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PROFESSIONAL EXPERTISE CRONOLOGY.

2010 - present – RODZ +, Innovation and design consultancy agency. From 2010 to date, I have performed mainly as a project leader in design and engineering, the knowledge I have experienced during my whole professional duty, had given me the ability to manage projects from their conceptual phase, verifying that the products adhere to the requirements of the market or the marketing departments, their feasibility , its stylistic design and its level of manufacturability. My work is focused on reviewing and making projects come true, evaluating the previous topics and facilitating that they are carried out in the best way, through the teamwork of diverse professionals and suppliers. Since then, I have implemented collaborative work remotely using digital tools and video conference. For project execution, I assembled specialized teams with highly skilled professionals, and leveraged the network of all my business connections and suppliers that I had developed. With that combo, was able to provide a wide range of design and engineering services, ranging from specialized furniture products for laboratories and medical equipment, to automotive and mechanical accessories and advanced design projects for international automotive companies, such as Ford Motor Co., AUDI, Chrysler, General Motors, Crown Lift Trucks, Nissan, Seat, Air design and several more. I also have collaborated as a professor at the undergraduate and graduate levels at prestigious universities such as ITESM, U. Iberoamericana, U. of the State of Mexico, Rigoletti Casa de Diseño, and since 2014 to present, I have been the master professor of the Automotive Design Engineering Masters program, at Universidad Anahuac campus Norte.

Since 2015 to present, University of Cincinnati Colaboration: I have had a special collaboration with the University of Cincinnati. At this last place, I have co-led several special industry sponsored projects in their Transportation Design program and their Future Mobility Center. I am currently training their industrial design faculty and their head of transportation design in the topic of automotive design packaging. Through this RODZ+ journey, many of the projects that I have had the opportunity to lead, have been highly recognized by the sponsoring companies as well as have won some awards.

I am a part-time researcher of Design and Innovation topics, writing several articles on the subject and my work has been presented at conferences such as the International Association of Design Research Societies celebrated at the University of Cincinnati in 2017. My work has been published in various books and magazines. Furthermore, I have been fortunate to have been invited as a lecturer more than 150 times by very diverse academic institutions and companies in many parts of Mexico, the United States, and Guatemala.

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2005 - 2009 – Hunpel Sudios. Co-founder and leader of the Design area of this 24 employee consultancy firm. 2006 - 2008, Design of 3 urban buses for the company Operbus SA de CV. The strategic design project brought the company from a bankrupt state to a state of financial equilibrium in 1.5 years. The evolutionary design of 3 buses was carried out by joining two chassis (Mercedes and International), in a single production line, standardizing 82% of its components and implementing that many of its processes were carried out by external suppliers to do increase manufacturing efficiency, reducing costs and increasing quality. The company manufactured 1,300 units between 2007 and 2009.

Detailed achievements and challenges faced during Hunpel Studios. Please review appendix "B"

1997 - 2004 – General Motors. Several successes were obtained during my stay, but the most important was being part of the design and engineering team of the Chevy C2 project (1999 - 2003), where I served as Senior Interior Design leader (2001 to 2003 Working at Design Center over General Motors Tech Center at Warren Michigan). After the earlier model lost more than 50% in sales, the new product gained great success after its launch, re-emerging as the sales leader in 2004, going from 24,500 units to 76,000 units in 1 year. The Chairman's Honors Award was also obtained as part of the company's top 5 projects worldwide in 2004. And the car interiors won the National Quorum Design Award, also at the end of that year.

Detailed achievements and challenges faced during GM. Please review appendix "C"

1993 - 1996 – Leader of the Design Team of the First Tonatiuh Solar Car from 1993 to 1995. And global coordinator of the project in 1996. The vehicle was built with composite materials. The team took the vehicle to compete in the United States Sunrayce in 1995, where 2 awards were achieved: the "Composite Award" given by 3M for the best design with the use of composite materials, and The Max J. King Award, an award won by the team for being best representing team spirit. In 1996, the vehicle was entered in the "World Solar Challenge" race held in Australia where we finished 6th in our category. **1995 - 2005 – Formula Electratón México**, the first inter-university competition for electric vehicles in México, designed and built by students and private participants. I was a core part of the team that created the event and the design and manufacturing rules, as well as the competition rules. I remained as organizer of the event for 10 consecutive years, together with the initial team, after which the event was given to the National Auto Parts Industry (INA) and finally in 2017, it was finally retaken by one of the initial competitors. From its beginnings to the present, the event has reached a big relevance similar to the Mini Baja and Fórmula SAE events. More than 15,000 engineers and designers have been trained, many of whom currently work in various automotive industries.

APPENDIX “C” GENERAL MOTORS ACHIEVEMENTS AND CHALLENGES.

