	57	4	3	2	5
Bus	23	35	108	100	0	0	3	8
Mini Bus	54	21	38	60	0	0	5	9
Truck/ water tanker	12	11	8	18	0	1	10	17
Hand cart	27	10	0	1	0	2	0	0
Cycle	2	1	1	1	0	0	0	0

Source: Primary survey conducted for traffic volume count in Katra, (5th June- 15th June 2011).

Fig -5: Traffic Composition on major junctions/roads (Source: UDPFI guidelines and KDA report)

Type of Vehicles	Bus stand		Asia Chowk		Banganga road		Udhampur road	
	PCU count							
	10.30-11.30 am	6-7 pm	10.30-11.30 am	6-7 pm	10.30-11.30 am	6-7 pm	10.30-11.30 am	6-7 pm
Car /Jeep	403	447	441	477	47	80	50	77
2 wheeler	91.5	57	72.5	74	13	9	11.5	25
Auto-rickshaw	572.4	499.2	222	190.8	177.6	378	18	33.6
Tempo	37.8	19.6	56	79.8	5.6	4.2	2.8	7
Bus	50.6	77	237.6	220	0	0	6.6	17.6
Mini Bus	75.6	29.4	53.2	84	0	0	7	12.6
Truck/ water tanker	26.4	24.2	17.6	39.6	0	2.2	22	37.4
Cycle	13.5	0.5	0	0.5	0	1	0	0

Source: Estimated from the actual traffic volume and PCU standards are adopted from Indian Road Congress guidelines for traffic and transportation

Note: PCU count for different type of vehicles is; car/jeep: 1, 2 wheeler: 0.5, auto-rickshaw: 1.2, tempo: 1.4, bus: 2.2, mini bus: 1.4, truck/water tanker: 2.2, cycle: 0.5

Fig – 6: Traffic Volume and PCU Count

If we talk about Traffic Volume then we write it as Passenger Car Equivalent (PCU), it worked on traffic variables such as speed, density, headway or load. This is a relative value which is compared by car (which has PCU:1). It is usually helpful to understand the spatial distribution of traffic on the transportation Network, to appreciate traffic characteristics in terms of size composition & variation as well as it helps us to develop services on the road network system.

After studying the PCU of different places we get to know that number of cars and auto-rickshaws is maximum at all the zones in the town, a high number of busses can be seen at bus stand & Asia Mode Junction. In comparison to Asia Mode & Bus Stand traffic is low at Banganga Road and Udhampur Road.

2.3 Railway:

Railway comes up with lots of benefits for the Katra town. Railway department acquired 2000 Kanal land of some KDA villages (i.e. Kun Darorian, Arli Hansali & Serli) for construction of railway station. So this railway station is a link between Jammu Udhampur Srinagar Baramulla Railway line, this link was completed and after the construction completed it was inaugurated in July 2014. It has increased the daily business in Katra a great deal, which clearly reflects the role of transportation planning for any city.

Alternatively, it also comes up with some modal development which could be the basis for future infrastructural development as well as transit stations development for this town**.** E.g. In this railway station ground floor contains escalators, lifts, current reservation, second class booking, train enquiry section, pilgrim guide, tourist assistance, VIP lounge, a fully air-conditioned hotel with a shopping lounge, multi-cuisine restaurant, cloak room, waiting hall, a book stall, tea stall, toilet blocks, and catering area. The first floor accommodates 8 retiring rooms and a cafeteria.

Sustainable Measures has been taken in this station. The roof is fully covered with solar panels. This railway station serves the Katra town and Shrine of Shri Mata Vaishno Devi. **Vehicular Density on the roads of this town is reduced because of this railway line**.

3. PROBLEM IDENTIFICATION AND ANALYSIS

• Katra is a well-known pilgrimage town of India, holding more than 2 million pilgrims per year. As religious driven faith shall invite these numbers with constant increments in future too. Thus, Development in terms of Commercial establishments, increase in vehicles, floating population & overall infrastructural burden on Katra is obvious.

