A Proactive Organization for Growth of the **Paper World**

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Amar Elastomers Provides Technologically Advanced Roll Covers for Increased Efficiency

Offering a comprehensive range of new roll covers, Amar Elastomers strives to deliver quality-oriented products to pulp and paper industry. The company went for technical collaboration with SAMCO Inc., USA to develop new generation rolls to meet industry requirements.

From R to L: Mr. Amar Nath Singal, Chairman, and Mr. M.P. Singal, Managing Director, Amar Elastomers Pvt. Ltd.

Offering a comprehensive range of new roll covers, Amar Elastomers strives to deliver quality-oriented products to pulp and paper industry. The company went for technical collaboration with SAMCO Inc., USA to develop new generation rolls to meet industry requirements.

Amar Elastomers has been serving paper industry since 1996, with new and technologically advanced roll covers. Initially, the company started with smaller machine rolls with lesser nip loads and narrower deckle. But to strengthen their presence in the industry and for economic viability, Amar Elastomers stepped out to produce rolls with higher nip loads and wider deckles.

With an absolute renovation of infrastructural capacities in 2013 with expansion of workshop floor area, the company upgraded its CNC drilling software, overhead capacities, and machining capacities. Recently, during an interview Mr. M.P. Singal, Managing Director, Amar Elastomers explained their revolutionary Ceramic rolls and company's future plans. Excerpts:

Q You have been serving the paper industry since long time, so how has been your experience?

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Revolutionizing the Growth of Paper Industry

Mr. R. K. Agarwal, CEO, Amar Elastomers Pvt. Ltd.

As we are aware that over the past few years taking maximum efficiency and output from each individual equipment or component or section of paper manufacturing process has become critical for the sustainability of the paper manufacturing projects. The Indian paper industry has taken due cognizance of this fact by trying to improve products and processes that can meet the newest sustainability parameters. Paper and pulp machines including major components are undergoing considerable modifications keeping in view both the environmental and business sustainability.

Sustainable approach is a long term thought process, which takes care of numerous commitments towards the environment, society and economic dimensions. AMAR ELASTOMERS as an organisation is committed to sustainability so as to meet the need of the present without compromising the ability of future generations.

The Indian paper industry seems to have understood that key growth drivers are sustainability and competitiveness through technology and proper investment decision making. The objectives of the technological improvements today are institute quality improvement, cost competitiveness, resource conservation, and cleaner production. Likewise, there have been significant developments with regards to paper machine rolls in recent times to address issues of efficiency, durability, and machine downtime in case of roll breakdown.

In order to best meet the sustainability criterion, AMAR ELASTOMERS' latest manufacturing technology takes care of parameters such as superb operating performance, low vibration levels, and fewer sheet breaks while developing its high-quality rolls. The long operational life of new rolls is ensured by accurate dimensioning, durable materials, and functional roll design.

As said the word sustainable can perfectly be practised by following the sincere approach towards the subject and by doing the Justice to your produce, as what exactly is needed for the Industry.

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A Paper industry is a basic industry, especially in India. The paper industry has always been growing at a good pace and has a bright future and scope to grow further, especially in the field of packaging. But, sometimes, this industry behaves as a cyclic industry giving seasonal profits yet it has good scope to grow further.

Q What kind of contributions and developments have you made in the industry as a roll manufacturer?

A We started with simple rubber coating but after that we realized the changing needs and requirements of the industry. So, to fulfill these requirements we started developing new coverings and installed latest technologies for the same. We explored new ideas for enhancing the life of rolls. Moving ahead in 2002, we had a technical collaboration with SAMCO Inc., USA for developing new generation covers. We undergo regular development feature for rollers and paper industry, in terms of changing trends in demand for better products and growth of the paper industry.

Q Talking about your most recent development, Ceramic rolls can you tell us something about what was the demand, how much time you took to develop it, and what kind of efforts have you made for the same?

A Ceramic covered rollers are required on machines on central position in bi-nips and tri-nips. Some industries that have high-speed machines are largely dependent on imports of Ceramic covered rolls to meet the requirement. Therefore, we did some research and development so, the use of Ceramic rolls will not be limited to few big companies instead it could be within an easy reach of even general companies. After carefully observing the results and market trends we made continuous efforts in order to further enhance our Ceramic rolls. Finally, we got successful and now Ceramic rolls are easily available for every paper mills in India.

Q Are you planning some more developments in near future?

A Yes, definitely, our philosophy is to have continuous development for betterment of trade and the machinery for future benefits. See there are still many things for which Indian paper industry is dependent on imports and to move ahead with the concept of 'Make in India', we are forced to do continuous development in this domain. Therefore, in order to move forward, we are planning to develop composite or polyurethane and other covering alternatives that may give better results. The roll cover has its own life. With increase in speed of machines, its efficiency also needs to grow so that the downtime of machine can be minimized after installing the roll. Our next major focus is on enhancing the surface life of the roller.

Q How do you go about adding value for the industry especially in context of achieving best of the possible efficiencies?