ACHIEVEMENTS IN GM IN CHRONOLOGICAL ORDER.

Participation as Senior Creative Designer and Design Engineer

1997 and 1998: Activities as Junior Designer.

- Textile design for the “J” platform (Mid size sedans) (Chevrolet Cavalier and Pontiac Sunfire), and the “S” platform (Small cars) (first generation Chevy).

- Development of textile suppliers (American Textil SA de CV and Industrias TEXEL) for the same “J and S” platforms and monitoring of textile development from conceptual design to implementation on the production line.

- Participation in TREC's product engineering "Remediation" program to solve complicated and remaining problems on various platforms, Example: Cost reduction, resolution of noise and vibrations, efficiency of parts and components.

- Design and preparation of concept vehicles for the 1997 and 1998 Autoshows, over Monza, Chevy Pick Up and Chevy Joy 3 doors.

1999 - 2000:

• Part of the Pope Movil design team and supervisor of its construction at “Roush Industries Inc. in Livonia Michigan. (https://www.roush.com/)

• Training as a "Compartment Integration Designer" (CID) at the Tech Center facilities in Warren Michigan and the "Truk Product Center" in Pontiac Michigan.

• Training as an assembler sequence evaluator and interference analysis, using virtual reality technology at the Advanced Mockup facilities at the Truk Product Center in Pontiac Michigan.

• Training for scanning surfaces on clay models or rigid foam models, using an Analog Digitizer. The training was received in the Saturn brand studio facility at "The GM Design Center" in Warren Michigan.

• Training in ISO 9000 and champion of processes, procedures and evidence of the Design Study of GM Mexico at Toluca State of Mexico.

• Responsible for activities as a CID (Compartment Integration Designer) for global virtual Mockup meetings for platforms "J" and "P90".

ACHIEVEMENTS IN GM IN CHRONOLOGICAL ORDER. (continuation)

• Planning and assembly of study management activities for the Chevy vehicle redesign project (platform "S") in its three versions: 3, 4 and 5 doors. As a responsibility for this work, I was assigned to develop the report of the possible changes that the vehicle could withstand was prepared, which included a complete analysis of parts and components of exterior and interior (appearance and Body and Frame), based on two scenarios: Scenario 1: (low cost) for making Minor Enhancements, and Scenario 2: More outstanding changes for a Mid Cycle Enhancement development.

• Participation as part of the Design team of the C04 project. This project worked as simulation for the C2 MCE Project (Or Chevy Redesign). An aspirational Mini SUV was developed, based on the current 4200-S platform or Chevy. The project was developed in just 3 months, from the initial design to a 1: 1 scale physical model, which was developed at the facilities of Tecno Idea, a former company belonging to Designer Daniel Mastretta Guzmán. For this project I also had the opportunity to supervise the construction of the model until its completion and presentation at the General Motors Internal clinic where it was shown, together with other concept vehicles. For this project 3 half-scale models 1: 4 were also developed, the 4-door sedan version, the 3-door hatch back version and the mini Pick Up version.

2001 - 2003 The great adventure of C2 Project.

• Participation as Senior Creative Designer in planning activities for the S4200 or Chevy C2 Mid Cycle Enhancement project. Under this assignment, an in-depth investigation was generated of all the components that were going to be affected by the project, both interior and exterior parts, analyzing their level of impact. The report generated included: detailed development of the list of parts and components that were going to be affected in the development, analyzing their level of change, type of suppliers involved and level of resources that were going to be necessary for the development of each component.

• Participation as Senior Creative Designer in the initial development of the conceptualization of exterior and interior components for the C2 MCE project. This first development was carried out during the second half of the year 2000, within the facilities of the Design Studio, within the Technical Center of Engineering in Toluca (TREC)

• For 2001, the project continued its development in a satellite study of the General Motors Technical Scepter in Warren Michigan. For this assignment I was transferred to the United States to be part of the design team, and to continue the ideas that we developed during the second half of the year 2000 in the Mexico studio.

ACHIEVEMENTS IN GM IN CHRONOLOGICAL ORDER. (continuation)

• My main positions weighed on conceptualizing both the vehicle's "Front End and Rear End," centralized in the development of the Intake's front bumper and Chevy bow tie front emblem design, as well as the front grille. But mainly my greatest performance was in the development of the interiors of the vehicle, along with 2 other designers. Conceptual design included door panels, instrumental panel and upper center console, as well as some components like the steering wheel, the shifter knob and seat textiles, color selection, finishes and textures, component validation for the texturing process and as a harmony leader to validate perceived quality in assemblies and the equalization and adjustment of colors, textures and finishes, of the whole components of the interior, as well as the equalization of the color and intensity in the lighting of the various components of the panel (IP), which integrated different types of technology illumination.