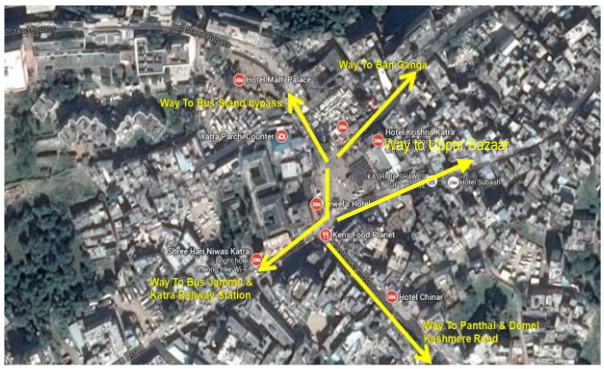

Fig-7: Katra-Connections within the city

• Katra is a town which saw less growth till 1990 until Shrine board did the main development of the Track coupled with other facilities in the town. These revolutionized the pilgrim's flow. This has opened the avenues for business establishments in the town & So, more & more agricultural land from the KDA villages region got converted into commercial use. This was more rapid until 2010 in the absence of proper Controlling authority, its implementation at ground level. Presently, about 80% of the population of Katra comprises of floating population. So, the factor of connectivity, transportation, and vehicles are due to come.

• Katra's Urban development in the last 25 years also dictates that it has been a uni-dimensional i.e. money making out of pilgrims was the only motto without any concern for the Urban pattern, urban Planning, transportation planning, Urban Design, Judicious Zoning/redevelopment plan, Architecture, Environmental concerns or energy consumption & its efficiency. Further, Business oriented development was focused only on numbers rather than its place. This factor has increased the mixed-use haphazard development pattern particularly in the strategic areas of the town, pilgrims are bound to experience.

Fig- 8: Present Katra Town

• An equitable number of support infrastructure icons like Schools, Hospitals, housing with proper and risk-free connections are altogether missing.

• Main Areas of the town totally mesmerizes the urban context i.e. Pilgrims do not feel safe, comfortable and worth appreciating the city mainly due to:

- No Place to walk comfortably on the connecting roads. (No Footpaths, no segregation of vehicular & pedestrian traffic.

- Roads used for a mix of traffic modes everywhere. E.g. Buses, Auto-Rickshaws, mini-buses, motorcycles, cars, bicycles & pedestrian locals/hawkers & pilgrims, creating an altogether Chaos.

- No regular parking lots for feeder traffic as such long traffic jams are a routine affair in the town.

- Bus Terminus is located right in the heart of the Town, though plans for its shifting are in vogue.

- In the absence of safe pedestrian modes, local scenic environment, local arts & crafts doesn't get the attention equitable to its worth.

- Architecture Style or emphasis is altogether missing & doesn't seem a concern at all in the new developments too i.e. town bears a mix of too many brands of Architecture to attract the eye of the visitor.

- Pilgrims are bound to see Katra owing to their dedication as it's the gateway (Basecamp) to Goddess Mata Vaishno Devi. However, the image of the town is far degraded than it ought to be amongst these pilgrims.

• Decentralization of the housing sector from the core, Its redevelopment focusing on eco-friendly approach, traffic identification with proper study of its peak hours, Connecting Roads quality & improvement with focus on rejuvenating the pilgrims potential of surrounding Areas like Reasi, Painthal, Udhampur is the key to promote The Image of Katra's Town in the eye of pilgrims for their safe & repetitive stay in Katra without losing the economic benefits & safety of pilgrims in the town located in seismic Zone-V.

• Yes, the image of the town has improved a lot ever since the Railway station is made functional in Katra & it's truly reflected in the numbers and business points Katra has earned since then.

Hence, Transport Planning for this Pilgrimage Town is a must for its rejuvenation.

4. PROPOSED MODEL-SUGGESTIVE MEASURES

Katra's redevelopment is the key to rejuvenate it. Statistics after the railway venture until this pilgrimage Town speaks it All. This has particularly happened due to development of new, broad Urban Highways (Roads) i.e. Railway Road Katra. Along with it, not only business establishments found a legible place to prosper but also, it gives the sense of safety to the people to stay, walk & appreciate the scenic beauty of Trikuta Hills bounded

Town. But, evidently, in history, it would be overburdened & thus, it would be another chaos of threshold Katra. Moreover, Train access to the town can motivate the people not to go for accommodation in the Town which would be a great loss to the Town & Country's exchequer. Hence following guidelines are hereby suggested for rejuvenating the town:

• Identification of sectoral Planning and sectoral Access mode: Different zones of the city need to be identified for a single function and corresponding access type. Various Successful Urban Models like Burgee's Land Use Model, Sector, and Multiple Nuclei Land use Models (for emerging impacts of motorization on the urban spatial structure) and Ebenezer Howard's Garden city theory could serve as ideal inspiration for Katra for its overall rejuvenation particularly in Transport Planning.

By Collective Collaboration of these models, we hereby propose redevelopment as follows:

• Overall redevelopment shall have a prime focus on the following aspects of transport planning within the city:

- Construction of new Roads/pedestrian movement circuits and Widening of existing movement paths available. (Roads etc.). Distribution of Traffic with injudicious road width.