A The extensive range of products that we develop act as a value addition for the industry. For instance, Ceramic rolls have considerably reduced paper breaks enhancing the overall productivity of the machine, as each and every paper break costs 10-20 minutes. The considerable reduction in between the presses further increases the performance of the machine. Also, the surface life of a roller plays a critical role. The granite or rubber rolls need to be regrinded within 3 to 6 months so, every time when the roll needs to be changed the machine has to face a shutdown of 8 to 15 hours. With the installation of Ceramic rolls this problem has considerably decreased as the Ceramic roll needs to be changed after one year or may be more than that and reduction in downtime had a positive impact on efficiency of the machine.

Q How do you make sure that you offer best service and quality?

A For us quality starts from the selection of raw material which is the base for making quality products. We import best raw material from prestigious manufacturers instead of buying from local agents or distributors. In addition, we have state-of-the-art infrastructure and updated machinery that help us deliver high quality products. And, as far as services are concerned, we are always there for the industry. We have a proper system which records reviews from clients and know their requirements for future references this help us maintain good time schedules. ■

- A way ahead at AMAR ELASTOMERS, we had always tried to optimize the performance of the equipment installed, by correct design approach on installation of components.
- By and large, we study the complete configuration of the paper machine before we recommend installing any of our rolls or coverings on the machine.
- In many of the cases, we had studied and study the wet end of the paper machine for better fibre orientation and drainage, and then would propose and set our roll parameters for the trailing section.
- The golden words by one of the greatest boxers of all times Muhammad Ali are a testament to the verity that if one has a conviction and passion to pursue a dream, turning it to reality would be then easy.
- With a view to realise the enormous potential of the Indian paper manufacturing industry and making the technology accessible for all, AMAR ELASTOMERS stood in support of certain reforms to open the gateway to various roll covers for better sustainability of the rolls.
- The revamped affordable technology allows the domestic industry sector their approach to advanced roll coverings for better performance.
- As an Indian Integrated roll manufacturing unit, we are committed to contribute towards this wave of growth, while we plan to further expand internationally with our latest roll coverings and techniques. ■

Amar Cera, the First Indian Made Ceramic Covered Roll

Amar Elastomers's Ceramic coated press roll is the first such roll to be designed and produced by an Indian company with features such as cover thickness range 0.50 mm-0.75 mm; hardness: 1200 - 1500 Hv 0.3; surface finish: 0.6 – 0.8 Ra; and run Out & concentricity: less than 30 Microns. These features may be customized as per the customers' specifications.

Running life of roll depends on several factors which have been addressed in the first time indigenously made 'Amar Cera'. With Amar Cera's Ceramic coatings, the centre press roll (Binip Press) runnability is noticeably improved because of better surface ingredients and physical properties which enhance the centre roll performance. Amar Cera's distinct coating parameters also influence the water film characteristics formed in between the web and coating, forcing good sheet release. On the other hand, the physical properties of coating materials have a direct effect on the behavior of water on the coated surface (hydrophilic/ hydrophobic) as well as its tendency to attract or repel binders, pigments, stickles, and other impurities. "Amar-Cera" coatings can also be customized with respect to its chemical composition for different rolls of paper mills.

Amar Cera in brief:

Cover Thickness	: 0.50 mm to 0.75 mm
Hardness	: 1200 - 1500 Hv 0.3
Surface Finish	: 0.6 – 0.8 Ra
Run Out & Concentricity	: Less Than 30 Microns

Giving a presentation on the newly introduced Ceramic coated press roll, **Mr. R. K. Agarwal, CEO, Amar**

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A Long Journey Travelled, Longer to Go...

Since the inception in 1996, AMAR ELASTOMERS has been continuously fighting with the odds of the industry for better sustainability of new and technological advanced roll covers. In fact, it started its journey in 1977, when Mr. A. N. Singal laid the foundation of AMAR ALLIED WORKS in Wazirpur Industrial Area, Delhi for manufacturing rubber covered rolls for paper machines. Later on Mr. A. N. Singal introduced his son Mr. M. P. Singal, under whose hard work the company flourished and expanded. Their constant hard work gave birth to an upgraded facility of around 3,300 square meter covered area at Kundli (District Sonepat, Haryana) in 1996.

Initially, the company registered its presence in smaller machine rolls with lesser nip loads and narrower deckle. But to mark the presence in the Industry and for economic viability, the company stepped out to deal with the so called A-grade mills with wider deckles.

With such a background and with no quality certification, AMAR ELASTOMERS bagged the first wider deckle roll order in 1999 from Orient Paper Mills, Amlai, which was successfully delivered and commissioned. This was followed with procuring the orders from Rama Newsprint, Surat and Century Pulp & Paper PM#3, Lalkua in 2000. These orders encouraged the company to enhance the infrastructural capacities.

MAJOR MILESTONES :

1977 — AMAR ELASTOMERS began its journey in 1977 as AMAR ALLIED WORKS in Delhi.

1996 — Foundation of an upgraded facility over an area of 3,300 sq m at Kundli, Haryana.

1999 — Bagged the order for first wider deckle roll from Orient Paper Mills, Amlai.

2002 — Went for wider grinding and machining facility to deliver quality oriented products.

2002 — The company went for a technical collaboration with SAMCI Inc., USA and installed the CNC multi-spindle drilling facility for press rolls and suction rolls.