Next I will describe each of the assignments below:

a) **Design of the Cluster:** This component had very little budget, and it was intended only to do a minimal redesign of its gages, reusing 90% of the original component, however a component like this is very important, since it communicates the level of technology that the car has behind the driver eyes, and this effect, psychologically has a strong emotional impact. For this reason I decided to see how to make the biggest possible change of the old component, so I had to apply a strategic design, which demanded to generate several budget exchanges, in order to transfer economic resources from other expensive components not so relevant, towards the cluster. On the other hand, lighting technology, that was very old (incandescent bulb lighting by reflection) could not be upgraded to LED technology (current technology in the year 2000) and this was a great challenge because we had to design a series of refractive lenses behind the old cluster. I have given full lectures only recounting the great challenge that this component demanded, so it would be impossible to write the achievement in this mean. Once they obtained the resources for its development, the aesthetic design of the component was already carried out, which also required interesting resources. The cluster was extremely successful in the end, due to the design of its lighting, the illuminated needles, the details, and satin chrome bezels, despite all its technological and economic difficulties.

Challenges:

1. Transform a cluster with more than 70% parts and carry over technology, designed in the late 80s, into a successful and aesthetic product, very competitive with clusters designed for products of the new millennium.

2. Improve the lighting of the product by 78%, according to data from the supplier Magneti Marelli.

ACHIEVEMENTS IN GM IN CHRONOLOGICAL ORDER. (continuation)

3. The achievement of financial resources for the development of a component, which had only been approved to increase $ 1.00 USD in its final cost, through the exchange of components, parts and tooling costs, and many negotiation meetings with the planning group.

4. Designing a cluster that would impact three different market segments differentiated by age and gender. Designed for Men and Women and for young people between 20 to 30 years old, adults under heritage formation between the 30s and 40s and a segment of mature adults between the 50s and 60s.

b) Steering Wheel Design: I also participated in the design of this component, selection of textures and stylistic design, here the grip was improved, increasing the thickness of the wheel section and defining the complementary character. The horn pad central emblem was also designed by me.

c) Upper center console design: This component integrated the rubber mat design of the upper storage bin, HVAC knob design, Lighting design and harmonization, monitoring the integration of the new Clarion sound system. This component had a major technical problem to resolve. Normally all components of this type (Center Stack or upper center consoles) are manufactured in ABS polymer, which provides structural stability and a good appearance, but for costs, the material selection for this component was PP (Polypropylene) this material is more unstable and very difficult to finish, under the texture requirements that ourselves as a studio had determined. So the TRW supplier from Brazil was actually delivering very poorly manufactured parts. For this reason, I was assigned to follow up on the component in Sao Paulo Brazil, where I was working in command with the TIER 1 sub-suppliers (TIER 2 and 3) until the tooling was ready for texturing. Several analysis and processes had to be applied, from the CAD model, both class “A” and surface “B”, in order to eliminate problems that existed from CAD, injection tool cutting and the injection process itself. 2 and a half months were necessary to solve each of the problems until leaving a component worthy of being assembled on the board.

d) Design of the lower center console. This other component posed a great challenge. On the one hand, it was not considered within the original scope of the project, since due to costs, the “Carry over” console that the vehicle originally brought was going to be used and, on the other hand, this floor console was not connected to the IP, however, the new concept involved integrating it into the IP as if they were a single piece.

I was assigned to solve the project, together with my engineering counterpart, with a time limit of 60 days, from the conceptual phase to the prototype, because the entire vehicle was already under validation and this component had to match the same validation date as the rest of the interior components.

ACHIEVEMENTS IN GM IN CHRONOLOGICAL ORDER. (continuation)

Challenges:

1. Pack new components that the original floor console did not have such as: Storage bin for cell phone and for glasses, Ashtray, Power outlet and cigarret electric lighting and button for front fog lamps.

2. Dock the new console whose fixings were located on the platform, to the board, under the problem that the board had a decoupling cloud of +/- 5mm in Z, 8mm in X and 5mm in Y, what which made the connection between the console and the lower part of the center stack very difficult.

3. The same console had to be used, both for the manual version and for the automatic version. The latter was the one that was causing the coupling problems since the base of the PRNDL (Besel of the automatic gear lever) was fixed to the gearbox (platform) and the Console was now fixed to the dash on the one hand. Thanks to the development of a wide variety of rapid prototypes made of cardboard and polyurethane foam, we were able to carry out many physical coupling and packaging tests on the vehicle's platform, which allowed us to find out diverse solutions in record time.