- Need to identify the service roads corridors so that vehicle movement in the majority of the core areas is minimized. In addition, Most of the Areas must be fed by slow traffic during peak hours & outer periphery holds the fast traffic corridors for pilgrims.

- Construction of fly-overs, centralized parking spaces, multilevel parking lots. Identification of alternate transport measures pertaining to such a hilly & dense terrain e.g. Pod Taxi, Ropeways, electric cars, bullock cart etc. in identifies zones.

- The equal emphasis on the provision of services & street furniture in addition to transit routes. Provision of adequate Street Landscaping, Lighting requirements & security controls with in Road designs. Provision of an adequate number of Nodes (squares, junctions) and Open spaces (parks, gardens) with in the movement area of Pilgrims to appreciate the city's infrastructure, natural beauty, Architecture through the careful amalgamation of Roads, buildings, and open spaces.

- Proper Waste disposal criteria in new plans are equally important to check the incidents like recent chopper crash due to vulture crash. (on way to Bhawan).

- Connectivity to nearby thrust pilgrim potential areas in addition to the advertisement of the same in road & movement corridor redevelopment.

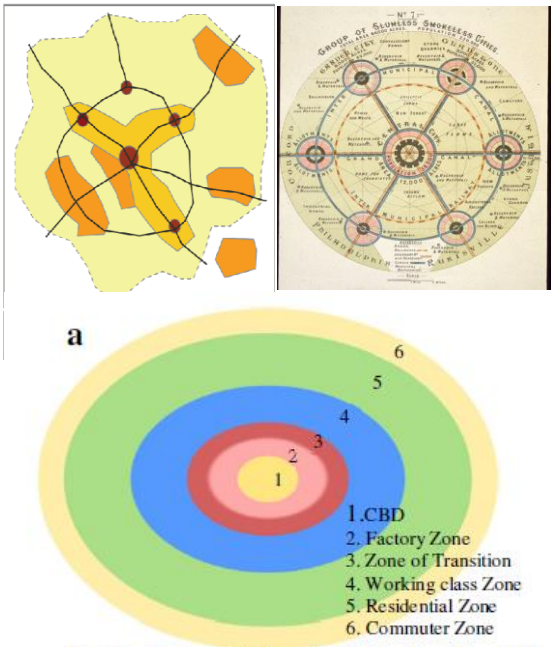

Fig-9: Inspirations: Hybrid Model, Ebenezer Howard's Garden city Model & Burgee's Land-Use Model.

• Redevelopment must focus on single-use activity zones majority i.e. central hub (central square) must be totally pedestrian friendly zone (CBD) comprising of low rise kiosks, market area, street furniture, facilitating safe movement of pedestrians to enjoy various activities of the town, art & craft of the town in addition to the various open spaces for the tourists to sit & for some processions, celebrations in the peak season time (auspicious time of the year). This zone directs pilgrims for onward journey to the shrine, holding ticketing counters & other booking facilities.

• Immediately to the outer side of the core, there should be area comprising of hotels, guest houses & other accommodation needs to be served by slow traffic from transit stations like bus stops, train junctions etc. So, All the housing from the core must be shifted elsewhere.

• To the outer of the Hotel Zone, there has to be a commuter zone for slow traffic which would be allowed in the CBD area and hotel zone in intervals for different needs. This zone also comprises of dedicated parking lots for the convenience of one and all. Moreover, these parking lots must be so located that 5-minute walking distance from the fast traffic commuter zone to this zone shall hold good for successful urbanism environment. This Zone shall also have provision for Pod Taxis, Rope Ways, Bullock carts etc. for accessing different inner zones for areas on the pilgrimage track.

- To the outer of commuter Zone, there has to be amenities zone comprising of schools, hospitals, community halls etc. for the needs of locals and pilgrims accessible by commuter zone's slow traffic.

- Outside of above zone, residential zone for the local businessmen, workers lie; who would be accessing all the above zones through own vehicles or slow traffic.

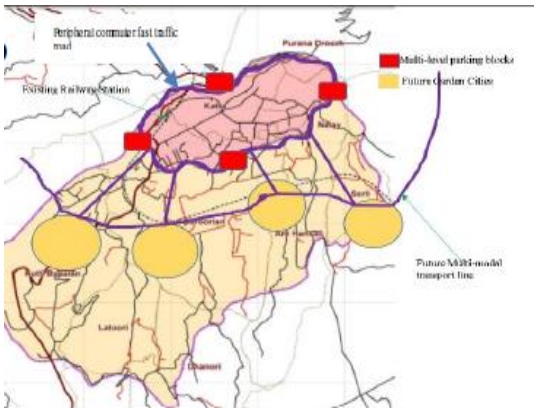

Fig-10: Fast Traffic Zone with multilevel parking and satellite towns-Connections- A schematic proposal for Katra Town

- Above zone shall be surrounded by fast traffic zone linking Katra with other parts of the state. It includes Bus terminus, train junction etc. within it, in addition to parking lots for slow traffic modes for carrying passengers to the commuter zone (3) or inner zones where allowed. No Fast traffic mode is allowed in any zone except this one. It shall also hold multilevel parking lots to hold vehicle rush in peak seasons/hours.