2011 — Commissioning of the steel melting shop for the in house requirement of graded cast iron shell for manufacturing heavy duty press rolls.

2013 — Absolute renovation of infrastructural capacities in 2013 with expansion of workshop floor area.

2016 — Crossed the milestone of delivering 100 big press rolls to paper machines across country.

2016 — Announced the successful commissioning of India's first manufactured '*Ceramic covered roll mounted on bi-nip press position*'.

AMAR ELASTOMERS then went for wider grinding facility and machining facility in 2002, so as to deliver the quality oriented product to the paper machines. It should be appreciated that Mr. M. P. Singal, Managing Director of the company always dreamt of integrated rubber roll manufacturing unit. In this endeavour, the company went for a technical collaboration with SAMCO Inc., USA and installed the CNC multi-spindle drilling facility for press rolls and suction rolls.

On the other hand, the basic engineering infrastructural development as far as human resources are concerned was also on the agenda. Keeping in view, experienced engineers from reputed design organisations and manufacturing industry were engaged. The joint team effort of design, manufacturing and sales paved the way for a good future ahead for AMAR ELASTOMERS. There happened to be a massive decision for commissioning the steel melting shop for the in house requirement of graded cast iron shell for manufacturing heavy duty press rolls in 2011.

AMAR ELASTOMERS went for an absolute renovation of infrastructural capacities in 2013 with expansion of workshop floor area. The CNC drilling software was upgraded with more advanced roll handling station. The overhead capacities and the machining capacities were also upgraded in the process.

Today, AMAR ELASTOMERS is proud to announce the successful commissioning of India's first manufactured *'Ceramic covered roll mounted on bi-nip press position'*. Also, it enjoys the expertise of delivering and commissioning more than 100 heavy duty press rolls n India.

As known, the upgraded facility of Amar Elastomer was established in 1996 over an area of around 3,300 square meter at Kundli (Distt: Sonepat), Haryana in 1996. A new chapter was added by setting up of Precise Castings in 2009 at its second facility at Kashipur, where the entire heavy duty graded cast iron shell of press rolls are casted. This second facility has a covered area of 5050 square meters, thus making the Amar Group as a integral manufacturing unit of integrated rubber roller manufacturing unit, right from steel casting of shells to rubber coverings.

Amar Elastomers today can handle rolls with specifications weight: 40 tons; total length of roll: 9.5 m; face length of roll: 7.0 m; and diameter: 1.8 m. The company produces felt rolls, wire return rolls, breast rolls, couch rolls, press rolls, blind drilled press rolls, suction press rolls, hard cover sam rock rolls, and Ceramic covered press rolls.

Manufacturing Facilities:

Works: KUNDLI

- Lathes of companies like WMW, SAFOP, SKODA, BINS & BERRY.
- Horizontal boring machine of COLLET, TOSS.
- Cylindrical grinders of WALDRICH SIEGEN, HERCULES.
- Rubber strip coater of ITALAMICA, ITALY.
- CNC multi spindle drilling machine, maintained on BOSCH.

Works: KASHIPUR

- Steel melting induction furnace of INDUCTOTHERM.
- Heavy duty lathe machines for internal boring of shells & outer diameter machining of shells.

ROLL COVERS

AQUAVENT NX

Roll Position	:	Grooved Press Rolls
Hardness P&J	:	0-15
Temperature	:	250 Deg. F
Cover Thickness	:	1/2" - 1"

BLACK ROCK

Roll Position	:	Wire Rolls Felt Rolls Wringer Rolls Breast Rolls Table Rolls Carrying Rolls Guide Rolls
Hardness, P&J	:	0-1
Temperature	:	225 Deg. F
Cover Thickness	:	1/4" - 1"

DWELL KOTE NX

Roll Position	:	Size Press Gate Rolls Coating Backing Rolls Blade Coating Rolls Applicator Rolls
Hardness, P&J	:	25-120
Temperature	:	250 Deg. F
Cover Thickness	:	3/4" - $1^{1/4}$"

DWELLPRESS NX

Roll Position	:	Suction Press Rolls Blind Drilled Pressure Rolls Blind Drilled Suction Press Rolls Yankee Pressure Rolls
Hardness, P&J	:	4-50
Temperature	:	250 Deg. F
Cover Thickness	:	3/4 - 1"

SAMDRIVE RX

Roll Position	:	Wire Drive Rolls
Hardness, P&J	:	10-50
Temperature	:	250 Deg. F
Cover Thickness	:	1/4" - $1^{1/4}$"

SAMDRIVE NX

Roll Position	:	Wire Turning Rolls Breast Rolls
Hardness, P&J	:	10-50
Temperature	:	250 Deg. F
Cover Thickness	:	1/4" - $1^{1/4}$"

SAMPRESS NX

Roll Position	:	Suction Press Rolls Blind Drilled Pressure Rolls Press Rolls Yankee Pressure Rolls
Hardness, P&J	:	10-50
Temperature	:	250 Deg. F
Cover Thickness	:	3/4" - 1"

SAMROCK

Roll Position	:	Hard Plain Press Rolls Hard Size Press Rolls Hard Smoothing Press Rolls Centre Press Rolls
Hardness, P&J	:	0-2
Temperature	:	230 Deg. F
Cover Thickness	:	1/2" - 3/4"