4. In order to carry out this assignment, I had to carry out interference analysis, new assembly concepts, partitioning of the component in 2 to make it feasible to assemble and a floating clamping system that helped the assemblability of the product, both with the base of the IP as with the PRNDL base of the automatic gearbox lever. The component was finished on time and approved for production.

e) Design of Knobs for the HV / AC system (Heating, Ventilation and Air Conditined).
As it happenes with the lower console, these components were not included in the original pipe-plane of the program, since it had been decided to use the carry over knobs on the previous board. But after the success of the express design of the floor console, I was assigned to redesign the new knobs, according to the brand character that we had been handling in other components such as the cluster gages, cluster needles and the gear lever knob ring. Helped by my engineer on duty and by TRW Brazil engineers, we were able to finish these components, also in record time.

f) Design of the shifter knob. This component, simple as it may seem, also turned out to be complex issue, due to the low budget it had for its development. So after very diverse proposals, a strategy never before seen in such a component was selected. Instead of having a single injection in some EPDM with an ABS insert in the palm support face, it was decided to put all the meat on the grill to integrate a luxurious chrome ring to the lever, so the design was all made in EPDM with a SAND-like texture and under flush graphics, but highlighting the design with the chrome ring manufactured in ABS and satin chrome finish. In this way we obtained a very attractive design at a low cost.

ACHIEVEMENTS IN GM IN CHRONOLOGICAL ORDER. (continuation)

g) Design of the pattern for the seat textiles. After several designs, a very interesting geometric pattern was approved, monochrome but with 3 different shades of the same color, which made a 3D prism-like effect. The fabric supplier was American Textil, and the seat supplier was Lear Industries. Once the fabric for both the central insert (pattern) and the bolster (smooth fabric for the sides and back) was approved, a production was made to make 40 tray-out seats to find out possible manufacturing issues. We thought that everything would be fine, but it turns out that the insert fabric, which is the fabric with geometric patterns, was based on an ortogonal square modules, and also, the inserts, at the center of the seat and the front part of the backrest, were also square. So, from the bonded fabric fastening process to the sewing and assembly process, there was a pattern deviation of up to 16mm, making the inserts all look crooked. There was no more time for a new fabric design and a new development, the supplier had struck with his tolerance figure and American Textil had not been able to forecast such visual aberration…. After several days at the Industrial LEAR plant, I figured out to start testing with a different mind paradigm, changing the orthogonal angle of the pattern's through several overlapping simulations. While everyone was fighting and yelling, I was focused on trying to solve the problem, so suddenly “Voilá” when turning 45 ° in the alignment of the pattern, the feeling of misalignment disappeared, so I prepared several seats with a variation of up to 10 ° between sample to sample, so I made 6 samples of seats, cutting inserts and placing them with pins and each sample with variations of up to 10 ° and the aberration was imperceptible, since the 3D geometric effect that the insert pattern had, caused that when rotated more than 30 °, the misalignment effect disappeared because the human eye no longer located an orthogonal reference to notice deviation. So I called the group and asked if they noticed the difference. They could perceive that something different was happening but they did not notice what it was and they asked me amazed that, what had I done. So I explained the change in angle orientation to them and that was the solution. American Textil redesigned the pattern so that the fabric was woven at 45 ° and the issue was resolved.

h) Champion of the “seating buck” for final approval of interiors. This assignment was fun but very complex, as its goal was to assemble a prototype vehicle interior simulator for final approval. This approval was executed by the “GM Strategy Board”, made up of the president of the subsidiary, Arturo Elias and the general managers of Marketing, Planning and Product Engineering. The Simulator was presented at the GM Mexico Design Studio facilities. The challenge was great since I had to install in a “Black Metal” or body structure of a Chevy Monza 4 doors, all the interior components, which were categorized into “carry over” components and new components. As the final design was not yet frozen in this phase, there was still no tooling developed and there were no injected parts yet, and the new components had to be manufactured through many different technologies, from components cut into hard foam with CNC machinery (Milling Machines) and many others parts manufactured with stereolithography processes such as SLS and SLA.

ACHIEVEMENTS IN GM IN CHRONOLOGICAL ORDER. (continuation)

All the components were sent to the facilities of one of the suppliers that was going to develop the texturing of the dashboard, in Michigan, they captured the selected textures in a self-adhesive polymeric film to imitate the texture of the grain patterns, and texture, and matched with acrylic lacquer paint, the colors of the approved color patterns. In this way they reproduced all the interior parts and sent them to me in a special shipment to the Product Engineering facilities in Toluca Mexico. To carry out the total assembly, it was necessary to first obtain all the “carry over” components such as carpet, the head liner, and all the lining plastics called “garnishes”. In addition, Industrial LEAR was asked to provide us with a set of front and rear seats. Finally, with the structure, the “Carry Over” components and all the prototypes of the new components, which were: The 4 door panels with fabric insert, Instrument panel with Center Stack and Cluster and the Floor Console, I was able to assemble the entire LEGO in a week. At the end I was very shocked by the level of realism of that big simulator, and therefore very pleased with the work. Then finally, the meeting was held and the interior design was a complete success, fortunately.