- To its outside, the industrial belt may be explored (presently absent) within thick forest cover belt. It shall have land supporting the historically & ecologically important prime occupation, agriculture in all times.

- The architecture of Katra must ensure the local Hill-style popularity, art & craft, materials, climate, safety & longevity & So, North Indian Temple architecture for religious buildings & sloping roofs in other buildings with local materials within seismic zone V provisions may be practiced. Norms must be put in new plans to stop mix of different architectural styles to globalize the unique diversity of Indian Arch. & culture.

- Regular controls and bye-laws must ensure proper density in all the zones beyond which satellite towns may be developed to rejuvenate Main Town Katra. Fortunately, there is great religious potential present in neighboring towns like Painthal, Reasi etc. which may be connected appropriately to Katra in order to encash upon a prestigious pilgrimage tourist circuit.

Fig -11: Road redevelopment pattern.

- These satellite towns may be accessed through new modes like MRTS or Pod Taxis to & from Katra, & among themselves. Each of these should have proper bye-laws, density control, prime agricultural belt, industrial belt & forest cover to make it self-sustainable.

- Road infrastructure coupled with urban amenities friendly to pedestrian-pilgrimage traffic shall be the best way in transport redevelopment pattern, Landscape must be the core ingredient of whole plan.

- Bus stand, police station must move out of CBD (central region), to give way to urban open spaces.

5. CONCLUSION

Religious driven Katra is due to receive pilgrims inflow till eternity. The beauty, image & safety of its inhabitants largely depends on area's infrastructure, comfort measures & activities. In Katra, business benefits from pilgrimage tourists are prime. So, they must spend time in Katra. Hence, Transport planning is the main connecting device to prompt & facilitate the tourist to stay, to explore the beauty of the place & able surroundings. It's the contemporary age & most of the cities across the world have gained importance owing to their infrastructure complimenting the transport corridors & vice-versa. Thus, for the overall sustainable future of Katra, its redevelopment focusing on legible architecture style promoting the tradition and diversity of a place must be promoted in general & careful Transport planning (as mentioned above) facilitating the usage/visits of the pilgrimage tourists to said iconic structures & places, in particular, is the must requirement. Pilgrims attract & capture the image owing to different elements of transport planning present in the city (e.g. urban squares of Nepal, urban design nodes), same must be targeted in the transport planning redevelopment. Also, New Transit stations must inspire from Katra railway station to take step towards energy efficiency & quality infrastructure for its overall growth.

REFERENCES

[1] Anoop Kumar Sharma, "Revitalizing the Urban Development Scenario- Contemporary Katra Town",

Procedia - Social and Behavioral Sciences 216 (2016) pp. 236-248, Jan-2016.

[2] Sumant Sharma, Anoop Kumar Sharma, Ashwani Kumar (2011), "New city model to reduce demand for transportation", Procedia Engineering 21.Elsevier International Conference on green buildings and sustainable cities, pp.1078-1087, 2011.

[3] Sumant Sharma, Ashwani Kumar, Anoop Sharma, " New Urbanism Model for Indian Cities", Proceed.ings – Int. conf. on Urbanism & Green Architecture, NIT Hamirpur, India, Oct.-10.

[4] A. Kumar, Impact of building regulations on Indian hill towns, HBRC Journal(2015), available online at https://www.researchgate.net/deref/http%3A%2F%2Fdx.doi.org%2F10.1016%2Fj.hbrcj.2015.02.002

[5] A.Kumar, Satish Pipralia, sumant sharma, Anoop Kumar, " impact of transport projects on Architecture", International Journal of Enhanced Research in Science Technology & Engineering, ISSN: 2319-7463, 3(2), Feb-14, pp: (281-286).

[6] Daily excelsior report for Katra a casualty of mismanagement.

[7] CEPT University, Ahmedabad (India) (2012). "Draft master Plan Report (2012)" Preparation of Master Plan for Katra Town. For Town planning organization (TPO).

[8] UDPFI GUIDELINES

[9] www.Wikipedia.org,www.mapsofindia.co.in, www.google.com/images.