SAMROCK NTX

Roll Position	:	Hard Plain Press Rolls Hard Size Press Rolls Hard Smoothing Press Rolls Centre Press Rolls
Hardness, P&J	:	0-1
Temperature	:	230 Deg. F
Cover Thickness	:	1/2" - 3/4"

SAMSIZE NX

Roll Position	:	Soft Size Press Rolls Soft Smoothing Press Rolls
Hardness, P&J	:	10-50
Temperature	:	250 Deg. F
Cover Thickness	:	1/4" - $1^{1/4}$"

Elastomers said, "The press section is the heart of the paper machine, and excellent roll cover performance in the press section is crucial. Therefore, coating materials and technologies are constantly being developed to meet the ever-increasing demands of paper-making process. Release of the paper web from the centre roll is one of the most important factor influencing the runablity of the press section and of the whole paper machine. Hence, the manufacturing technology and the raw materials used in making Ceramic centre roll coatings are continuously under research in order to develop coating solutions with enhanced release properties. 'Amar Cera' is a response to all the research done for improving the performance of press section, with an excellent outcome."

The most important parameters of the centre roll coating, viz. topography and the long term stability of the topography have been duly addressed in 'Amar Cera'. The surface roughness of the coating is a combination of the macro roughness achieved in grinding and the micro roughness that is dependent on the pore structure within the Ceramic Coating – which, again is affected by the coating process and raw material. The surface topography has a major effect on the web's tendency to adhere to the roll cover. The other typical parameter in 'Amar Cera' affecting the sheet release property is the hydrophilic/hydrophobic nature of the material, i.e. the wettability of the coating.

- For the first time in India, a Ceramic cover on a centre press roll application is developed, manufactured and installed on a bi-nip machine by Shah Pulp & Paper Mills Ltd.
- Amar Cera facilitates a very good sheet release
- It reduces draw to your second press
- The runability of the machine increases and as a result the stiffness of also paper increases
- A definite gain on drainage and hence on dryness
- Results in lowering the load at drying section
- Less wear of doctor blades, increasing the changing interval duration
- Better grinding life, may be up to 2 years, resulting in lesser downtime ■

Edge Cracking, the Major Drawback to the Performance of Drilled Press Roll Cover

Determining how the web gets formed and compacted from forming section to press section appears to be a fairly simple task. However, lot of factor must be taken into consideration if the process has to minimise problems and if the result of the processing has to be the best possible.

Edge cracks are more common and can be due to the rubber cover being cooler at the edges, where it is not in contact with the felt and the paper. So the edges should be ground down from 2-3%. The section of the roll lying outside the suction zone can furthermore be blind drilled; this will make the ends just as compressible as the rest of the roll.

Determining how the web gets formed and compacted from forming section to press section appears to be a fairly simple task. However, lot of factor must be taken into consideration if the process has to minimise problems and if the result of the processing has to be the best possible.

The paper web formed in the forming section passes onto the press section and this is followed by the pressing of the web on the paper machine through the nip of two rolls running under pressure. This effect of pressure in nip between the two rolls further removes the water, thus improving the compactness and strength. The pressing operation is critical and important as it relates to the economics of a paper machine and accordingly determines the dryness of the sheet entering the dryer section.

Now, to be more precise the design and the number of nips are most important to critically define a press section. It should be noted in this context that maximum removal of water in forming and press section is more economical, then to remove it in dryer section.

Making the press design should be more stressed for:

- Graduation of dryness in nip.
- Less no. of nip with highest possible dryness has to be achieved.
- Unnecessary fibre crush or distortion should be avoided, as it affects the paper quality.
- Rigidity of press structure and press rolls enhances the run ability of paper in press section.
- And of course, the fabric handling easiness is to be ensured.

Technicians and Paper Makers claim to achieve a dryness level of 36-55% in this Press Section, which categorically is governed by the above detailed parameters.

Moving on the subject, a better and optimum roll cover of a press section should be:

- ✓ Resistant
- ✓ Durable
- ✓ Efficient
- ✓ Economical

Amar Elastomers, over the study of several years, has computed the Blind Drilled Press Roll Cover, nomenclature as "DWELLPRESS" which had been significantly designed, keeping almost the entire design parameters.

- ✓ The overall hardness uniformity of the cover results to better wear stability at higher nip pressure. This results to uniform and maintains more efficient nip