i) Component Surface Validation for Texturing champion. I was assigned to be in charge of the CSVT process for interior components, which was necessary to be able to release the class “A” surface of all interior components for the texturing provider. As I had been in charge of the Color & Trim selection for interiors, then I knew in depth all the color and texture patterns of the vehicle. I had not done this activity before, and the problem was that the 4 harmony engineers GM of Mexico had trained, were already assigned to other full-time projects, so at a meeting the crisis and the lack of resources became evident, so that, I proposed myself to carry out this activity. In order to accomplish this, I had to get train as a Harmony Engineer in just 2 weeks. I went to one of the CSVT gurus (Eng. Mike Docus) who was located at the Launch Vehicle Center facilities at the GM HQ in Warren MI, and he provided me with all the necessary information and explained everything. He took me to meet the texture application suppliers and he showed me how the process was done step by step. Then I contacted the plastic injection engineers to teach me all the different types of problems that could appear in an injection part and in the tooling itself. Then I went to the Class “A” modeling center in the Chevrolet studio, for the modelers to explain to me all the possible problems that could appear on the surface of a component. And finally, I went again to the Launch Vehicle Center, so that the product engineers could show me how a bad design of surface "B" could affect class "A" in the injection process. After my intensive course, I got to work and began to evaluate each and every one of the interior components, analyzing their problems, detecting their origin and working full time with each supplier and each engineer who owns the part, to be able to set each component ready for the texturing process. This process was highly enriching, since it made me travel to the supplier factories in the US, Mexico and Brazil. In the end, all components were successfully released and I received great recognition for the work.

ACHIEVEMENTS IN GM IN CHRONOLOGICAL ORDER. (continuation)

j) Responsible for interior harmony to make match colors, textures and finishes. With the acquired knowledge in this field, it was possible to carry out the harmonization activity of all the interior components. Once all the texturing tools were approved, it was possible to assemble model-prototypes with non-salable components, to equalize the color of the pigments of the whole components, which belonged to very different suppliers, as well as the type of textures, level of gloss and finishes. The process required to approve the CGT & G masters (Color, Gloss, Texture & Grain) through laboratory tests issued by the Appearance Engineering area. However, when carrying out this process (by the book) I realized that despite the readings under laboratory measurements they were correct, when I assembled the components in the vehicle and analyzed it in daylight and inside CHR (Color Room and Harmony), under UV and infrared light patterns, all the components seemed to be made with uneven polymers, at first we thought that the suppliers were not doing their job well, however, I realized that according to the design characteristics of the interior of the C2, which had 3 different plastic colors, the influence of one color on the other, the position of the components and their level of light reflection, changed its appearance. So, I had to ask color experts again and I had to study the subject intensively and in depth and after a couple of weeks I had to put the conventional procedures aside, and redesign the way the color masters should be analyzed. So, I did a reverse process. Inviting all suppliers to the component appearance review sessions, held at the CHR (Color Harmony Room) and with manual colorimeters and glossy-meters we were determining the true HUE-BL color coordinate of each part, and each supplier reformulated the pigments of their raw materials and re-injected each component. For the next prototype model, the improvement was overwhelming, and so we continued to do the trial-and-error process until by the 4th lap the components were harmonious and equalized. Then each supplier changed their pattern to appearance and around 8 different “CGT & G Masters” developed for approval. This new way of analysis by eye adjustment, made the entire interior look great.

k) Harmony processes to equalize the lighting of interior components. After the success of matching the colors, textures, and gloss levels and finishes of the interior components, I was assigned to perform the same process but now with the color and intensity of illumination of the components with illuminated controls. The main challenge I faced was that each component had a different lighting technology, some of them had LED lighting, some others had a direct incandescent bulb, and others had a filtered incandescent bulb, but also some had a refracted incandescent bulb.

To start, I took as a color lighting pattern, the Cluster, which was the first component developed in an integral way. In this case, a physical color code, such as a PANTONE type color code, did not work since the identification of a color in the light is carried out by means of the variation of the wavelength and energy applied to a LED. For this reason, it was very difficult to equalize, so as we did with the color masters for plastic components, it was necessary to figured out a strategy for each lighting technology in the various components that required lighting.

ACHIEVEMENTS IN GM IN CHRONOLOGICAL ORDER. (continuation)

1. **Cluster:** The lighting was achieved by the action of the refraction of 2 light bulbs, through injected polycarbonate lenses and conduits to make the light refract and distribute it more affectively in the 3 gages of the Cluster (Gasoline measuring dial, speedometer and odometer and dial for measuring the temperature). Since the lighting was retro-projected, the color was realized by means of screen printing of meshes or dot concentration matrices, applied to the back of the polycarbonate faces of each device. A PANTONE code was assigned to the pigment used to print the gages, this way it could work as the initial color pattern.