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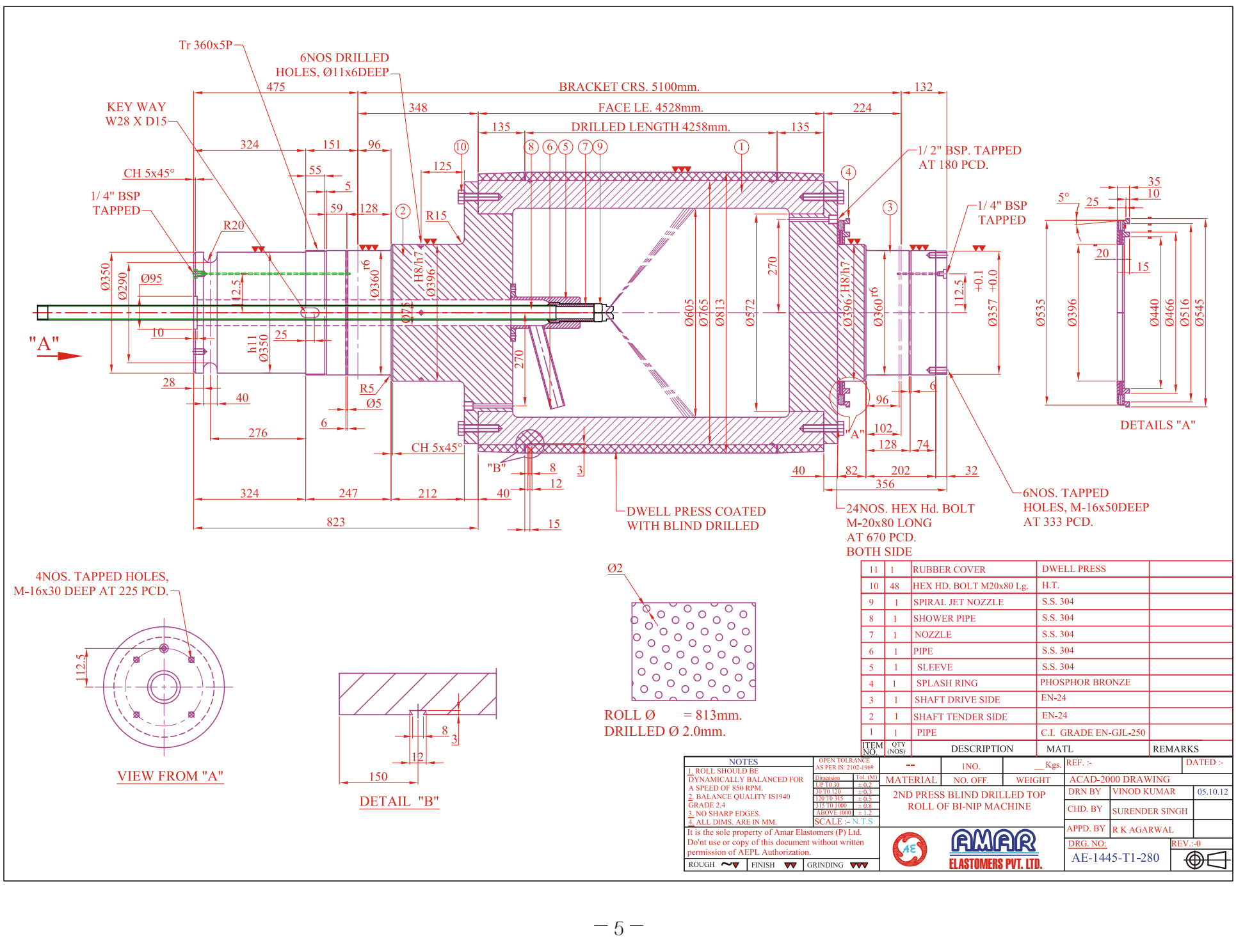

ITEM NO.	QTY (NOS)	DESCRIPTION	MATL	REMARKS
11	1	RUBBER COVER	DWELL PRESS	
10	48	HEX HD. BOLT M20x80 Lg.	H.T.	
9	1	SPIRAL JET NOZZLE	S.S. 304	
8	1	SHOWER PIPE	S.S. 304	
7	1	NOZZLE	S.S. 304	
6	1	PIPE	S.S. 304	
5	1	SLEEVE	S.S. 304	
4	1	SPLASH RING	PHOSPHOR BRONZE	
3	1	SHAFT DRIVE SIDE	EN-24	
2	1	SHAFT TENDER SIDE	EN-24	
1	1	PIPE	C.I. GRADE EN-GJL-250	

NOTES
1. ROLL SHOULD BE DYNAMICALLY BALANCED FOR A SPEED OF 850 RPM.
2. BALANCE QUALITY IS1940 GRADE 2.4
3. NO SHARP EDGES.
4. ALL DIMS. ARE IN MM.

OPEN TOLRANCE AS PER IS: 2102-1969

Dimension	Tol. (M)
UP TO 30	± 0.2
30 TO 120	± 0.3
120 TO 315	± 0.5
315 TO 1000	± 0.8
ABOVE 1000	± 1.2

SCALE :- N.T.S

--	1NO.	__ Kgs.	REF. :-	DATED :-
MATERIAL	NO. OFF.	WEIGHT	ACAD-2000 DRAWING	

2ND PRESS BLIND DRILLED TOP ROLL OF BI-NIP MACHINE

DRN BY	VINOD KUMAR	05.10.12
CHD. BY	SURENDER SINGH	
APPD. BY	R K AGARWAL	

DRG. NO: AE-1445-T1-280 REV.:-0

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ROUGH ~▽ FINISH ▽▽ GRINDING ▽▽▽

AMAR ELASTOMERS PVT. LTD.

pressure throughout the nip width and in the cross directional length of the roll.

- ✓ Programmed drilling pattern(diameter and pitch) helps paper makers for optimal quality of paper. Basically the nip pressure to be applied on what grade of paper makes our technician to get this pattern programmed for the Press Section.
- ✓ Next comes the uniformity in the dewatering i.e. the cross directional dryness/moisture profile, which is thus maintained as a result of uniform hardness and the drill pattern.
- ✓ Selection and maintaining the thickness of the rubber cover, also improves the dynamic stability of the cover.
- ✓ In recent days the edge crack on the drilled rolls has raised as a major problem and tremendously reduced the overall life and performance of the roll covers.A recent study done by us on number of high speed machines and higher nip loaded Press Section has made it clear that proper edge relief and end dub is more important and critical to avoid end cracking of drilled rolls. The combination of the selection of rubber cover thickness and the edge relief/ end dub constitute to a good programmed cover, resulting to prolonged life of the cover. We had tried to follow the studies done by the experts and technicians in the past by keeping the edge relief in the range of 1.5 to 2% of the total face length and surprisingly it resulted good as on higher rubber displacements, the rubber cover gets better margin to get accommodated for a uniform nip profile.

Results show that betterment in the reduction in sheet moisture in a level of 2-4% has been observed, which of course a big energy is saving as compared to get it done in drying section. As a result of higher dryness achievement, the productivity increases. Keeping the designed parameters in consideration, even nip profile helps to avoid paper crushing in the nip.

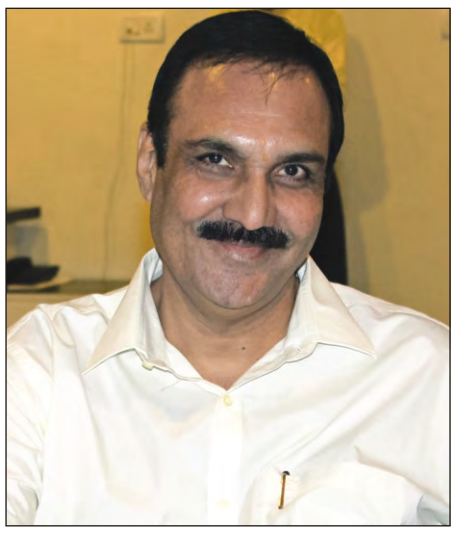
To summarize, rubber cover design management – using the tools of hardness, drill pattern, thickness of cover, compound material and edge relief – optimizes the performance of a drilled rubber covered roll. Correct choice of press design and rolls, use of supplier expertise and most important, understanding of the theory can make significant contributions to production efficiency. ■

Shah Pulp & Paper Installs First Indigenously Made Ceramic Covered Press Roll

The Vapi based company obtains positive results from the Ceramic covered press rolls installed in its paper machines. The new rolls have been supplied by Amar Elastomers, which became the first Indian company to design and manufacture Ceramic coated press rolls.

Shah Pulp and Paper Mills Limited, incorporated in 1993 as a newsprint maker, now produces a variety of kraft (paper and board), newsprint, and writing & printing (W&P) paper and is a major recycled fiber based manufacturer in India. The company is also known for adoption of best practices and technology to improve its mill operations, environmental footprint, and product quality.

As one of the lowest water consumer mills around Vapi area, the company has recently installed Ceramic coated press rolls, first time made in India and made by Amar Elastomers. It arranged an open house to celebrate and discuss the recent installation where the supplier and other few mills were also present. Speaking on the occasion, **Mr. Mahendra Bhai Shah, MD, Shah Pulp and Paper Mills** said, "I had heard that Ceramic rolls are not manufactured in India. The cost of the rolls after adding the cost of import was beyond the imagination for a unit like us. Then, we had a word with Mr. R. K. Agarwal, who has recently designed the first



Mr. Mahendra Bhai Shah

indigenous Ceramic coated press roll and after getting convinced I gave a go ahead."

On the installation of Ceramic covered rolls, **Mr. R. H. K. Sinha, Director-Technical, Shah Pulp & Paper Mills Limited**, said, "We had a number of troubles with granite rolls where you need to grind it every 2-3 months increasing the downtime of the machine in the absence of rolls. Moreover, there were issues with doctor and doctor blades too and frequent changing of doctor blades contributed to downtime affecting the production. With the Ceramic coated rollers these problems have considerably reduced. With these new rollers, we are getting a good life and excellent roll cover performance in the press section, which is crucial as the press section is the heart of the paper machine."

"Moreover, with the Ceramic coatings, the centre press (binip press) runnability has improved.

Mr. R. H. K. Sinha

The coating parameters has also affected the water film characteristics formed between the web and coating, resulting in good sheet release. These are some of the benefits that we are getting with the new Ceramic covered press rolls," he added.

The physical properties of coating materials have a direct effect on the behavior of water on the coated surface (hydrophilic/hydrophobic) as well as its tendency to attract or repel binders, pigments, stickles, and other impurities. This fundamental understanding has been utilized in development of "Amar-Cera" (the Ceramic rolls by Amar Elastomers) coatings and in customizing its chemical composition for different rolls of paper mills.