2. HV / AC Controls and Headlight Knob. This pair of components were illuminated by means of direct projection incandescent bulbs, since the “Carry Over” lighting was amber without filtering, and since the new lighting was orange to follow the Opel brand character pattern (Brand original vehicle), we now had to see how to filter that light, for which EPDM caps were developed, whose pigment was created based on the orange PANTONE code developed for the cluster.

3. Stereo Clarion: this component already integrates LED lighting, the requirement for the supplier was to stablish the color lighting on the appearance of the Cluster lighting, they varied the wavelength of the LEDs to achieve the correct lighting. To execute this, it was necessary to give the supplier a cluster as a sample, since they had to evaluate the color of the light in the dark room in order to approximate the tone by trial and error. According to the supplier, it was the first time they did this practice, so they learned a new way to achieve equalization of light for other brands, with the same issue.

In the end, having developed the lighting for each component, I decided to do an overall evaluation all together, so I assembled all the components on a board and inside the Color Harmony Room completely off, I decided to evaluate the assembly. And by means of a 2MP digital camera that was mine, I took shots in the dark with 500 milli-seconds, for the camera to capture the true intensity of color in each component and through these photos, it was possible to calibrate the color and the light intensity of each component with each one from suppliers. The final result was an equalized and very homogeneous lighting on the IP. This achievement was also commendable because I received another internal recognition.

I) Harmony inspector for interior and exterior component assembly appearance on vehicles under try-out production. This assignment was very exhausting but very important. I was assigned to verify the perceived appearance problems in the assembly between components during the first C2 try-outs at the Ramos Arizpe General Motors plant in Nuevo León. The task was to create a photographic report, specifying that the assembly was not complying with the design requirements, indicating the current condition and how it should be executed. The problems were diverse, from torsion or warping in the pieces, detection of "V" Gaps, poor condition of alignment between components, or bad assembly between components.

ACHIEVEMENTS IN GM IN CHRONOLOGICAL ORDER. (continuation)

In addition to locating the problem, the change had to be managed and made known to both the component engineer and the supplier responsible for producing the part, all through endless meetings within the plant. The work started from 6am every day, everyone walking next to the vehicle, during the assembly process, to visualize assembly problems in the sequence, until the static review of the finished product. A total of 48 vehicles were evaluated, among which were 3, 4 and 5-door models. In this way, we were able to analyze where the origin of the problem was, which could lie from a bad design of the component's "B" surface, poor execution of the manufacturing process, bad execution of the assembly or all together, and to be able to average a cloud of errors with all the units at the end. It was a task that required arduous teamwork of approximately 12 hours a day, for 2 consecutive weeks, with long board sessions and reviews. An exhaustive but very pressing and beneficial work for the product.

m) Final harmony check during Last round of non-salable vehicles. This activity was carried out during three rounds of in-plant tray outs, to ensure that all the changes that had been pointed out in previous rounds had been made and corrected. Little by little we were releasing the vehicle components until final production.

n) Ride and drive to Acapulco, night lighting tests. During the last round of "Not Sellable vehicles", when the vast majority of the components had been released, I had to participate in a "Ride & Drive" test that was carried out with 5 units, from the City of Toluca to Acapulco, to test vehicle lighting for both exterior and interior lighting. In this test, the vehicles were evaluated at the level of sensory perception and usability, all the vehicles already under normal use. Still small adjustments were detected by me, which caused some displeasure in some of the engineering groups as this required them to do one last round of small refinements. However, this act was well seen by the "Upper Management" that supported my actions, encouraging that these last minor adjustments put the vehicle in excellent criticism by the advertising media, who would later launch dozens of articles on the reappearance of the new Chevy, now called C2.

2003 - 2004 Back to the study of Mexico at the TREC facilities in Toluca.

o) Design of a special version of "Limited Edition". As part of the marketing effort to make the new launch rebound, we sold him the idea as a studio to create a "Special Edition" version, so we were asked to generate and submit proposals. We worked for a month to develop diverse alternatives with diffeent levels of change. Finally one of the proposals was approved, whose changes only impacted the aesthetic part of the vehicle. The changes were in the development of a new emblem, changes in the seating trim, change in the body paint, creation of sports accessories and interior accessories. In this project I focused on developing the "Special Edition" emblem and looking for alternatives for interior accessories. After an investigation, due to budget reasons, only the attachment of a cup holder was authorized to improve the performance of the vehicle. The promise was that depending on customer feedback and behavior, if this component liked it, then it would already be implemented as a standard accessory for the 2006 version.