When asked about the potential benefits one is going to get from these Ceramic covered rolls, Mr. R. H. K. Sinha said, "First of all, we know for certain that the downtime we have been facing every three or six months because of roll or roll cover change is going to reduce significantly. Not to say, the productivity would go up because of that. Moreover, the downtime owing to doctor blade changing is also expected to come down considerably with these rolls. Another advantage that we are witnessing is doctor passing breaks have also been lesser and this is critical when you are making lightweight paper around 50gsm. The draw between the presses has reduced resulting in lesser breaks, again a gain on productivity side. So, these are some of the benefits that we either hope to get or are getting from the installation of Ceramic coated press rolls."

The new Ceramic press rolls are guaranteed to give better sheet release, reduced draw to the second press, increased runability of the machine giving higher stiffness to the paper, gain on drainage hence more dryness, lower load at drying section, less wear of doctor blades and, of course, better grinding life, may be up to 2 years, resulting in lesser downtime. ■

Approach Towards Optimisation of Performance On Wire Table

– R K Agarwal

The content of this discussion is based on the vast study and experience on various paper machines and also includes the various references from the studies of various experts from the Industry.

One of the most requested improvements from papermakers is to help to improve formation along with drainage. Unfortunately there is no single or simple answer to this. It is a question of examining and optimising each contributing factor in turn to gain small improvements from each.

The keys to achieving good formation are: -

- Achieve a uniform suspension of fibres at the slice. Any flocs must be small and should not be allowed to compact together as these are more difficult to break up.
- Use the lowest practicable consistency. This will result in the flocs taking longer to form as the individual fibres are further apart. Stock will travel further from the slice before re-flocculation occurs and preventative measures can be taken earlier and with more effect.
- Create lateral shear forces in the suspension. These help to break up flocs, tearing them away from the fibre mat and putting them back into suspension.
- Create the correct amount of turbulence at each point during the dewatering phase to prevent re-flocculation.

To Achieve fibre suspension at the slice

The head box delivers a stock flow that is not only even in consistency, speed and thickness, but also has passed through and over various devices designed to create shear forces in the stock by adding turbulence to the flow. Cellulose fibres are mutually attracted by chemical and electrical effects and since every fibre collides with 5000 other fibres every second the speed at which flocs can form can be very fast. Some technical papers suggest speeds of 0.01 seconds for long fibres at high consistencies. During this time the stock will only travel 13cm. It is therefore possible that some flocs can start to form in the slice flow before the stock meets the forming fabric, with many more formed over the forming board and initial formation zone.

To use the lowest consistency

Keeping the consistency as low as possible separates the fibres, giving the turbulence more time to act on the stock. More energy is used in prevention and less in breaking apart existing flocs. Unfortunately the stock approach and head box have limitations on the quantity of water that can be moved around, and on machines that have been uprated for speed, this is often a limiting factor.

To create lateral shear forces in the suspension

In the past most paper machines had shake mechanisms that introduced lateral shear into the stock at about 5Hz and formation was good. These machines ran at slow speed and today it is impossible to shake a wet end at effective speeds. Instead vertical movement of the stock is created and the collapsing peaks create lateral movement on a micro scale, hence micro turbulence.

Correct amount of turbulence at each point

Once the flocs have formed it takes a lot of energy to break them up. It is better to prevent them from reaching flocs by providing a continuous supply of energy 'pulses' or waves in the stock. There are a number of devices claiming to add turbulence to the stock. Some affect the slice flow but more are variants on the principle of passing the forming fabric over dewatering blades with a divergent angle cut onto the back surface.

Basic Principles

FOURDRINIER MACHINES

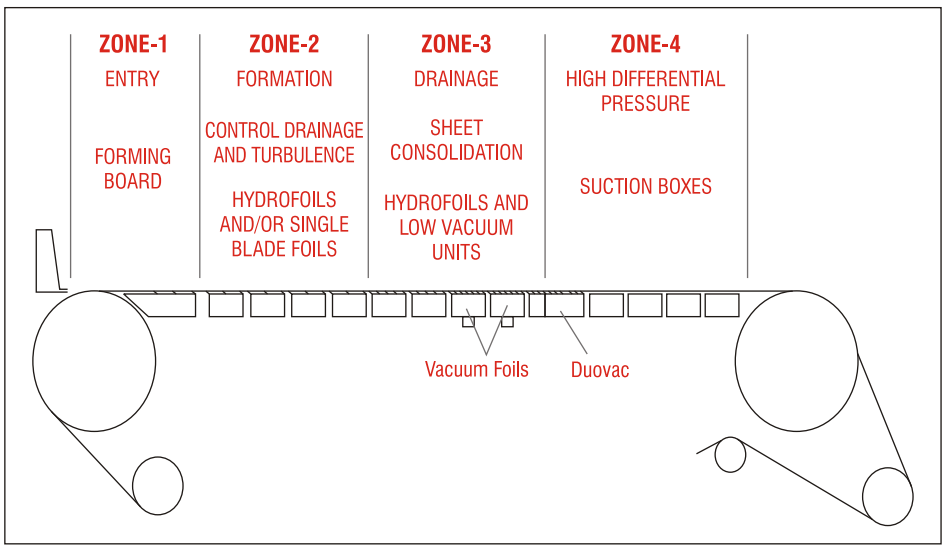
The dewatering of a sheet on a fourdrinier machine takes place in four distinct phase: -

ZONE 1 – THE ENTRY ZONE

The head box should be capable of delivering a uniform stock jet with well dispersed fibres. The jet should be projected onto the fabric at as small an angle as possible to minimise disturbance to the dilute fibre suspension.

A Forming Board is used to:

- Provide support for fabric at the point where the jet lands
- Prevent too rapid drainage in the first few centimetres of travel causing sheet sealing
- Change the velocity of the jet



ZONE 2 – FORMATION

Control of water removal is critical in the formation zone. Excessively high or low water removal rates can cause trouble and increase two-sidedness. Gentle drainage with carefully controlled turbulence is required to achieve good formation, smooth variations coming from the headbox and keep the fibre mat open.

Excessive turbulence, such as a table roll can give, tends to flood the sheet and loosen the fine fibres and fillers which are then drawn through the fabric by the vacuum created as the roll rotates away from the fabric surface. This effect is magnified as the machine speed increases. Alternatively, excessively rapid drainage in this area will compact the fibre mat making further drainage difficult – this known as sheet sealing.

ZONE 3 – DRAINAGE

Once the sheet is set process of consolidation can begin; drainage force is increased progressively introducing Vacuumfoils and Duovac units – low vacuum foils – which are designed to provide a smooth transition for the sheet from the gentle foil action to the heavy drainage forces developed over the dry suction boxes.

ZONE 4 – HIGH DIFFERENTIAL PRESSURE STAGE

At the dry line the water is removed from the majority of the capillaries in the fibre mat (not in the individual fibres) and numerous air passages through the mat from top to bottom.

At this point low vacuum are no longer effective in removing water and it is necessary to use large volumes of air to wipe the water from the fibre surfaces and crossovers. The high differential pressure created tends to further compact the sheet, closing the capillaries and making the air flow more effective in carrying water out of the sheet. Here again the pulsing of suction box vacuum from slot-to-slot and box-to-box causes a continuing compression and relaxation of the sheet, resulting in a final sheet strong enough to overcome sheet transfer tensions, draw and pressing forces.

We should understand that the objective of the forming process i.e. Head to couch, which is normally spelled as "Wet End" is to produce a sheet of paper, in which fibres are uniformly distributed and the surfaces are smooth and uniform. ■

Next Generation Cover with Wider Spectrum of Applications

AMAR ELASTOMERS is passionate to announce the launch of its new range of composite covering on various applications on rolls.

AMARTIGER composite is a high wear resistant cover for long regrinding intervals. This new cover provides paper makers a long series of benefits for trouble free paper calendaring.

Cover Hardness	:	90-92 Degree Shore D
Cover Thickness	:	8-12mm
Maximum Temperature	:	140 Degree C
Surface Roughness	:	0.6-0.8 Micron
Maximum Loading	:	500KN/m

Customer Speaks / Testimonials

The work of Amar Elastomers is quite satisfactory and they deliver quality products within scheduled time period. Their products are in-line with our company's specifications. They offer good services and take immediate action against calls to solve the issues as early as possible. And today, industry wants good service so if they maintain same level of services then they would definitely grow.

-Mr. S.K. Jain, Senior President,
Emami Paper Mills Ltd

We have procured rolls from Amar Elastomers for some of our projects and have found that their quality and workmanship are very good. They have a good manufacturing facility and the rolls are subject to stringent quality tests at each stage of manufacture. They endeavor their best to adhere to the committed delivery period. We have registered them as one of our valued suppliers of paper machine rolls.

- Mr. S. Ravi Shankar, Vice President,
Arjun Technologies (I) Ltd.

I came across Amar Elastomers while doing some project with ITC. They are always keen to learn something better and do something better. We have done two or three small projects with them and they have been very responding. The positive approach and attitude towards every problem will take the company to greater heights. Amar Elastomers always try to improvise on their in-house capabilities, housekeeping and safety systems that could give them better outcome. Also, I would like to add that they are very cost competitive.

-Mr. Rakesh Gupta, Paper Mill Consultant,
Ex-General Manager-Projects,
ITC Ltd. -PSPD

Amar Elastomers are good suppliers with regard to quality and product innovation. In case of some problem related to runnability or life of roll coverings, they have technical capability to resolve such issues. In addition to the deliveries as per agreed dates, customer emergencies are being taken care at Amar Elastomer by redefining production schedules.

-Mr. Atul Sharma, General Manager,
Ballarpur Industries Limited (BILT)

As per our experience, quality of products and services is good. And being a great technocrat himself, Mr. Rajiv Agarwal understands all the problems and acts accordingly as per the requirement. Amar Elastomers believe in maintaining good rapport and communication with clients which helps in solving almost any type of problem with utter ease.

-Mr. RHK Sinha, Director Technical,
Shah Paper Mills Ltd.

It is really a very good initiative by Mr. R. K. Agarwal of Amar Elastomer Pvt Ltd which will help the paper industry in a long way particularly medium scale industry.

-Mr. AC Mittal,
Paper Consultant

Amar Elastomers have always been aggressive to develop innovative products with quality aid of technically sound management and their team which results fruitful for their customers.

- Mr. JK Sharma, Director,
Saloni Engineering Works