ACHIEVEMENTS IN GM IN CHRONOLOGICAL ORDER. (continuation)

Challenge: Apparently designing a cup holder should not pose any problem, however, this same accessory had been required as part of the center floor console program, however due to the lack of space and because of the requirements of Human Factors, it could not be implemented at that time on the console. For this reason, the first challenge was to find the ideal place for this new component. A large number of proposals were made, but to top it off, there was almost no budget to develop it, so any folding mechanism or complex devise were completely ruled out. Due to this, I was about to give up, until I had the idea of placing it between the seats, behind the floor console, over the carpeting. Many interference, usability and safety studies had to be carried out to ensure that the component was not going to cause any interference with the seat belt buckle brackets, in the whole seating positions, taking into account the maximum and the minimums, determined by the 5th and 90th percentiles. After several internal and external clinics, and several reviews with the Human Factors team, I was able to demonstrate that the component was feasible and very economical to produce, since it was designed under a single cavity injection process, that is, a single male-female tooling. The component had very good reviews and as it was said, it was implemented in regular production for equipped vehicles in 2006. Regarding the emblem, it was also very charismatic, pointing to an era of a special edition vehicle, whose manufacture was only of 500 units. Outdoor sports accessories were incorporated into an after-sales market that was nominated as the Chevy Streaming KIT for "After Market" only sales at dealers.

p) Collaboration with the GM Brazil and GM Detroit design studios. Upon completion of the C2 project, I stablished again at the GM Mexico design studio. The 3 members were assigned to support various projects that were being developed both at General Motors Brazil and at some GM studios in Warren Michigan. Under this assignment I had the opportunity to generate conceptualization of:

1. Interior proposals for a four-wheel drive SUV named Chevy Niva.
2. Exterior proposals for mid-size sedans and mini SUVs over the Meriva platform, developed for GM Brazil.
3. Wheel cover and rim proposals for a Saturn brand sports vehicle.
4. Interior proposals for the latest edition of the Saturn VUE SUV.
5. We start working again for a new interior proposals for the coming 2008 C3 Minor Enhancement Project .

By the end of 2003, the C2 project was awarded with the highest prize: The “Chairmans Honors Award” which is only awarded to 5 projects developed at the global GM level, every 2 years. Additionally, special recognitions are awarded to only 25 members of the entire team, for their outstanding participation. The average number of General Motors people involved in the C2 project was estimated to be approximately 500 people, and I was fortunate to have received one of those 25 special recognitions, signed directly by Rick Wagoner, President of General Motors Global. in those times.

APPENDIX "B" HUNPEL STUDIOS ACHIEVEMENTS AND CHALLENGES.

ACHIEVEMENTS IN HUNPEL IN CHRONOLOGICAL ORDER FROM 2006 TO 2008.

Activities as a Design and Engenieering Manager

As co-founder of Hunpel SA de CV, my responsibility laid in leading the Design and Design Engineering area for the development and manufacture of the exterior and interior components, mainly for public transportation buses.

2006, Development of the OB1 project. CATOSA (Carrocerías Toluca SA de CV), was a family company which manufactured urban passenger buses, using heavy-duty chassis of the Mercedes Benz and International brands. After the imminent bankruptcy of CATOSA, Grupo Collado buys the company to rescue it, but changes its name to Operbus SA de CV. The success of the hiring of the Hunpel SA de CV study was based on the fact that we were able to understand that Operbus, under its state of rebirth, should take the company out of bankruptcy, in order to bring it to a state of financial equilibrium, therefore the proposal was not just selling a new appearance for its old buses, but bringing the company little by little from break even by transforming its existing products into new products through 3 escalating projects, until reaching a brand new bus. Therefore, what was sold was strategic design. The first step was to understand what we should do with the company's best-selling product so that with the least possible investment, we could take it from its current state, to a state of better appearance and functionality.

Objective of the project OB1. Transform the "Cosmos" bus (CATOSA's best-selling vehicle but now completely outdated). In a again salable and profitable vehicle.

Challenges:

a. Analysis of the manufacturing processes to redesign the assembly flow in the line.
b. Visualize and analyze which components could be standardized for both Mercedes and International chassis.
c. Substitution of the manufacturing of components "in house" by components manufactured by an external supplier, to ensure repeatability, quality and avoid being anchored by the poor technology of the plant.
d. Development of qualified suppliers for the development of components under a high-quality but low-production manufacturing process such as vacuum thermoforming of ABS sheet, polymer chrome plating, RIM injection and manufacturing of double-finished FGRP (Fiver Glass Reinforced Plastic) casings.
e. Analysis of the minimum of components that could be changed in the Cosmos bus, but that were sufficiently noticeable to be able to achieve a substantial change in the vehicle that gave the appearance of a completely new vehicle.

f. Creation of a new brand character for the Operbus company, which had solid and recognizable stylistic characteristics, but without neglecting the brand character of the chassis they used: Mercedes Benz and International.
g. Design and development of components and manufacture of prototypes.

After having performed the big analysis, we determined that the relevant changes should be made only on the front-end of the vehicle and into the driver's compartment.

Changes made: Exterior Front:

1. **Front-end body shell.** This part cover the front structure of the vehicle, it holds the windshield and the head-lamp bezels, and works as housing for the front hood.

2. Hood and hood opening mechanism. The hood integrated a removable or interchangeable grill bezel, in case the customer wanted to personalize his vehicle.

3. Front bumper. The front bumper was divided into 3 sections, developed to reduce the cost of repair or change in case of damage.

Driver's compartment:

1. Side service console and lighting switch bezel. This console integrated a cup holder and a multipurpose storage bin, but mainly developed to keep the cell phone and accessories.

2. Instrument panel housing for Mercedes Benz and for International chasis. This part had to be specially developed for each type of chassis. Since the cluster was already attached to the chassis platform. The challenge in this case was designing a piece that could be attached to the standard IP carrier that were also part of the complete dashboard.

3. Interior hood or service cover-gate for engine. This component was the best achievement of the interior, since normally, the paradigm used in all companies was to have an interior engine service cover that can be hinged upwards, which greatly limited access to the engine. In this case, we developed a sliding cover to the side (cross-car), providing a much larger opening, improving the access to the engine, from inside the drivers compartment.

2006, Development of the OB1-EVO project. Once the first vehicle (OB1) has been developed. Phase two, according to the strategic design, was to continue with the mid and rear portions of the vehicle, since the outer front-end, and the driver's compartment had already been developed.

OB1-EVO components:

1. Design of a new lighter and more efficient structure for the passenger compartment and for the rear shell (rear-end of the bus).

2. Interior trim lining, grip tube lay-out and passenger seat lay-out.

3. Design of exterior rear shell (rear end of the bus), with back windshield and rear fascia.

4. Exterior vehicle roof design.

5. Exterior side panel design.

All design and assembly engineering, was developed by Hunpel, supervised by myself.

2007, Development of the OB2 project. For this new vehicle, a total redesign and reengineering of both the exterior front and the driving compartment was carried out. Like the OB1-EVO, the new OB2 used the entire body and rear-end of the OB1-EVO, but now with a radical change to the front-end of the vehicle.

OB2 components:

1. Vehicle front-end: This new front-end was completely different from OB1, it was necessary to achieve a radical change. This new front-end included: New grille with brand nameplate, customized for Mercedes Benz and International chassis. New 4-part sectional fascia, new headlamp bezels, new panoramic windshield and engine filter air intake bezel.

2. The interior of the driving compartment included: New dashboard IP carrier and cluster holder, also customized for both chassis; side console for control buttons and accessory storage bin, and cup holder; Front console for stereo and coin-holder; overhead console with big storage bins and overhead cab panel light.

2008, Exposed rear spare tire support for SEAT Altea Freetrack

This project was developed for the VW Seat Group in collaboration with the Airdesign company. Hunpel was in charge of designing the fixing engineering, structure and mechanisms of the rear fixing arm for the exposed spare tire, while Airdesign was in charge of designing and manufacturing the outer plastics.

The development of this product was originally going to be planned only for sale as an after-market accessory, for sale and installation only in dealers, but it was very successful and therefore it was requested to be designed for production. This make us to design the product to pass the standard durability and vibration validation tests, but to achieve that, the product required the development of approximately 48 prototypes.

The arm was very successful at the end and pilot production of 150 arms were carried out, which were sold to the public. Unfortunately, the Altea Freetrack version vehicle was taken off the market prematurely after its launch due to the great crisis of 2009.

APPENDIX "A" RODZMAS DESIGN AND INNOVATION CONSULTING.

From 2010 to present: At RODZMAS, dozens of projects have been developed, starting from vision and innovation projects to products that are currently selling on the market. Such projects range, such as automotive accessories, construction accessories, laboratory equipment, medical equipment, construction systems, specialized mechanisms, specialized industrial furniture, urban furniture, office furniture, branding, corporate identity projects and multiple projects of innovation applied to mobility products, such as: Modular transportation systems, new platforms, interior design and interior components for mass and alternative mobility projects, autonomous mobility, automotive seat design and passenger transportation seating design and engineering, automotive interfaces (HMI) and the development of new theories and models for the creation of industrial design products.

You can find evidence of all this material in:

www.rodzmas.com
https://www.behance.net/Jorge_Rodz
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